Broken Hill Operations Pty Ltd ABN 95 103 555 862

Annual Environmental Management Report

16 December 2014 to December 31 2015

TITLE BLOCK

Name of Mine:	**Rasp Mine**
Mining Titles / Leases:	**Consolidated Mining Lease 7, Broken Hill** **MPLs 183, 184, 185, 186**
MOP Commencement Date 16/12/14 **AEMR Commencement Date 16/12/14**	**MOP Completion date 31/10/15 (New MOP has been submitted, awaiting approval)** **AEMR End Date 31/12/15**
Name of Leaseholder:	**Broken Hill Operations Pty Ltd**
Name of Mine Operator:	**Broken Hill Operations Pty Ltd**
Reporting Officer:	**Leonard Sharp**
Title	**Environment Officer**
Signature	 **……**
Date	**15/03/2016**

PLANS

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FIGURES

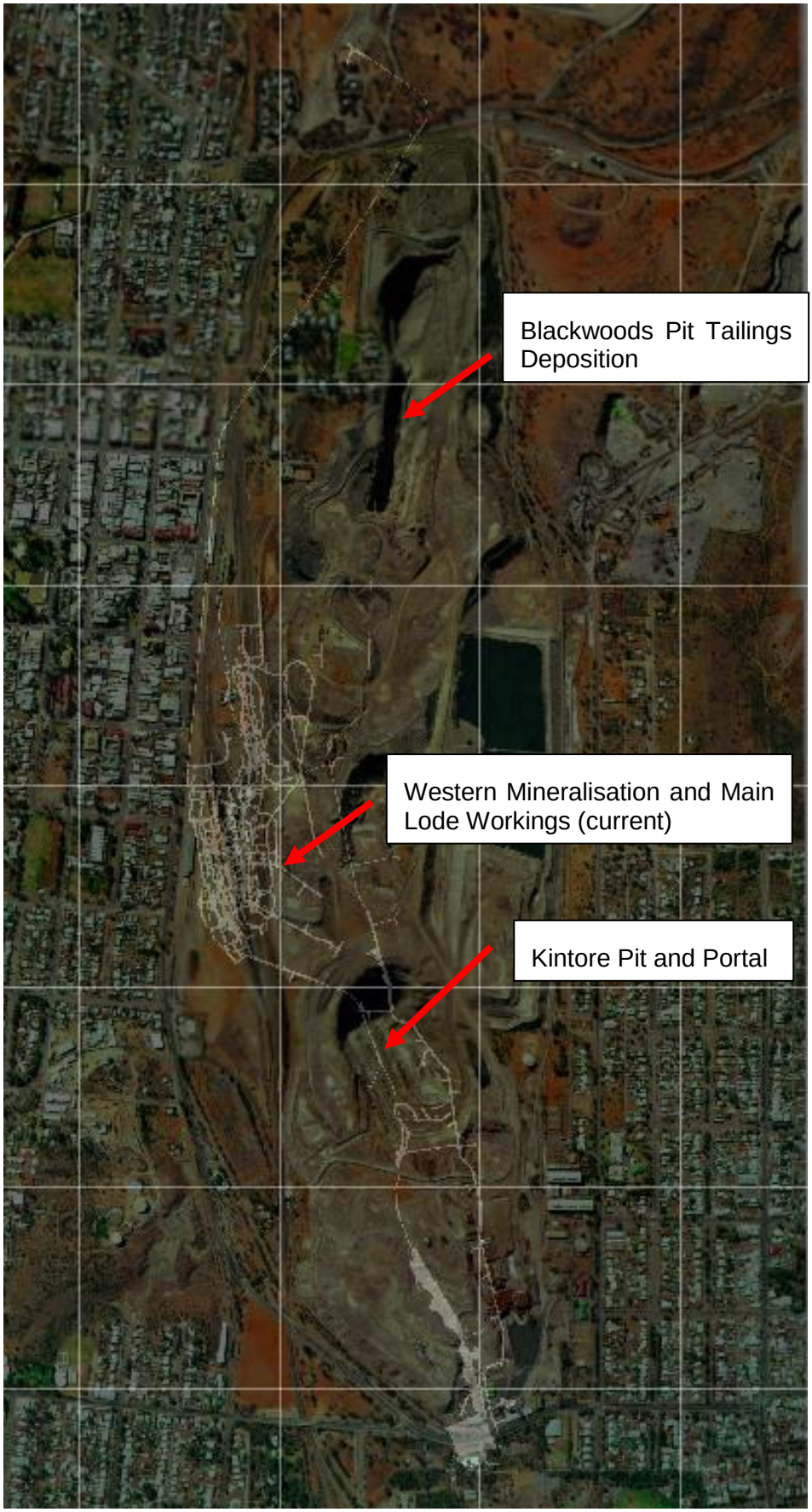
TABLES

Plans

Land Preparation

No clearing of undisturbed land was undertaken during the reporting period.

Mining Activities (Overview)



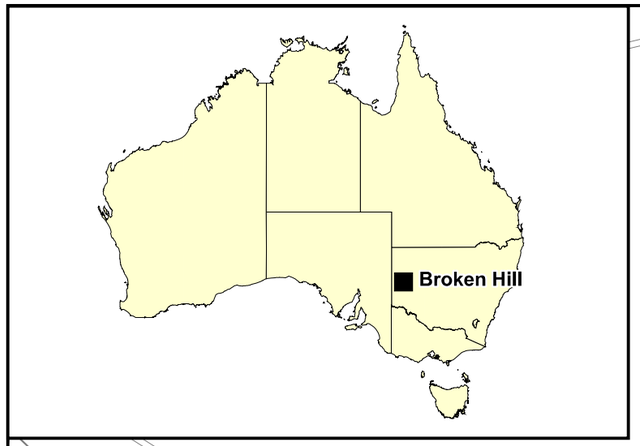
Mining Activities (contd.)

The following plans are as submitted in the current BHOP MOP. The latest MOP was amended and submitted to DRE 25/2/2016 and is yet to be approved.

List of Plans

Plan 1A	Project locality
Plan 1B & C	Natural Environment & Built Environment
Plan 2	Mine Domains
Plan 3, 3A, 3B, 3C Primary/secondary	Mining Rehabilitation
Plan 4	Final Rehabilitation and Post Mining Land Use

Plan 1A Project Locality



CML7

MUNICIPAL BOUNDARY

PROJECT: **BHO CBH Rasp Mine Closure Plan**

TITLE: Location of BHO CBH - Rasp Mine

DATE: 8th July 2015 **SCALE:** 1:60,000 at A3

DATA SOURCE:

-1 0 1 2

Kilometres

Mining Titles, Cadstre and Local Government Areas supplied by the NSW Government

LEGEND

- CML7
- Perilya
- Property Boundary
- Broken Hill City Council

Broken Hill Operations Pty Ltd
CBH Resources – Rasp Mine
130 Eyre Street
BROKEN HILL NSW 2880

MGA94 Zone 54

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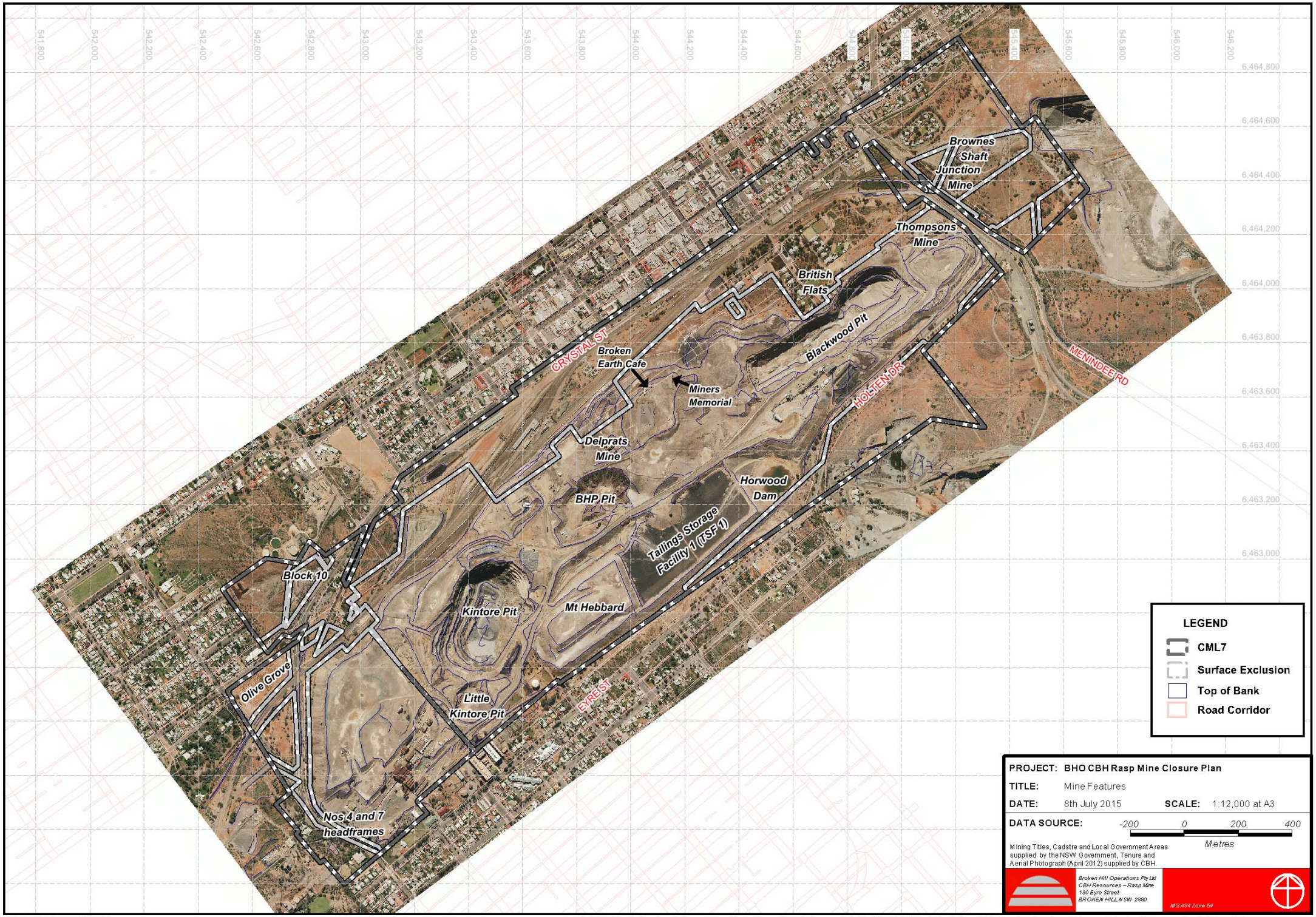
Plan 1B & C Natural Environment & Built Environment



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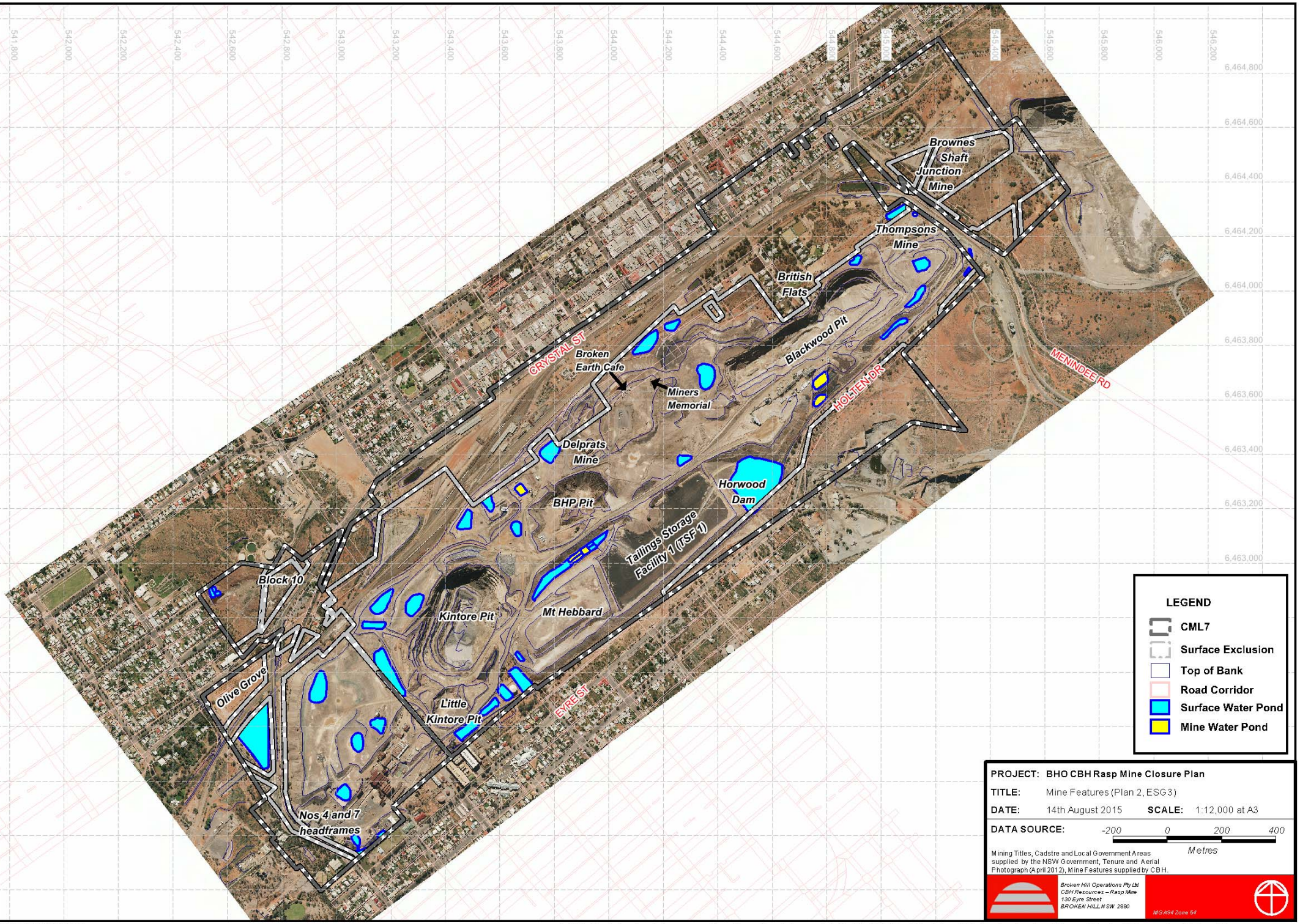
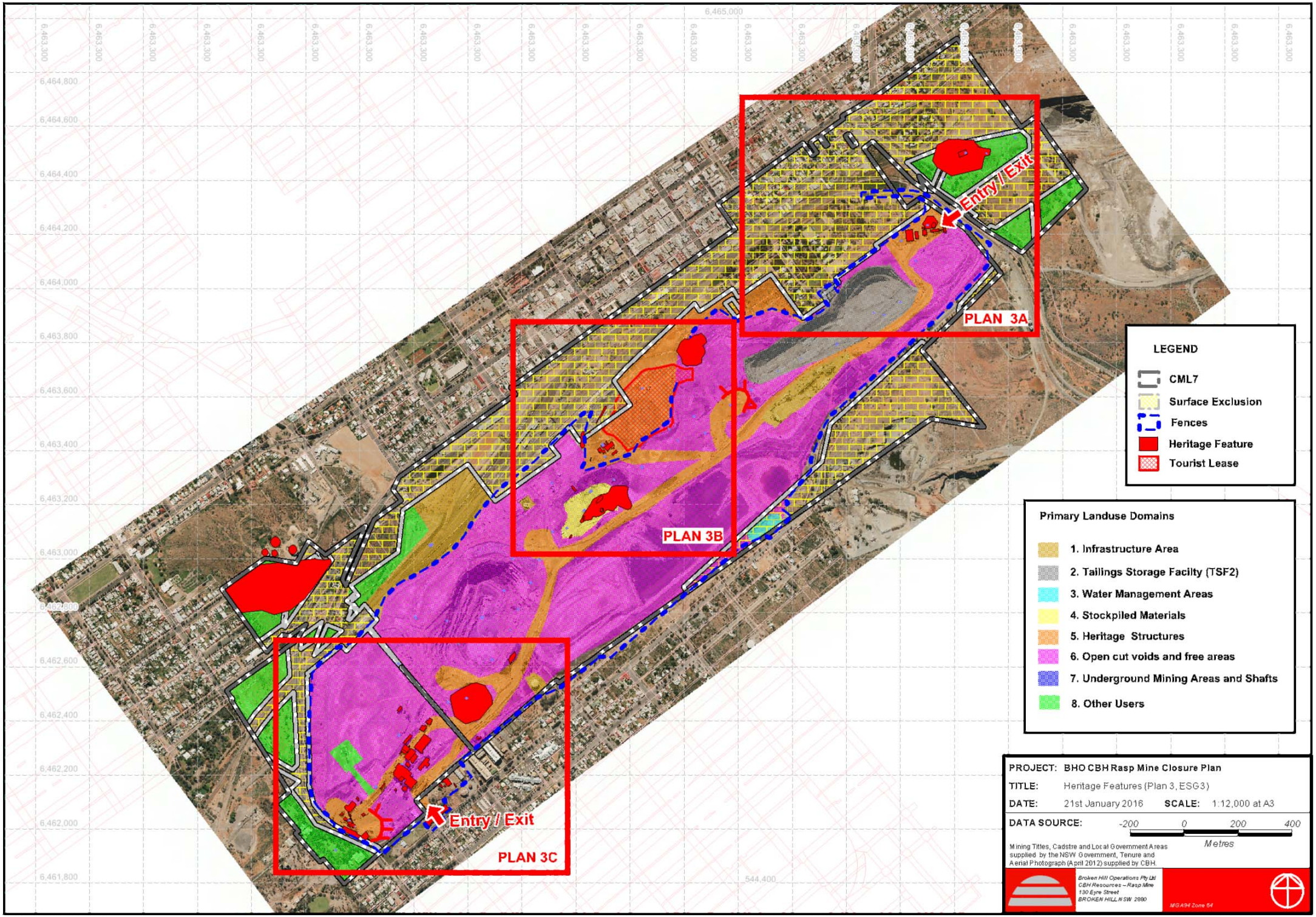
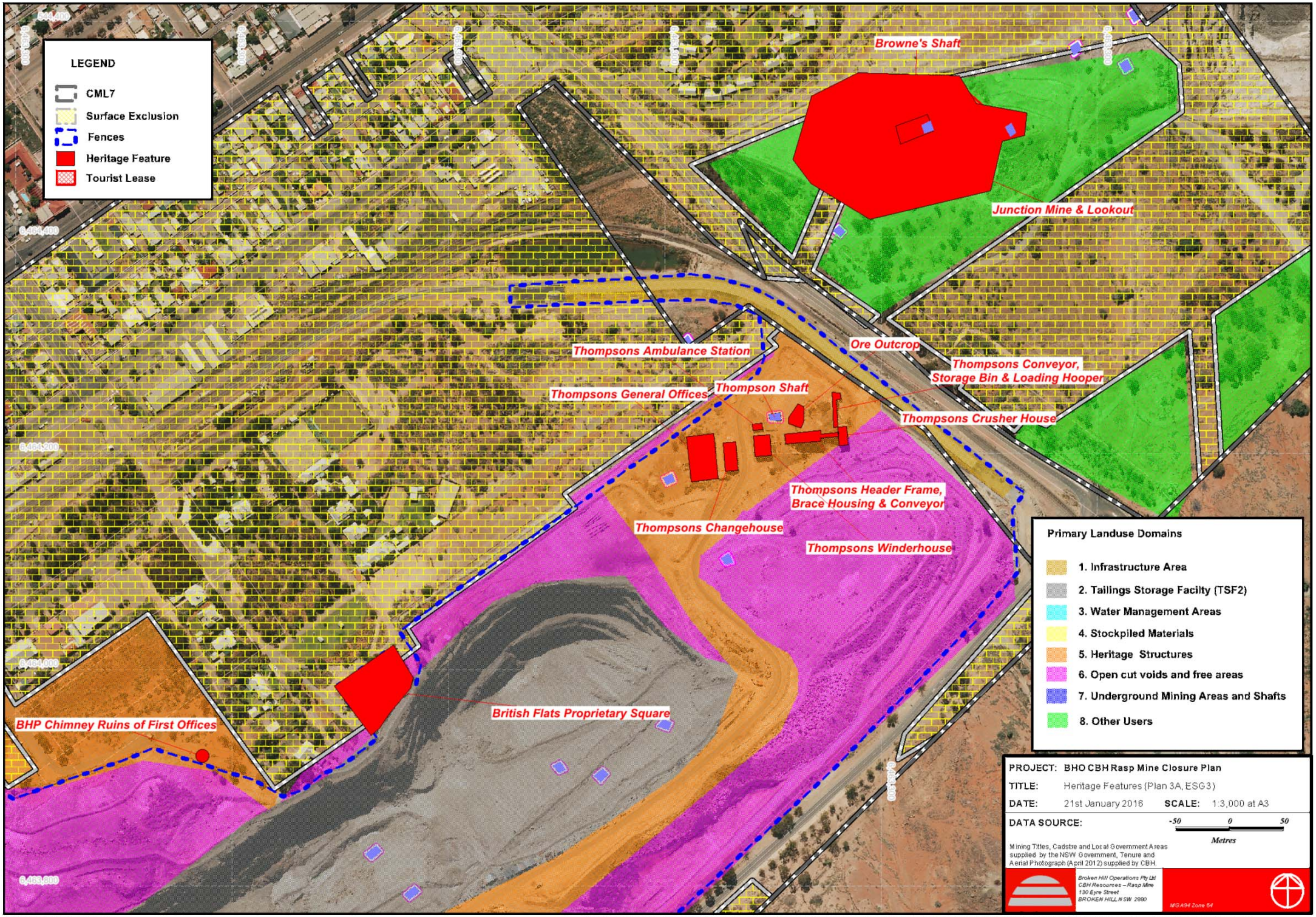
Plan 2 Mine Domains



Plan 3, 3A, 3B, 3C (Primary Domains) 3, 3A, 3B, 3C (Secondary Domains) Mining Rehabilitation





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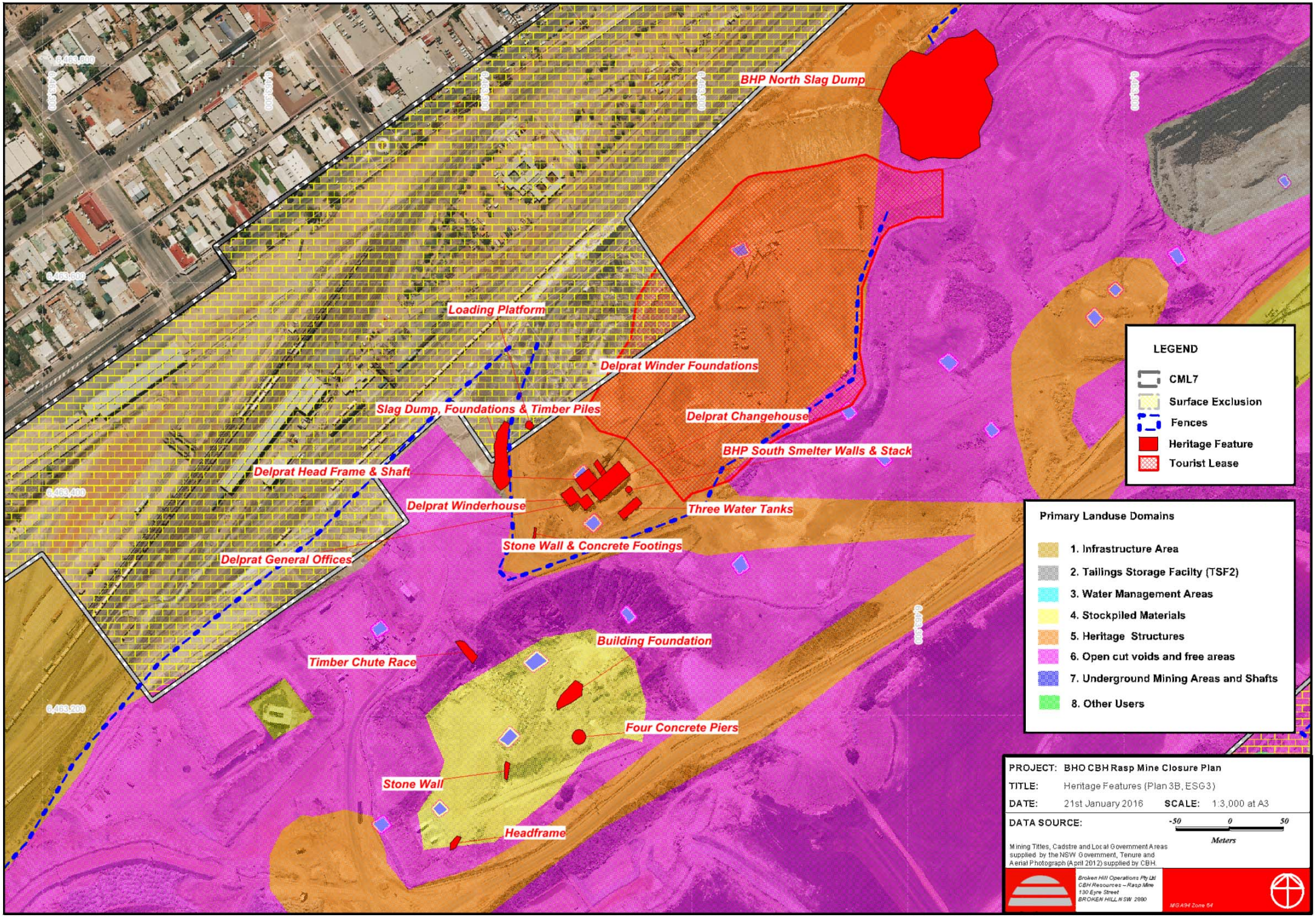
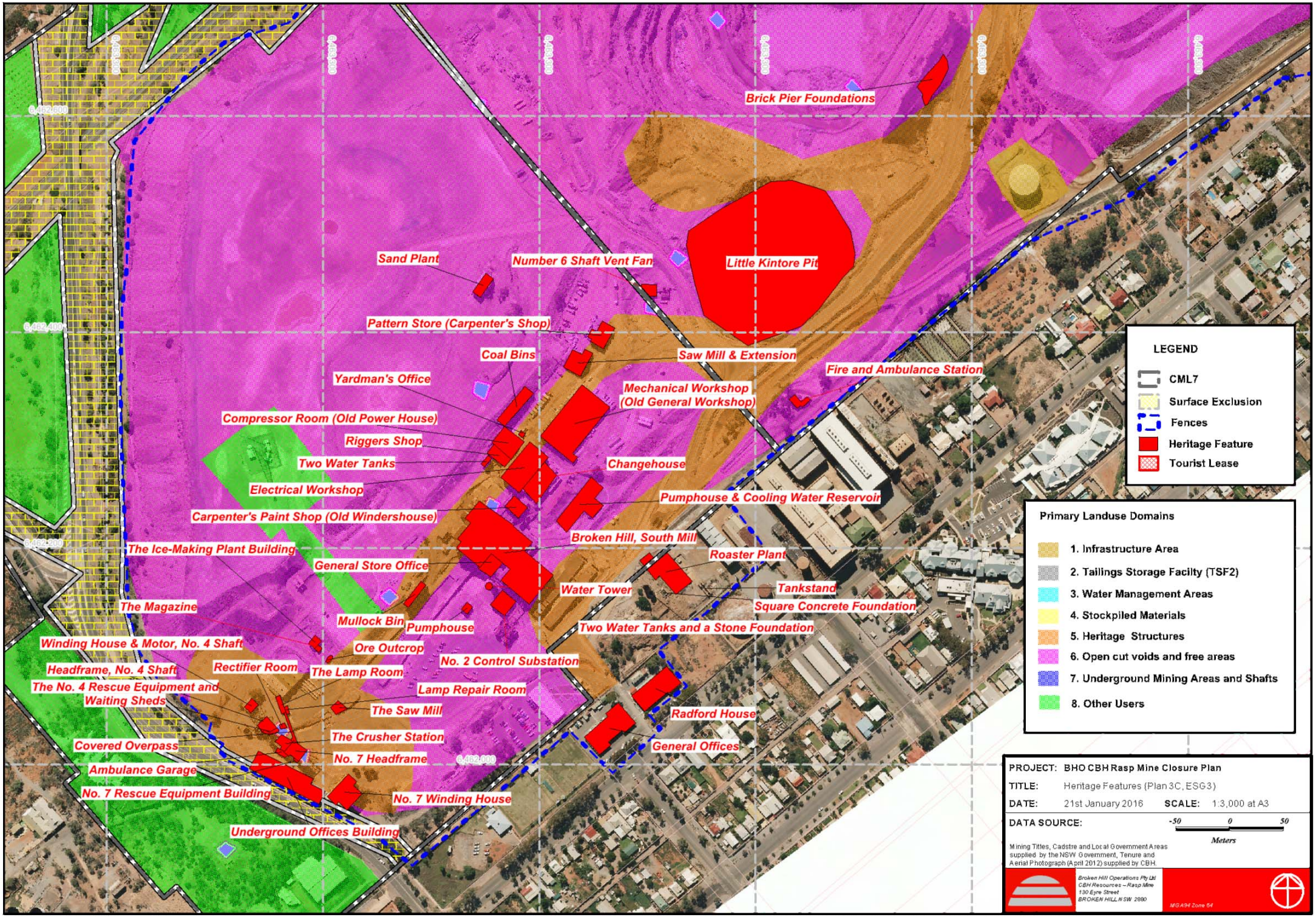
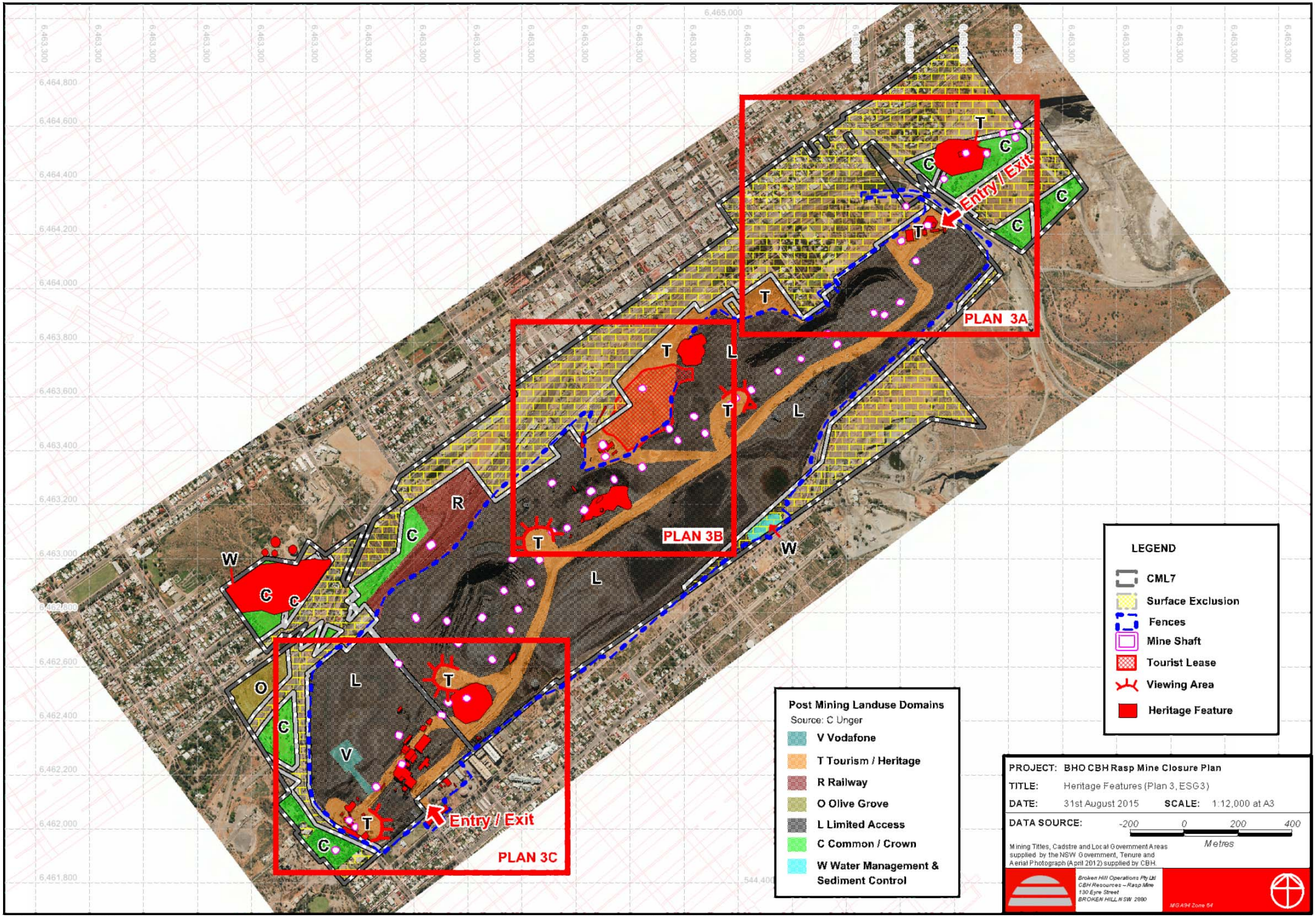
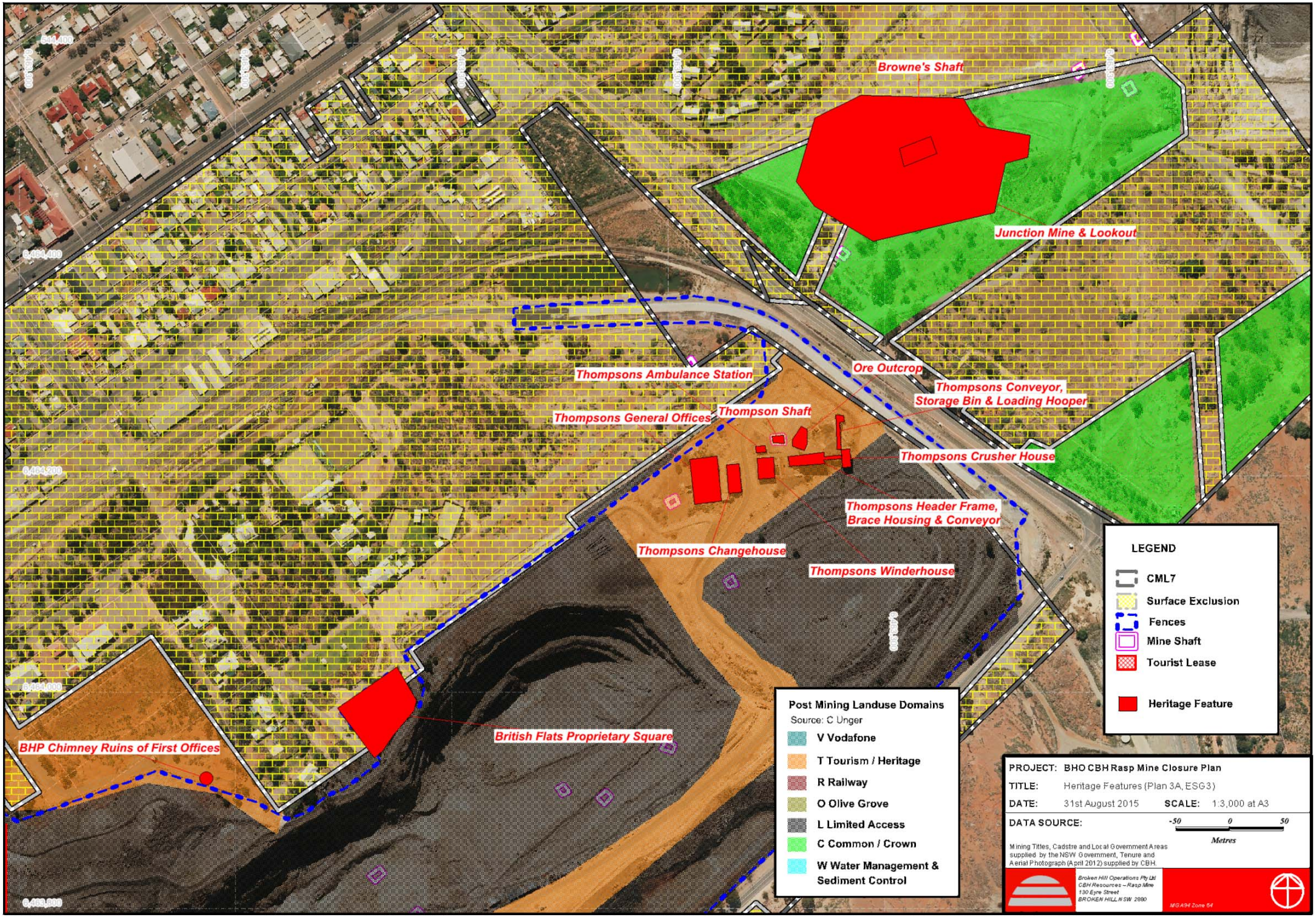
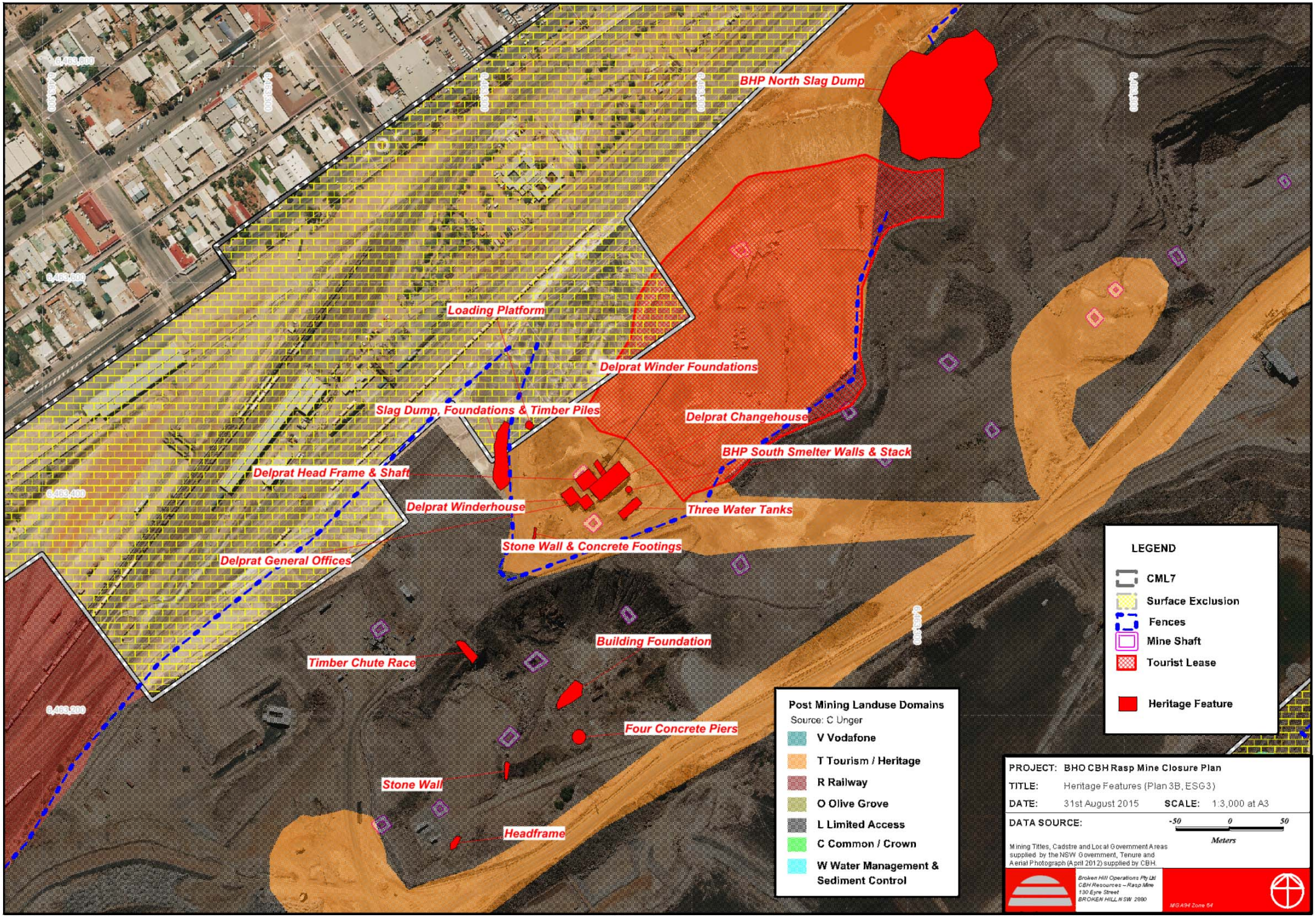
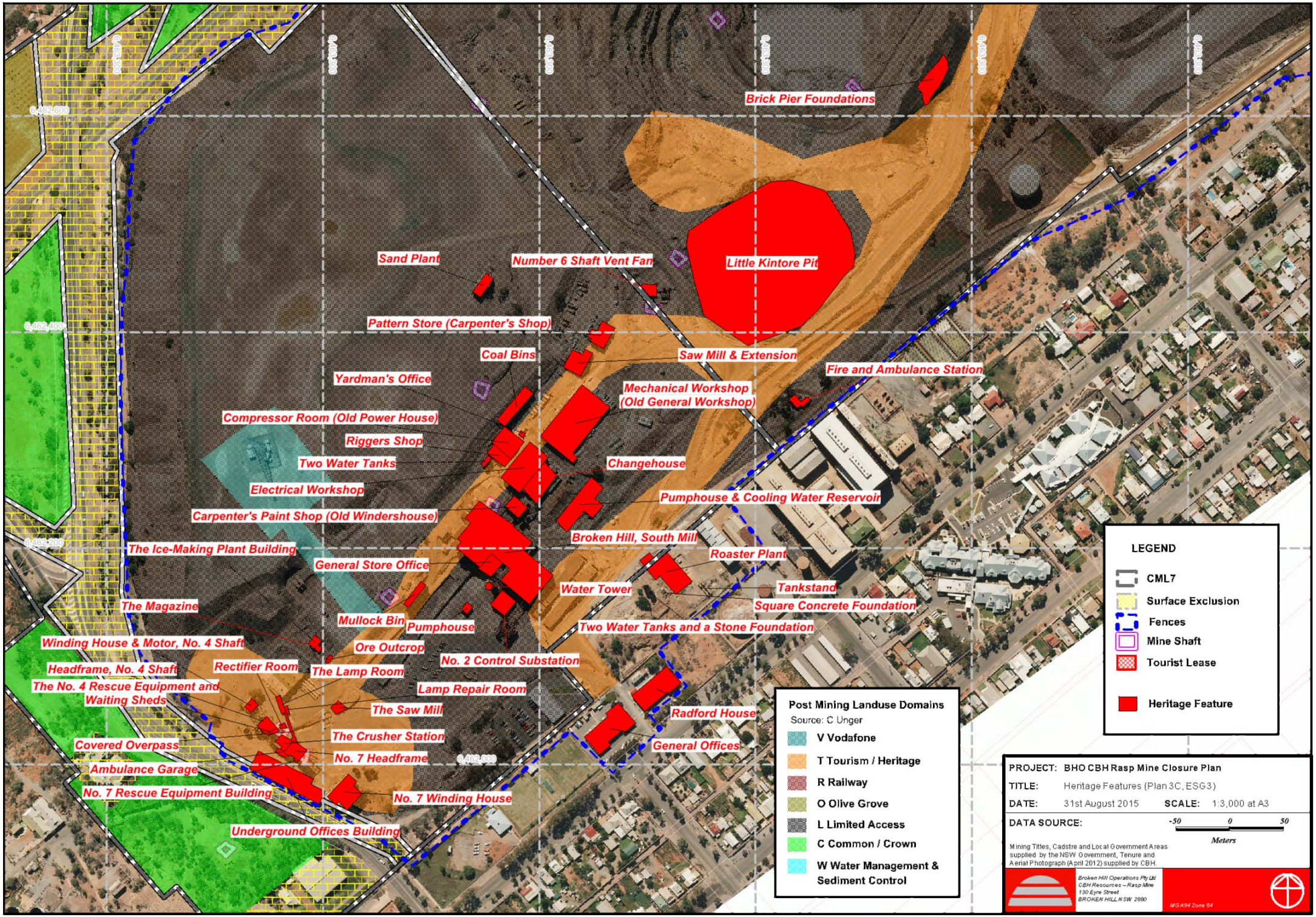




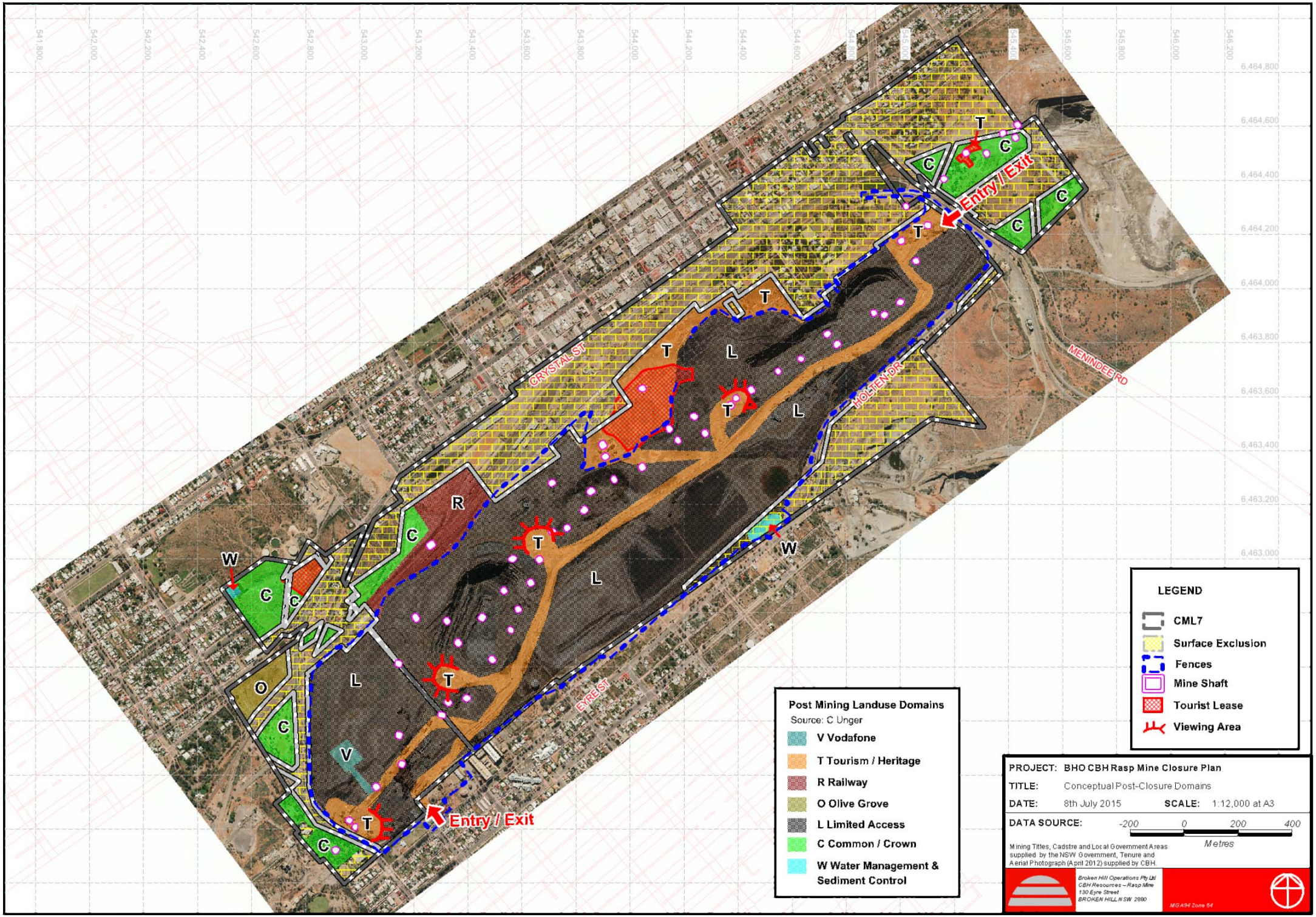






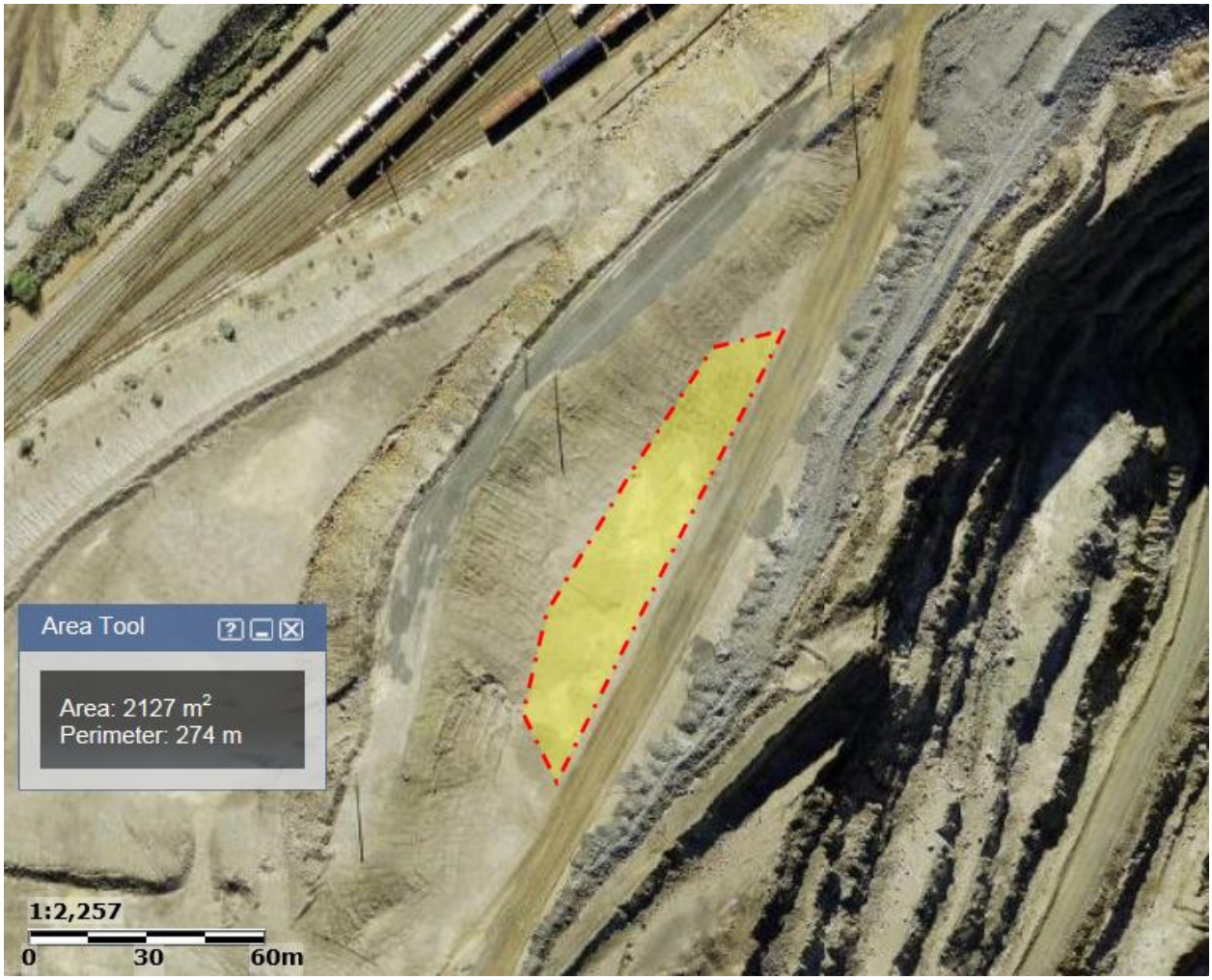


Plan 4 Final Rehabilitation and Post Mining Land Use

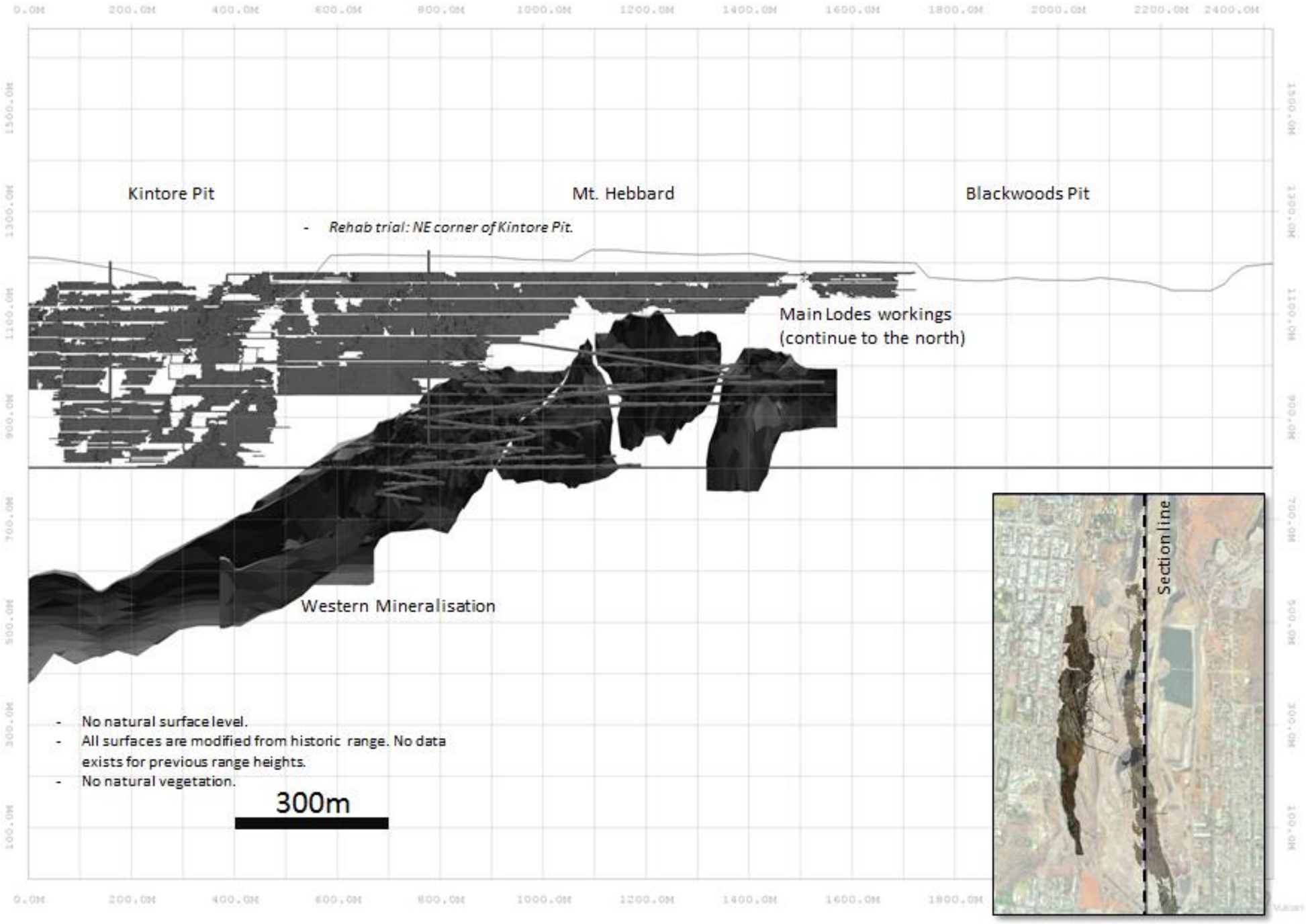


Rehabilitation

A waste rock trial was conducted during the reporting period on the northern side of Kintore Pit. The trial was conducted as per the waste schedule sent to DRE on 29/1/2015. Approximately 2200m2 was covered with waste rock.



Vertical Sections



Cross Sections

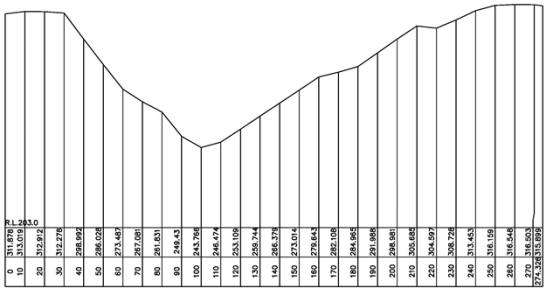
Locations shown left to right are:

Kintore Pit – active mining pit, Mt Hebbard/TSF 1 - historical tails dump, TSF 2 Blackwood Pit – active tails dam

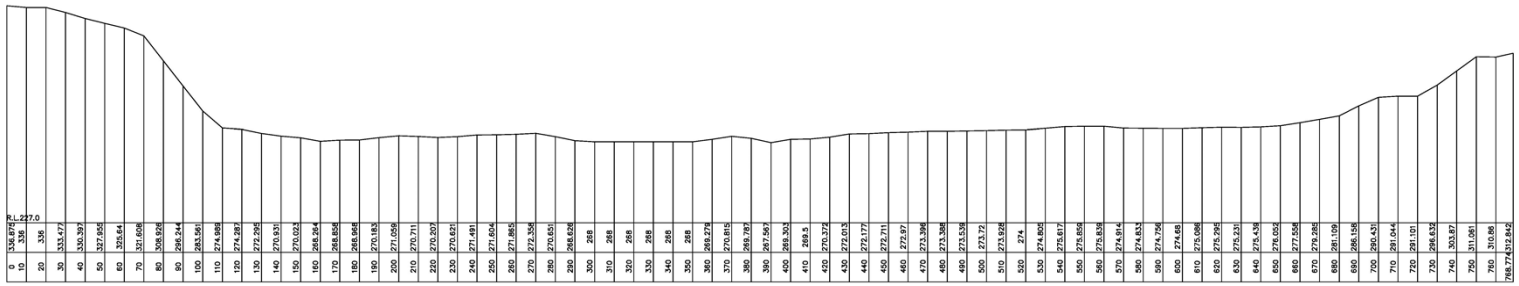
Surveyed March 2015, image created May 2015.

TSF 2 Blackwood Pit – active tails dam

TSF 2 Blackwood Pit – active tails dam



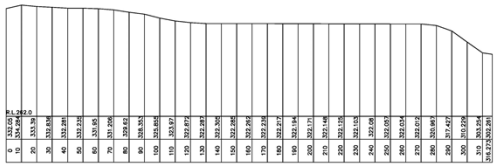
SECTION 2



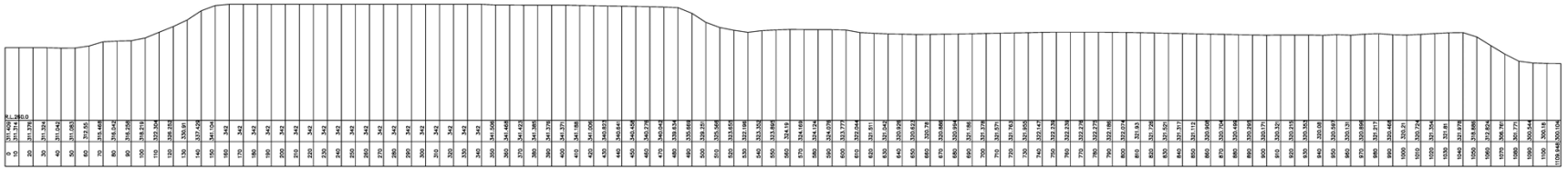
SECTION 1

Mt Hebbard/TSF 1 historical tails dump

Mt Hebbard (raised area on the left), TSF 1 historical tails dump (lower area on right)

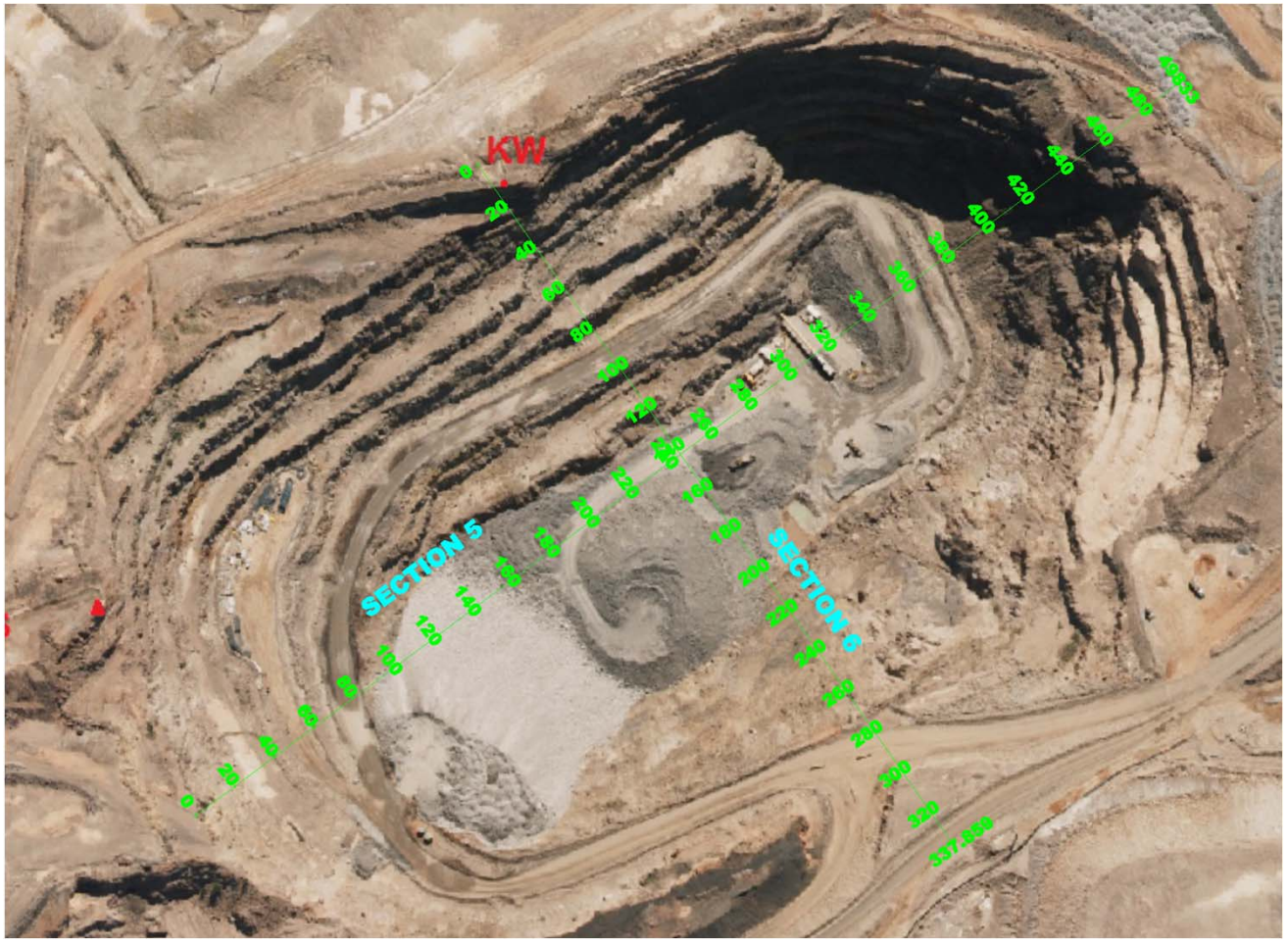


SECTION 4

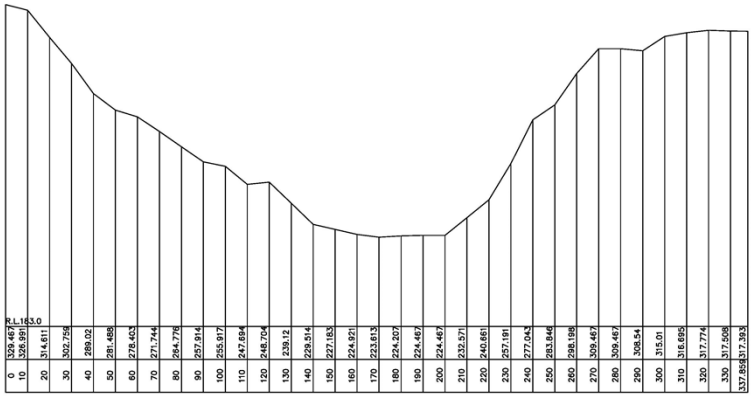


SECTION 3

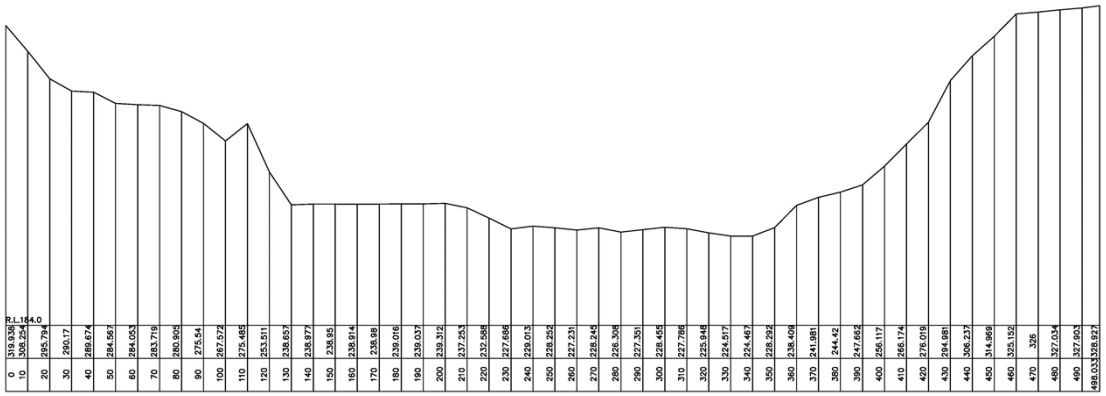
Kintore Pit – active mining pit



Kintore Pit – active mining pit

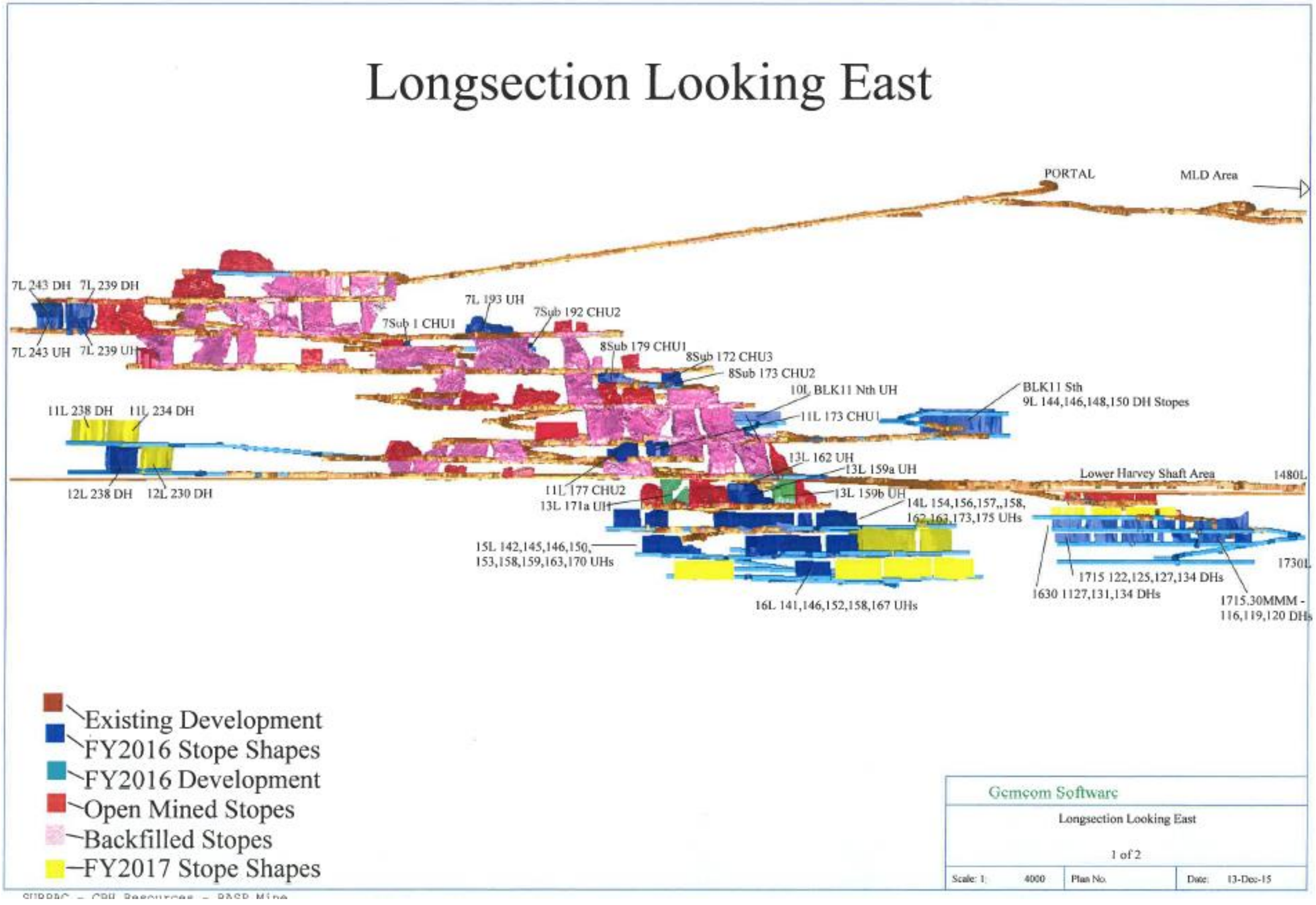


SECTION 6



SECTION 5

Longsection Looking East



Longsection Looking East

Gemcom Software

Longsection Looking East

2 of 2

Scale: 1 4000	Plan No.	Date: 13-Dec-15

1. INTRODUCTION

Broken Hill Operations Pty Ltd (BHOP) (a wholly owned subsidiary of CBH Resources Ltd (CBH)), purchased the Rasp Mine from Normandy Mining Investments in 2001 (NMI). The Rasp Mine consists of the Consolidated Mining Lease 7 (CML7) and Mining Purpose Leases 183, 184, 185 and 186. These leases occupy a central region of the historic Broken Hill Line of Lode ore body and incorporate the original mine areas that commenced operations in the 1880s including a substantial amount of mining infrastructure from various mining phases.

The Rasp Mine is located centrally within the City of Broken Hill and is surrounded by transport infrastructure, areas of commercial and industrial development and some residential housing. The Rasp Mine is bounded by Eyre Street and Holten Drive to the south and east, Menindee Road (MR 66) to the northeast, Crystal Street to the northwest and Bonanza Street and South Road (Silver City Highway SH 22) to the southwest. Residential and commercial areas are located to the west, south and north of CML7, Perilya mine developments to the north-east (North Mine) and south-west (Southern Operations) and the Blue Metal Quarry to the east. An aerial view of the Rasp Mine is provided in Figure 1.

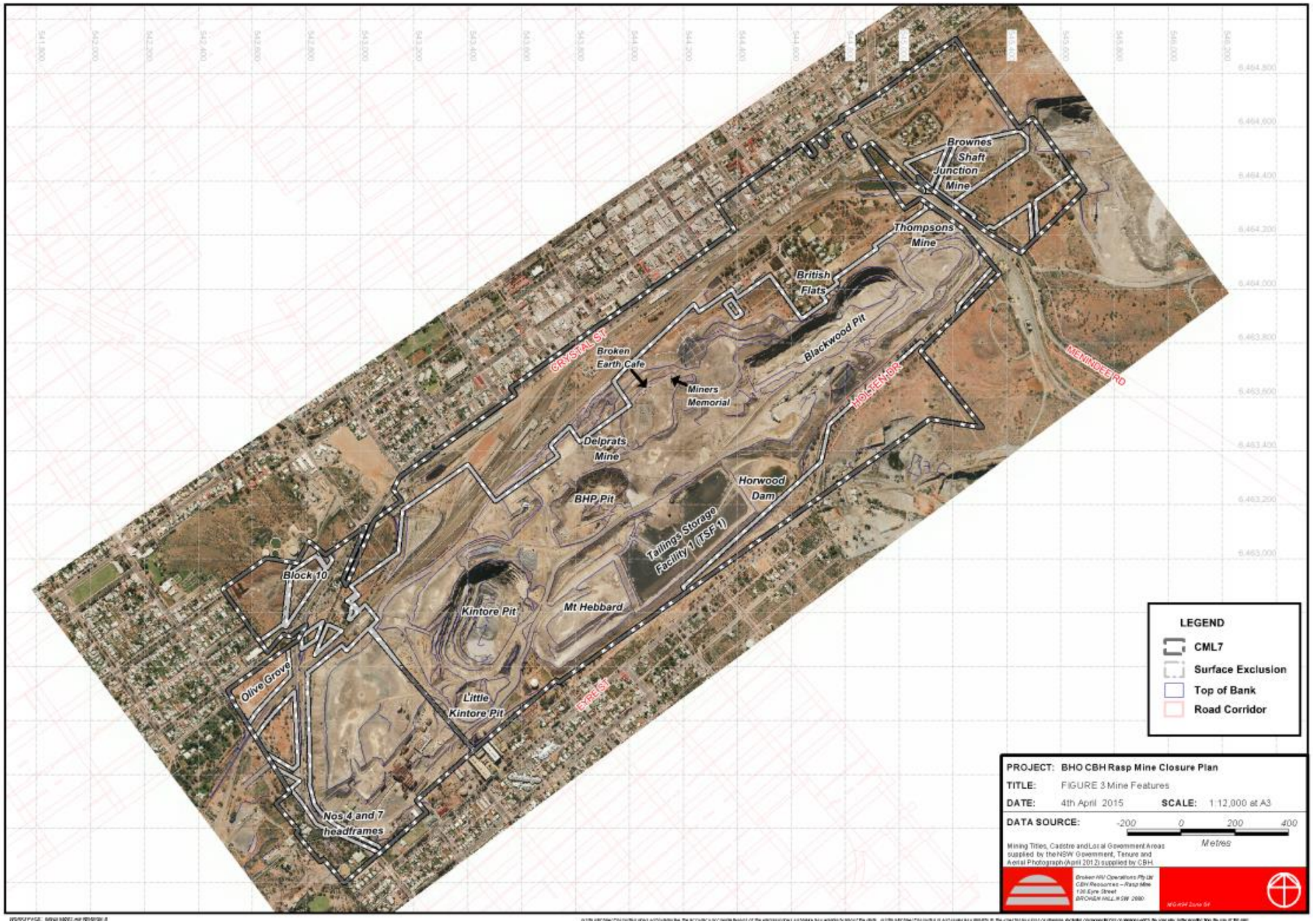


Figure 1: Aerial Overview, Rasp Mine

1.1 Consents, Leases and Licences

Table 1 provides a list of development consents held by Rasp Mine.

Table 1: Development Consents

Approval Number	Date Issued	Duration	Purpose
DA 125/2001	5 Sept 2002	Work completed	Surface drilling on CML7 in surface exclusion zone (near rail), supported by a SEE.
MOP 06/6463	26 Oct 2006	31 Aug 2008	Construct exploration decline, conduct drilling and obtain bulk sample, supported by a REF.
DA 101/2007	26 April 2007	Work completed	Undertake temporary mining in the Kintore Pit, supported by a SEE.
MOP Amendment 06/6436	5 May 2008	31 Oct 2008	Extend the exploration decline.
MOP 06/6463	1 Sept 2009	31 Dec 2010 Extended to 31 March 2011	For underground mining and stockpiling 120,000 tpa, supported by a REF.
DA 264/2009	19 Jan 2010	2 Feb 2011	For ancillary surface mining activities including crushing, stockpiling and transport of ore, supported by a SEE.
Part 3A Application 07_0018	31 Jan 2011	31 Dec 2026	Mining production of 750,000 tpa from Western Mineralisation, Centenary Mineralisation and Main Lode Pillars. Construction and operation of a minerals processing plant and rail loadout facility. Supported by an EAR.
MOP 06/6483	1 April 2011	31 March 2014	Mining production of 750,000 tpa from Western Mineralisation, Centenary Mineralisation and Main Lode Pillars. Construction and operation of a minerals processing plant and rail loadout facility. Supported by an EAR prepared for DoPI Part 3A Project Approval.
Part 3A Project Approval 07_0018 Amendment	16 March 2012	31 Dec 2026	Relocation of ventilation shaft.
MOP 06/6463	30 March 2012	31March 2014	Relocation of ventilation shaft.
MOP 06/6463	March 2014	30 June 2014	Extension of MOP requested and granted.
Part 3A Project Approval 07_0018 Amendment	August 2014	31 Dec 2026	Allow 24 hour crusher operation.
MOP 06/6463	June 2014	August 2014	Extension of MOP requested and granted.
MOP 06/6463	Oct 2014	Oct 2015	Allow 24 hour crusher operation.
MOP 06/6463	August 2014	October 2014	Extension of MOP requested and granted
Part 3A Project Approval 07_0018 MOD3	17 March 2015	31 Dec 2026	Extension of underground mining to include all of Block 7 and the Zinc Lodes.
MOP 06/6463	Nov 2014	Oct 2015	New MOP for underground mining, ore processing and despatch of concentrates, including ancillary activities.

Approval Number	Date Issued	Duration	Purpose
MOP 06/6463 Amendment	March 2015	Oct 2015	Extension of underground mining to include all of Block 7 and the Zinc Lodes.
MOP 06/6463	Currently under review	Oct 2018	New MOP for underground mining, ore processing and despatch of concentrates, including ancillary activities.

Table 2 presents the mineral authorities held by BHOP in the vicinity of the Rasp Mine. For the purposes of this document, the area covered by CML7 and MPLs 183, 184, 185 and 186 is referred to as the "Rasp Mine".

Table 2: Mineral Authorities

Mineral Authority	Grant Date	Last Renewed	Renewal Date	Holder	Purpose
CML7	8 Oct 1987	17 Jan 2007	31 Dec 2026	BHOP	As per Schedule 2 of the Lease Open cutting, shaft sinking, stoping, tunnelling, building of dams, extraction and obtaining minerals, generation of electricity, erecting dwellings, storage of fuels, dumping of ore, treatment and dumping of tailing, development of roads (**Appendix A**)
MPL 183	4 Feb 1981	24 Apr 2007	31 Dec 2026	BHOP	Dumping of ore and mine residues, treatment of tailing
MPL 184	4 Feb 1981	24 Apr 2007	31 Dec 2026	BHOP	Dumping of ore and mine residues, treatment of tailing
MPL 185	4 Feb 1981	24 Apr 2007	31 Dec 2026	BHOP	Dumping of ore and mine residues, treatment of tailing
MPL 186	4 Feb 1981	24 Apr 2007	31 Dec 2026	BHOP	Dumping of ore and mine residues, treatment of tailing
EL 5818	8 Mar 2001	7 Mar 2009	7 Mar 2017	BHOP	Surface disturbing works such as drilling and soil sampling

Table 3 presents the licences held by BHOP in relation to the Rasp Mine.

Table 3: Licences Held

Licence / Permit	Issued By	Date of Expiry/ Renewal	Purpose
EPL 12559	EPA	Upon surrender, suspension or revocation.	Authorises the carrying out of scheduled activities: Crushing , grinding or separating >500,000 – 2,000,000T processed. Mining for minerals >500,000 – 2,000,000T produced.
Dangerous Goods and Explosives Notification	Work Cover	23 Feb 2017 24 Oct 2017	Store Manufacture Notification
Water extraction	NOW	29 March 2017 (85WA752823)	Water supply work approval - 85WA752823 for dewatering associated with the excavation. Water Access Licence 31065 (WAL) with 370 unit shares in the Adelaide Fold Belt Water groundwater source which authorises take from 85WA752823. 85BL256109 – Licence for 6 Monitoring bores on CML7. 85BL256098 – Licence for 4 Monitoring bores on Lot 6035 in DP820407.
Radiation	EPA	26 July 2016	Sell and/or possess radiation apparatus. Sell and/or possess radioactive or items containing radioactive substances.

1.2 Mine Contacts

The contact names and phone numbers for key personnel are listed in Table 4, together with the telephone number of the Rasp Mine Complaint Line, as required by EPL 12559.

Table 4: Mine Contacts

Name	Title	Contact Details
Visko Sulicich	BHOP Director CBH Chief Operating Officer	T: 08 8088 9106 viskosulicich@cbhresources.com.au
Robert Williamson	BHOP General Manager	T: 08 8088 9157 Robwilliamson@cbhresources.com.au
Costa Papadopoulos	BHOP Manager of Health, Safety & Environment	T: 08 8088 9126 costapapadopoulos@cbhresources.com.au
Complaints Line	Health, Safety and Environment Office	T: 08 8088 1211

1.3 Actions Required at Previous AEMR Review

At the time of writing BHOP had not received any feedback on the previous AEMR (2014).

2. OPERATIONS DURING THE REPORTING PERIOD

2.1 Exploration

There has been no surface exploration drilling conducted during the reporting period.

2.2 Land Preparation

Topsoil and Subsoil Stockpiles

No topsoil or subsoil stockpiles were established or maintained during the reporting period.

Surface disturbance

No new ground has been disturbed during the reporting period. Surface expressions of mined waste are confined to the waste rock dump within Kintore Pit and the in pit tailings dam at Blackwood Pit.

Works to increase the height of bunding along the haul road progressed during this time and were almost complete by the end of 2014. Waste rock from underground was used to increase the height of the eastern bund on the haul road. The geometric mean lead and zinc concentration in the waste rock was 0.2%.

Figure 2: Bunding adjacent haul road

2.3 Construction

New buildings / structures

No new buildings or structures were erected during the reporting period.

Roads and fencing

No new roadways or fencing were constructed during the reporting period. Routine maintenance of the haul road was conducted to ensure its longevity. Boundary fencing was inspected and repaired as required.

2.4 Mining

Mine Access

Mining is conducted underground and is accessed through the existing portal located at the northern end of the Kintore Pit. Mining activities include mining of the Western Mineralisation and Main Lode Pillars.

Mining activities were undertaken as follows and met the requirements of the Development Consent:

- Truck haulage from underground to ROM pad 24 hours per day, 7 days per week

- Production rock blasting between 6.45 am to 7.15 pm, 7 days per week
- Development blasting concurrently with production blasting where practicable
- Independent development firing below the 10 level, 7 days per week at any time
- Ventilation fans, 24 hours per day, 7 days per week
- Underground operations, 24 hours per day, 7 days per week

Underground decline development

The current Rasp Decline has been developed between the Western Mineralisation and the Main Lodes, with a secondary decline to be developed providing additional access to the Main Lode stoping. During the reporting period the decline was extended by 205.1m linearly and 21.93 m vertically.

Ore and waste was excavated using load haul dump (LHD) equipment and transported to loading points where mine trucks transported ore to the ROM pad. Waste rock was used in underground back fill operations with some waste rock being retained and stored in the Kintore Pit for temporary storage.

A total of 30 stopes have been mined with 585,522t of ore coming from those stopes listed in Table 5.

Table 5: Mined Stopes 2015 Western Mineralisation, Main Lode and Zinc Lode

11_7	7_193
11_8	7_217
12_7a	7_234
12_7b	7_237
12_8a	7_240
12_8b	7l_217
13_159a	7l_237
13_171a	8_13
13_171b	8_9
1480s_127	8s_1
1480s_129	9_2a
1480s_135	9_2b
6_3	9_4
6_1	ZL LIFT 2
7_183	ZL_425_LIFT1

Mining Method and Sequence

The mining of mineral ore is limited to underground workings.

A variety of production methods are utilised, including long-hole open stoping (LHOS), up-hole benching, room and pillar and up-hole pillar retreat mining. LHOS is the most prevalent method used in the Western Mineralisation, up-hole stoping, with room and pillar and up-hole pillar retreat in the Main Lode Pillars.

The ore is blasted using a bulk emulsion explosive and extracted using LHD's either conventionally or under remote control.

Void Backfilling

Waste rock was used for backfill in mined out stopes. Over the next reporting period, more waste will be backfilled underground as more stopes become available. The backfill plant was not operational during the reporting period as the cost to complete its construction could not be justified in the current life cycle of the mine.

Tailings Deposition

A total of 499,598t of tailings was produced during the reporting period. All tailings have been stored in TSF2 (Blackwood Pit). Water is pumped from TSF2 and reused throughout the processing facility.

Ore and Product Stockpiles

All ore is transported by truck and stored at the ROM facility before being put through the processing plant. The ROM pad is 32m by 80m as indicated in the MOP. The ROM is surrounded by 5m windbreaks and has additional water sprays to control dust.

Mine production for the reporting period is provided in Table 6. Kintore Pit stockpiles for back fill were kept at a minimum during the reporting period (Figure 3). All ore on the ROM stockpile including low grade stockpiles were processed. No more than a week's processing was kept on the ROM stockpile at any one time. Table 6 provides a summary of production from the start of the AEMR reporting period to end of the reporting period with the figures being the total cumulative amount since mining commenced. The amount of waste rock and ore produced was less than indicated in the MOP as production and personnel were reduced to increase the viability of the mine.

Figure 3: Waste rock stockpile inside Kintore Pit

Table 6: Production and Waste Summary

Item	Total Production Tonnes
Topsoil Stripped	N/A
Topsoil Spread	N/A
Ore Tonnes Mined: Dry Tonnes	585,522
Stope Mucking: Dry Tonnes	392,787
Dev Ore Bogged: Dry Tonnes	179,636
Waste Backfill (UG Rock Places): Tonnes	223,611
Waste Trucked to Surface: Tonnes	228,942

2.5 Mineral Processing

Processing of ore from the Rasp mine, has single stage crushing, two stage grinding and differential flotation, including concentrate regrind, to produce separate lead and zinc concentrates. Concentrates are dewatered using thickeners and filters, the filtered concentrates are conveyed directly into concentrate containers for rail transport to a shipping port.

A summary of mineral processing operations for the reporting period are presented below in Table 7.

Table 7: Mineral Processing Summary (December 2014 to December 2015)

Activity/Element	Total Tonnes Produced
Milled tonnes	571,846
PB Con	26,201
Zn Con	46,047
Tailings	499,598

A total of 571,846 t of ore was milled with a yield of 26,201t of lead and 46,047t of zinc during the reporting period. There was a total of 499,598t of tailings produced which was deposited in TSF 2. During this time the processing plant operated on a campaign basis with processing occurring three weeks of the month with the fourth being a shutdown week for routine maintenance.

2.6 Waste Management

Waste management at the mine is classified into two broad categories: mineral wastes (mining and mineral processing wastes), and non-mineral wastes which include recyclables and non-recyclables.

Mineral Waste

2.6.1 Tailings

Tailings from the process plant are deposited into the Blackwood Pit TSF, (Figure 4). This is via a ring main and is done to beach the tailings and reclaim water for re-use in the process plant from the northern end. In addition, it is designed to be able to maintain some moisture to reduce dust.

In the reporting period, the Backfill plant was not commissioned. No tailings were used as underground fill.

There is approximately 1,486,064m^3 of remaining storage volume in Blackwood Pit and at the current milling rate of 500.000 tonnes per year the pit has 4.9 years remaining life assuming a uniform density of 1.65 tonnes/m^3.

The tailing contains the following elements by percentage volume: Lead 0.27%, Zinc 0.31%, Copper 0.01% and Iron 2.74%. Silver is also present at 5.05g/t.

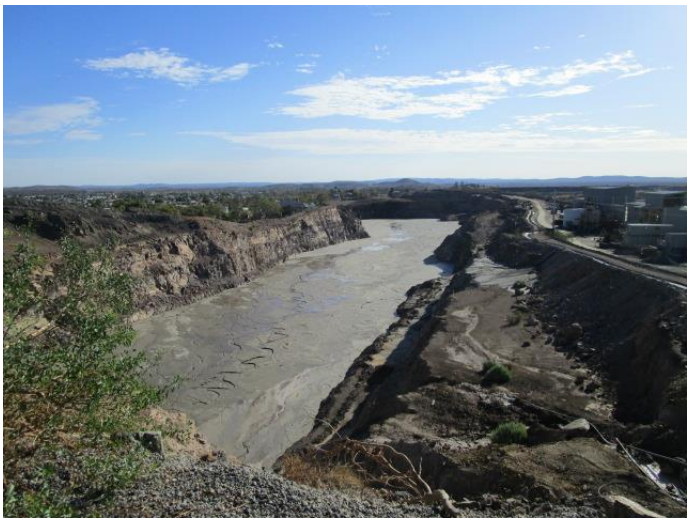


Figure 4: TSF 2, Blackwoods Pit

2.7.1.1 Waste Rock

Waste rock generated from the underground mine is generally reused immediately underground as backfill. There is a waste rock stockpile located on the surface in the Kintore pit. During the reporting period, 228,942 tonnes of waste rock was transported to the surface stockpiles. The waste rock originates from previous underground workings namely the upper decline bypass. Applications for the waste rock include crushing and screening for road base where required. Waste rock is likely to be utilised during the life of mine or can be utilised for TSF rehabilitation.

If waste rock is required for use on the surface, such as for bund walls, it is tested in accordance with the waste rock management procedure. The rock must undergo geometric assessment to establish its lead and zinc concentration and have a combined concentration of less than 1% for the stockpile.

Non-Mineral Waste Recyclables

Laydown area

Rasp Mine has four main laydown areas where used parts and equipment are stored for future use.

The recyclables area has dedicated sections for scrap metal, timber, batteries, rubber, electronic goods and used pods.

Hydrocarbons

Used hydrocarbons are handled and processed at the waste hydrocarbon depot. The facility handles used oil, grease, oily rags, oil filters and hydrocarbon contaminated items. Volumes of material sent off site are shown in Table 8.

Other Recyclables

Other recyclables include office paper, cardboard, printer cartridges and scrap metal. Standard practices/procedures are in place for paper, cardboard and printer carriages. Exact figures for recycling cannot be provided as material is taken off site "co-mingled". Used 1000L pods are returned to the manufacturer for reconditioning and reuse.

Table 8: Waste Management Register

Waste	Recycled Volumes*
Oil	100,000 L est
Scrap metal	1500 t est
Grease	24 x 205L drums
Oil filters	9 pods
Oily rags	18 pod
Printer cartridges	3 bags
Empty oil drums	4 pods
E-waste	nil

* One pod = 1000L

Non-Mineral Waste Non-Recyclables

Tyre Disposal

No tyres were disposed in underground workings during the reporting period. All tyres for heavy mobile equipment have been used on the haul road bund wall for this period. All other LV and light truck tyres are removed from site under arrangement with the tyre supplier.

Landfill

The Broken Hill City Council on a weekly basis empties rubbish bins containing general site rubbish into a garbage truck. The rubbish is taken to the Broken Hill waste facility where it is deposited. There is no landfill on site.

2.7 Water Management

The primary use of water is for processing plant activity with some water losses occurring due to underground backfilling, water retained in the tailings, water in concentrate, water used for dust suppression and seepage at the TSF.

The closed water circuit for the mining operations results in complete management of process water with no off-site wastewater discharges directly from the operations other than

the conventional sewage discharge. Collection ponds are in the vicinity of the processing activities to capture and return potentially mineralised sediment to the processing circuit.

The key aspects of the water management strategy include:

- The separation of raw water and potable water requirements. Raw water mining requirements include processing, workshop, vehicle wash-bay and dust suppression, while potable water requirements include showers, toilets and laundry.
- Reclaiming of water from the tailings storage facility to the processing plant.

Monitoring and updating of the water balance will be ongoing as mining operations progress. Observations regarding the rate of water usage and the effectiveness of the water balance on site will be reviewed periodically.

Water Supply

The water supply to the site comes from the Stephen's Creek Reservoir, Umberumberka Reservoir, Imperial Lake (emergency supply only) and Menindee Lakes Scheme on the Darling River. The following water supplies will be utilised over the life of the Project:

Broken Hill operations holds a license (85WA752823) which permits exemption from the water extraction embargo. There is no end date to this licence, the licence is valid indefinitely as long as operations exist.

Clean Water

The only clean water structures on site are the raw water tank and potable water tanks. There are no permanent watercourses within the mine's leases. All clean water runoff is diverted around the mine operations via bunding and drains as detailed on Plan 3, to ensure that clean water quality is not degraded with potential contaminants.

Processing plant water management

Runoff from the processing plant is directed to a 'first flush' plant water pond in catchment 42B, with overflows into a second pond (Plant Event Pond) located at the toe of the embankment within this catchment. Both ponds are lined facilities.

Blackwood Pit is used to retain the tailings from the processing plant. Supernatant water from this storage facility is transferred directly to a lined pond at the plant (Plant Water Pond) located in, but not part of, catchment 42B for subsequent reuse in the processing plant.

These ponds allow for the storage of supernatant water from Blackwood Pit, plant upsets and a 1:100 24 hour rainfall event. Any overflow from the Plant Event Pond (in excess of a 1:100 year rainfall event) is directed to Horwood Dam.

Shaft Seven Water

The storage area S22 is a large gully with a storage capacity in excess of 40,000m^3. The gully is used as catchment storage for runoff from surrounding catchments including TSF 1. It is also used for the separate storage and settling of water from the operating underground mine workings and the shaft 7. This water is reused for mining activities underground.

The area of S22 is divided into 5 compartments with the northern and southern ends available for surface water runoff (Figure 5). For a 1:100 year rainfall event, runoff into the northern compartment of the gully will be from TSF 1 of approximately 10,304 m^3. The runoff into the southern compartment of the gully will be from catchments 18, 19, 21A, 21B and 22 and will approximate to 10,185m^3.

The central three compartments are lined and comprise of two settling ponds and a storage pond with installed pumping capacity.

The volume of stored water in northern and southern compartments is kept to a minimum. Any collected stormwater is either evaporated or added to the central compartments for reuse underground or in the processing plant.

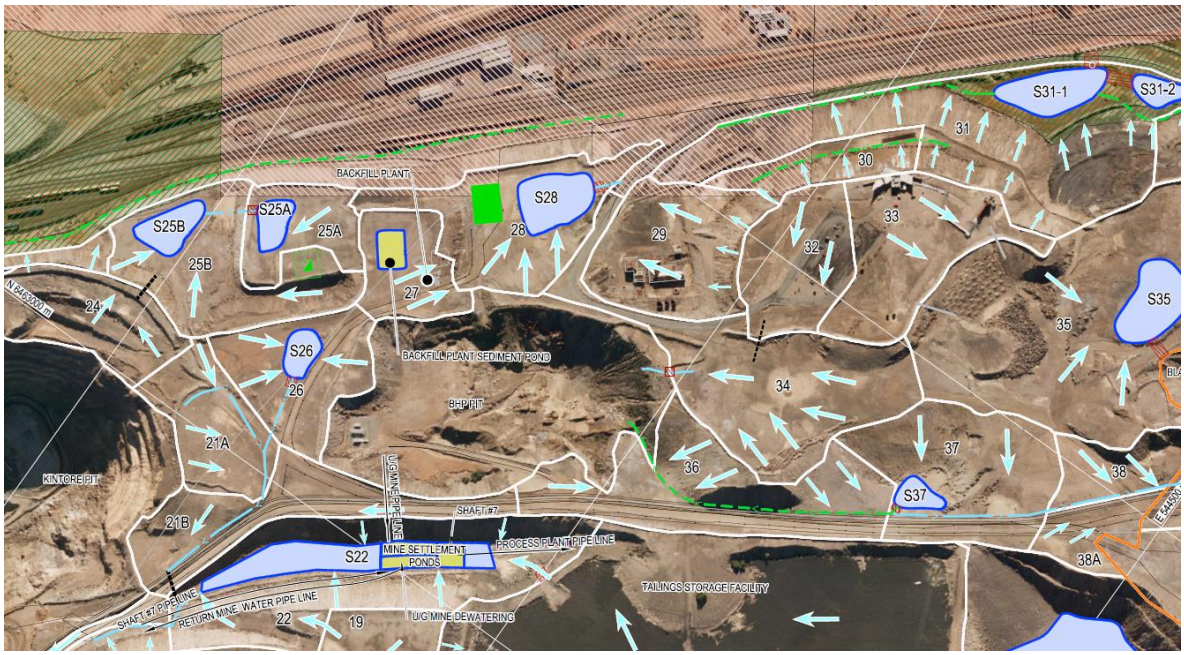


Figure 5: Storage Area S22

Controlled Discharge

There was no surface discharge of contaminated water during the reporting period.

Water Containment Structures

All surface runoff on site is captured by diversion trenches or berms and channelled to site water storage structures. Water catchments and containment structures are presented in Plan 3. Catchments, capacities and estimated stored water volumes for the reporting period are provided in Table 9**.** Detailed surveying of the water storage structures is planned for the next reporting period. Surveys will be used to develop staged storage curves that will enable more accurate capacities and volumes to be determined.

Markers have been placed in water ponds to indicate the maximum level to which water may be stored in the facilities to maintain sufficient free board to accommodate a 1:100y 72 hour storm event.

Table 9: Water Containment Structures

Volumes held (cubic metres)			
Tank Location / Pond Identification	**Start of reporting period (1/4/14)**	**At end of reporting period (16/12/14)**	**Storage Capacity m^3**
Workshop	9	9	9
Boom Gate	22.5	22.5	22.5
Mill	22.5	22.5	22.5
Delprat's Shaft	22.5	22.5	22.5
Kintore Pit	14	14	14
Silver Tank	8000	8000	8000
S2	0	0	5003
S14	0	0	7813
S17	0	0	4265
S31	0	0	225
S49	0	0	1951
S35	0	0	6092
Horwood Dam	6000	3000 approx	7663
Plant Water Pond	2000	2000	2000
S22 Mine Settlement Ponds	1000	1000	1000
S22-A	2000	2000	2000
Vehicle Wash	9	9	9

2.8 Hazardous Material Management

Licensing

Rasp holds Licence XSTR100095 for the storage and handling of dangerous goods. The license is valid until February 2017. Rasp also holds a Radiation Management Licence 5063802 which is valid until 26/7/15.

Dangerous Goods Management

Site dangerous goods management is managed according to the site "Chemical Management and Storage Procedure" and the "Dangerous Goods / Hazardous Substance Spill or Leak Response Procedure.

A Safety Data Sheet (SDS) database for each chemical is maintained. SDS's are kept at each location where chemicals are stored and in the mines rescue room. SDS's are also electronically available on the mine intranet using the *ChemAlert* database program. All SDS's across site are continually updated.

General and contractor inductions outline the required actions in the event of a spill, including completing an Incident Report.

All quantities and mapped locations are referenced in the Pollution Incident Response Management Plan.

Diesel storage

Diesel is stored in two tanks each with a capacity of 68,000L. These self bunded above ground storage tanks are located east of the workshop and are sitting on a constructed concrete re-fuelling station (Figure 6). The facility has been designed and manufactured in accordance with AS1940 and AS1692. BHOP has provision for diesel storage on its Dangerous Goods Licence, UN 00C1 Diesel 150,000 L.

Figure 6: Above Ground Storage Tanks

Lubricants and oils

Lubricants and oils are stored in individual pods located on a portable bund (Figure 7). A storage facility for these lubricants and oils has been constructed on the western side of the main workshop. It consists of a raised concrete pad incorporating drainage to a sump to facilitate cleaning.

Figure 7: Lubricant and Oil Storage

Processing Reagent Storage

All reagents are stored in a purpose built storage facility designed to prevent contamination and capture spillage (Figure 8).

Figure 8: Reagent Storage

3. ENVIRONMENTAL MANAGEMENT AND PERFORMANCE

3.1 Meteorological

A new fully automated weather station has been installed on site (Figure 9). The new weather station replaces an Environdata unit that had become obsolete; the new unit is a Vaisala WXT520 with telemetry. The data recorded by the site weather station is webhosted by Eco Environmental which provides updates every 15 minutes. The new weather station was sourced in compliance with a previous Pollution Reduction Program as issued by the EPA. The primary function of the site weather station is to provide localised weather data for determination of adequate noise sampling conditions.

Figure 9: Vaisala Weather Station Installation

3.2 Air Quality

Development Consent MP 07_0018 specifies two classes of air quality impact assessment criteria relevant to mining operations. These classes relate to dust deposition and particulate concentration levels. Dust deposition levels refer to the quantity of dust particles that settle out from the air as measured in grams per square metre per month (g/m^2/month) at a particular location. Particulate concentration refers to airborne dust and is measured in micrograms per cubic metre of air ($\mu g/m^3$).

Dust Controls

Dust generation is minimised on site by using RST Total Ground Control chemical dust suppressant (**Error! Reference source not found.**) on free areas and sealing the haul road and other high use roads around the site. The sealed roads are maintained by using a contracted street sweeper and the sites water truck as required. Unsealed site roads are watered with a water truck as required.

Rasp manages dust emissions from free areas by restricting access to free areas and by maintaining chemical dust suppression on a six monthly schedule.

Figure 10: Total Ground Control Dust Suppressant

Long-Term Impact Assessment Criteria for Particulate Matter (Tapered Element Oscillating Microbalance [TEOM] & High Volume Sampling)

The criteria for particulate concentration are defined in terms of two particle size fractions: TSP and PM_{10}.

TSP relates to particles of all size able to remain suspended in the atmosphere; typically particulate matter with aerodynamic diameters of up to 30 micrometres (µm).

PM_{10} refers to particulate matter with an aerodynamic diameter less than 10µm. PM_{10} is a sub-component of TSP.

The Development Consent MP 07_0018 long term impact assessment criteria for particulate matter are summarised in Table 10.

Table 10: Long Term Impact Assessment Criteria for Particulate Matter (Hi Vol)

Pollutant	Averaging period	[d] Criterion
Total suspended particulate (TSP) matter	Annual	[a] 90 µg/m^3
Particulate matter < 10 µm (PM_{10})	Annual	[a] 30 µg/m^3

Short-Term Impact Assessment Criterion for Particulate Matter

An Impact Assessment Criterion for maximum 24-hour average PM_{10} is specified within the Rasp Mine Development Consent (MP 07_0018), as provided within Table 11.

Table 11: Short Term Impact Assessment Criterion for Particulate Matter (TEOM)

Pollutant	Averaging period	[d] Criterion
Particulate matter <10 µm (PM_{10})	24 hour	[a] 50 µg/m^3

Dust Deposition

The Development Consent MP 07_0018 expresses dust deposition criteria in terms of both an acceptable increase in dust deposition over the existing background levels and an absolute maximum value. These impact assessment criteria are summarised in Table 12.

Table 12: Dust Deposition Criteria

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
[c] Deposited dust	Annual	[b] 2 g/m^2/month	[a] 4 g/m^2/month

Notes to Tables 10 -12:
• a Total impact (i.e. incremental increase in concentrations due to the project plus background concentrations due to all other sources);
• b Incremental impact (i.e. incremental increase in concentrations due to the project on its own);
• c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method;
• d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents, illegal activities or any other activity agreed by the Secretary in consultation with EPA.

In-Stack Air Quality Criteria

The EPA specify in-stack performance criteria within the Protection of Environment Operations (Clean Air) Regulation (2010). Standards of concentration specified in this document represent minimum requirements for point source emissions within NSW. They are generally expressed in terms of milligrams per cubic metre of air (µg/m^3), expressed at reference conditions (typically Dry, 273 K, 101.3 kPa).

Condition 4 of Schedule 3 of Development Consent MP 07_0018 states:

The Proponent shall ensure that the project is operated in a manner that does not exceed the criteria listed in Tables 4 and 5.

"Tables 4 to 5" referred to above are summarised in Table 13 and Table 14 below.

Table 13: Discharge Criteria for Point 1 – Ventilation Shaft (Little Kintore Pit)

Pollutant	Units of Measure	Concentration Limit
Oxides of nitrogen (as NO_2)	Milligrams per cubic metre	350
Total solid particles (TSP)	Milligrams per cubic metre	20
[a] Type 1 and Type 2 substances	Milligrams per cubic metre	1

Volatile organic compounds (as n-propane)	Milligrams per cubic metre	40

Table 14: Discharge Criteria for Point 2 – Process Enclosure/Baghouse Stack

Pollutant	Units of Measure	Concentration Limit
Total solid particles (TSP)	Milligrams per cubic metre	20
[a] Type 1 and Type 2 substances	Milligrams per cubic metre	1

Monitoring Data

3.2.1 Dust deposition

Total fallout dust (depositional dust) is sampled monthly. A total of seven depositional gauges are in use. Two gauges are located on site and five off site, one control site is located at Casuarina Avenue see Figure 11. Samples are sent to ALS Laboratory in Newcastle for NATA accredited analysis.

Figure 11: Dust Deposition Gauges

The limit for atmospheric dust deposition is set out in the project approval and is aligned with the recommended limits in *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW*. The guidance document recommends a maximum level of a 12 month average of 4 g/m^2/mth for insoluble solids, and that the activities should not generate dust 2 g/m^2/month above the background levels. A summary of the fallout dust results are given in Table 15.

Monthly dust deposition data over the reporting period is shown in Figures 12 and 13. With the exception of the deposition gauge located at Casuarina Ave all locations are within acceptable levels. It should be noted that this monitor is located in a residential backyard in the south of Broken Hill approximately 1.5km from the mine lease boundary in a South East direction. The resident at the household has reported trail bikes using the vacant area behind his house which can cause a lot of nuisance dust. It should also be noted that the lead concentration levels at Casuarina Ave are relatively very low in comparison to other samples analysed. There are not set limits for lead concentration within the samples.

Table 15: Summary of Fallout Dust Analysis

Site	Particulates – deposited matter ($g/m^2/m$)					Total Lead ($g/m^2/m$)		
	MIN	MAX	MEAN	Baseline (from EA 2010)	DIFFERENCE	MIN	MAX	MEAN
D1 St Johns	0.28	2.43	1.02	4.0	-2.98	0.00	0.01	0.00
D2 Block 10	0.06	1.02	0.50	3.01	-2.51	0.00	0.01	0.00
D3 Thompson Shaft	0.51	2.55	1.66	4.3	-1.34	0.00	0.03	0.02
D4 Junction Mine	0.11	1.98	1.30	5.7	-4.40	0.00	0.02	0.01
D5 Silver Tank	0.34	1.98	1.20	N/A	N/A	0.00	0.02	0.01
D6 Casuarina Ave	0.23	6.68	2.78	5.8	-3.02	0.00	0.01	0.00
D7 Blackwood Pit	0.06	1.92	0.90	N/A	N/A	0.00	0.02	0.01

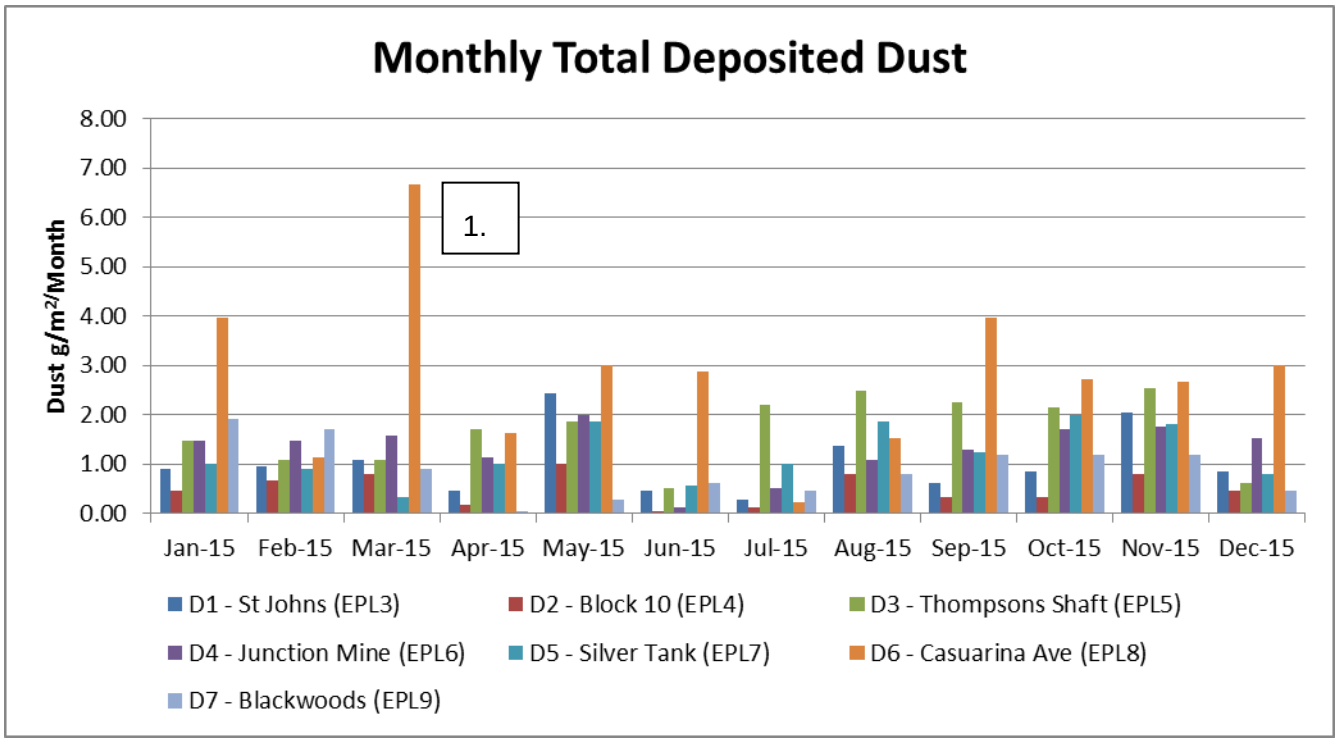


Figure 12: Monthly Total Deposited Dust

1. Samples at Casuarina Ave appear to have been tampered with in March 2015. This sample had a large volume of water present when collected.

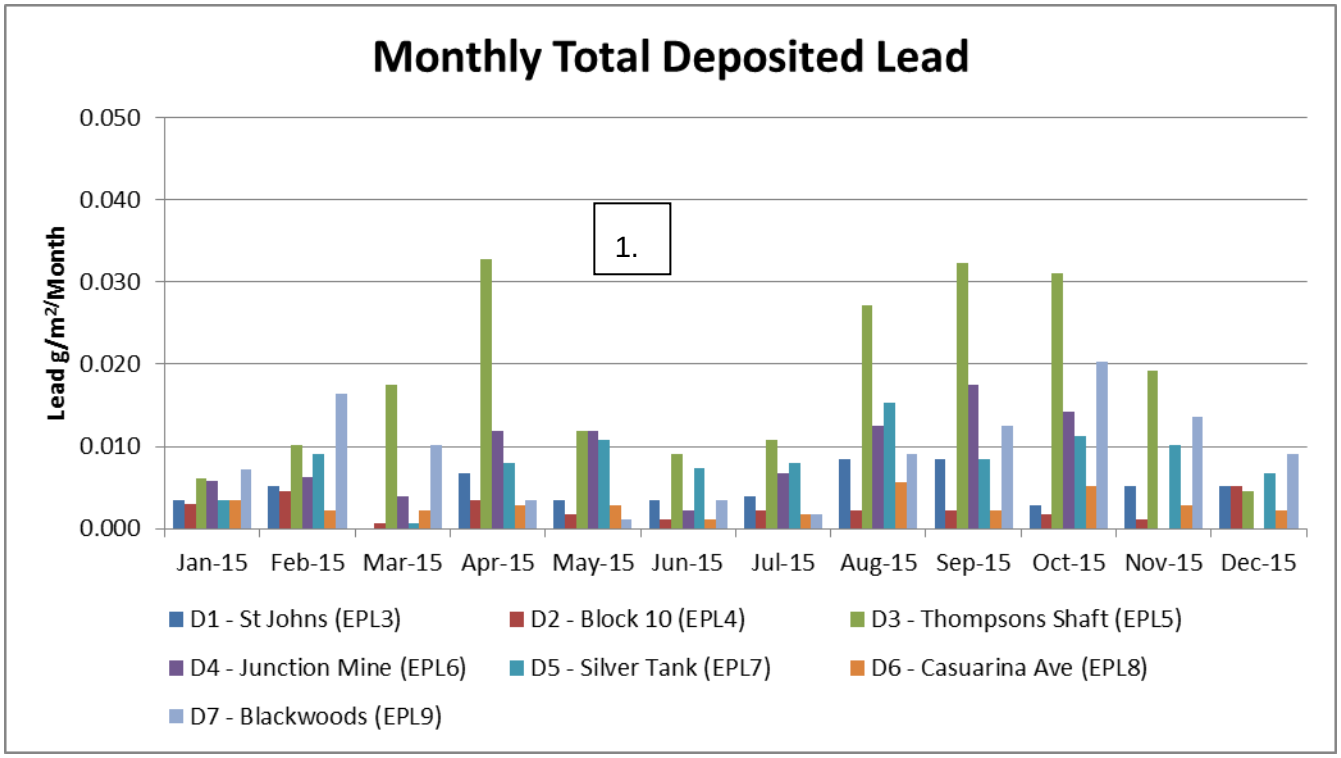


Figure 13: Monthly Total Deposited Lead

1. Samples at Thompson's shaft spiked in lead concentration in April, August and September. Nearby vegetation and buildings have been identified as potential sources. Nearby vegetation was removed in September. A clean up of the haul road adjacent Thompsons shaft was also carried out in September. The haul road will continue to be monitored. Further investigation is required with regard to nearby buildings, it is suspected the paint on the buildings contains lead and is in poor condition. There is also exposed remnant ore body at the surface in this location which may also contribute as a slightly higher than background influence. The dust bottle location was moved approximately 10m away from the buildings and has delivered a much lower total deposited lead reading for December.

Dust Particulate Concentration High Volume Air Samplers

HVAS1 (EPL10)

The average TSP level for the reporting period was 27.2μg/m3 compared to 22.1 μg/m3 in the previous 12 months. The 12 month lead average has remained low at 0.15μg/m^3 (Table 16).

Table 16: TSP HVAS1 (EPL10) Results Overview

PERIOD	TSP (μg/m^3)			Total Lead (μg/m^3)		
	MIN	MAX	MEAN	MIN	MAX	MEAN
16/12/14 to 31/12/2015	3.30	73.80	27.20	0.01	0.68	0.15
2014 - Previous 12 months	3.03	85.47	22.1	0.00	0.44	0.15

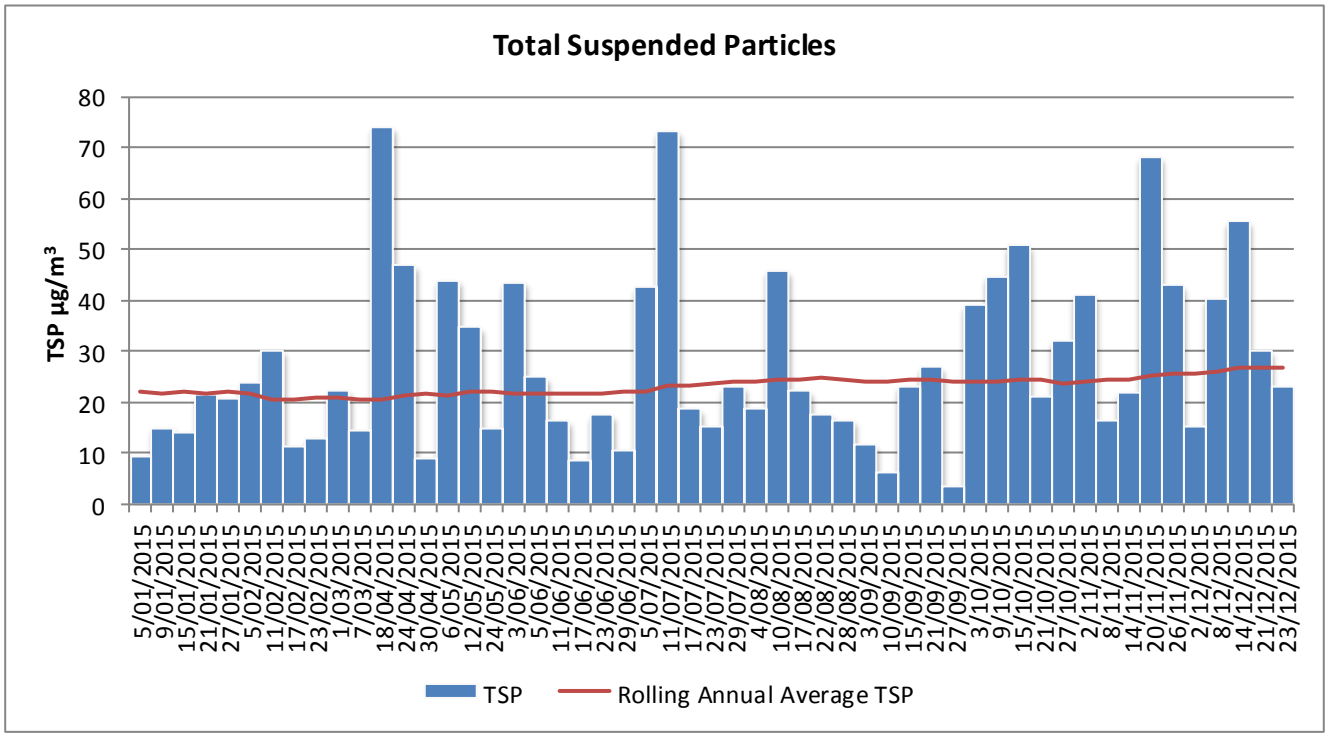


Figure 14: Monthly Total Deposited Dust Silver Tank (TSP)

HVAS2 (EPL 11)

The average PM10 level at this monitoring point was 11.52 μg/m3 which has increased when compared to the previous 12 months of data (Table 17, Figure 15). This result remains well below the criteria of 30μg/m3. The mean lead concentration has reduced.

Table 17: PM10-HVAS2 (EPL11) Results Overview

PERIOD	PM10 (μg/m³)			Total Lead (μg/m³)		
	MIN	MAX	MEAN	MIN	MAX	MEAN
16/12/14 to 31/12/2015	1.50	31.0	11.52	0.00	0.17	0.05
2014 - Previous 12 months	0.06	54.34	8.04	0.00	0.22	0.08

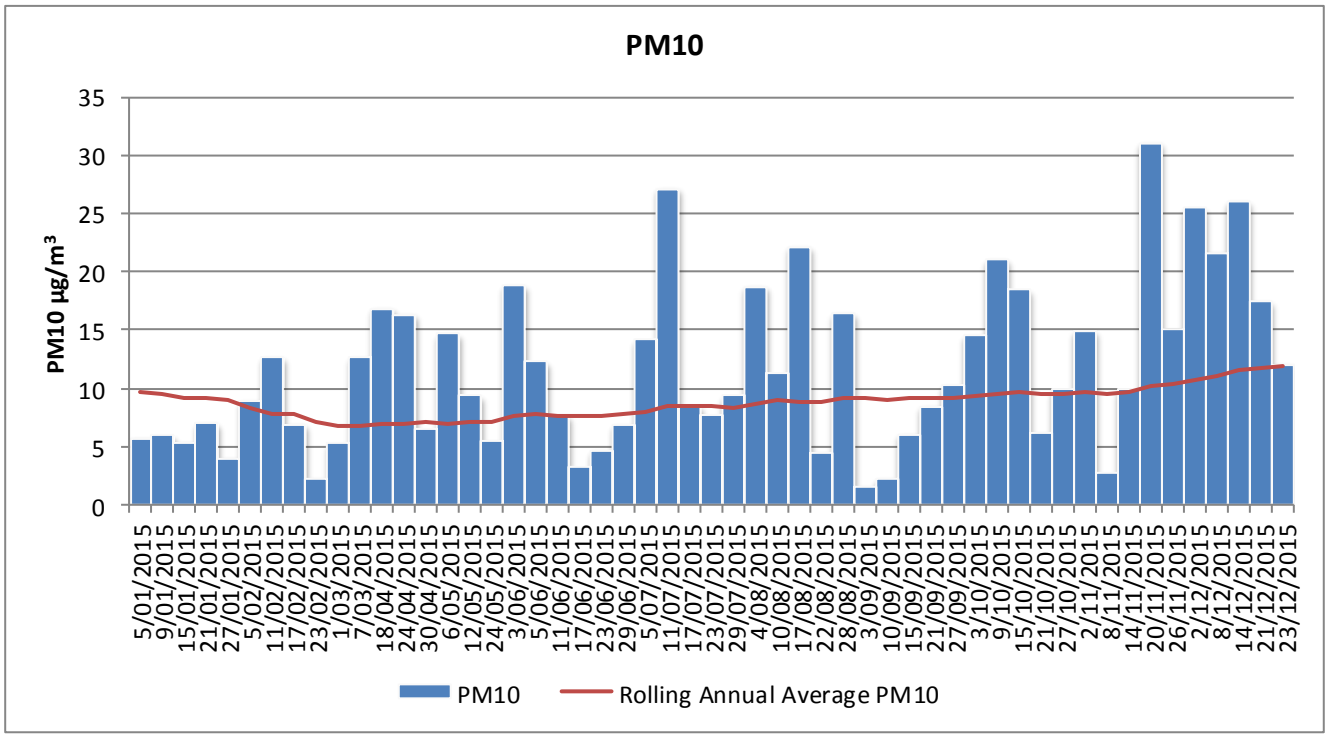


Figure 15: Monthly Total Deposited Dust Silver Tank (PM10)

HVAS 3 (EPL12)

The average PM10 reading at this location was 8.44µg/m^3, which was less than the previous 12 month period (Table 18, Figure 16). However, results indicated that total lead content has increased (0.09µg/m^3 vs 0.05µg/m^3).

Table 18: PM10 HVAS3 (ELP12) Results Overview

PERIOD	PM10 (µg/m^3)			Total Lead (µg/m^3)		
	MIN	MAX	MEAN	MIN	MAX	MEAN
16/12/14 to 31/12/2015	0.05	28.57	8.44	0.01	0.24	0.05
2014 - Previous 12 months	0.05	75.1	10.40	0.00	0.41	0.09

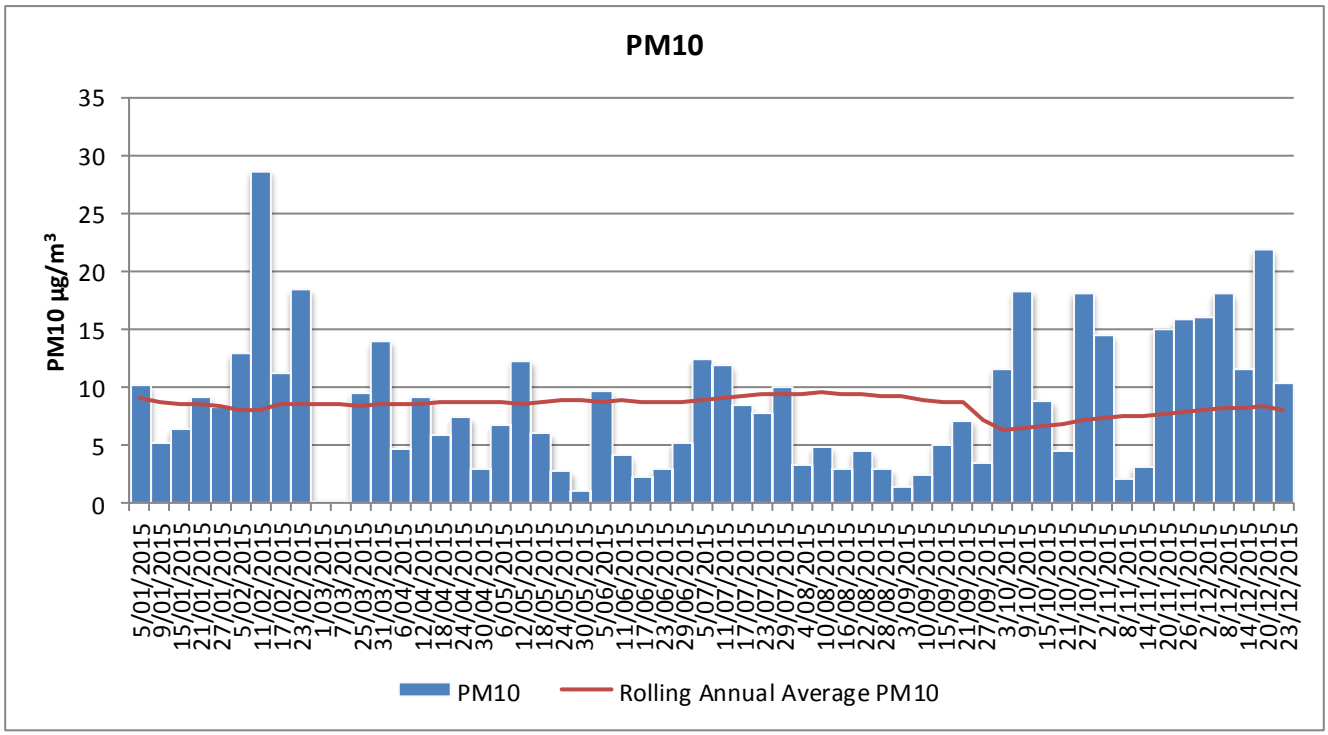


Figure 16: Monthly Total Deposited Dust Blackwood Pit (PM10)

TEOM Monitors

The Rasp Mine has two TEOM monitors which record real time PM10 data. This data is used to manage dust emissions during the day. The monitors provide a real time read out on a kiosk computer in the HSE office which is monitored by HSE personnel. When the level exceeds 50ug/m3, the cause is investigated and where possible controlled by use of the water truck or by modifying work methods. During the reporting period monthly averages did not exceed criteria at either monitoring point.

shows the recorded data at each TEOM for the reporting period.

The annual rolling average for PM10 was not exceeded during the monitoring period.

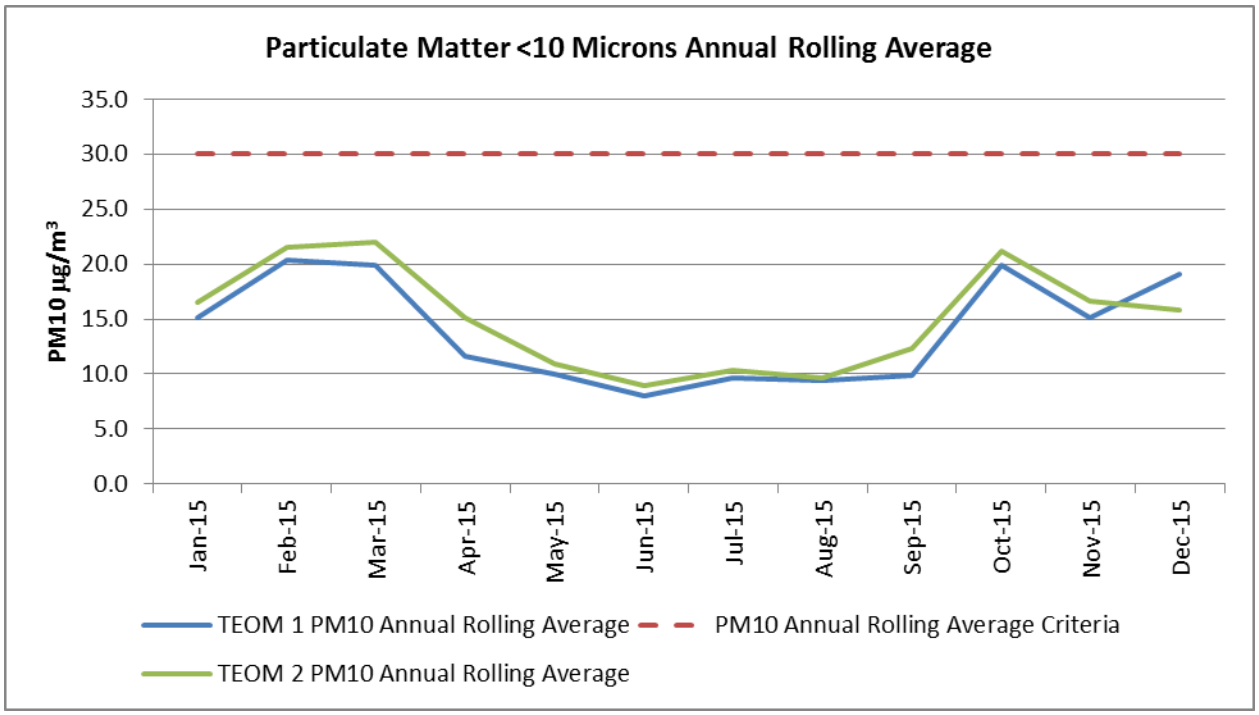


Figure 17: TEOM 1 and 2 Monthly Average PM10 Levels

In-Stack Air Quality

Pacific Environment (now Assured Monitoring Group AMG) were commissioned by CBH Resources to conduct air emissions sampling from two sources at Rasp Mine. The sources sampled were the vent shaft emission point and the mill bag-filter release point.

The sampling on the vent shaft is timed to coincide with blasting activities in the mine. To perform representative sampling on a release point of this size and to achieve reasonable detection limits, the sampling time is calculated to 80 minutes and the sampling is started immediately following the start-up of the sprinklers just prior to the blast. As described in the Rasp Mine Air Quality Monitoring Program, stack testing is conducted quarterly at the ventilation shaft. Water sprays were installed in the vent rise and are used during blasts to maximise suppression of dust. Emission testing is also conducted at the bag house. Tables 19 through 22 show the results of emission testing during the current and previous reporting

period for the Vent Shaft and Mill Baghouse respectively. There has been some variation between sampling periods however all samples were well below limits even when samples were taken at peak emission times during blasting/peak crushing throughput.

Table 19: Emission Testing Results

Vent Shaft 2015							
Element	Units	EPL Limits	Avg.	11-Feb-15	10-Jun-15	2-Sep-15	8-Dec-15
Stack PM Concentration	mg/Nm3	20	2.53	1.28	3.49	4.5	0.842
Nitrogen Oxides (NOx as NO2)	mg/Nm3	350	2.76	4.34	2.61	2.05	2.05
Total Heavy Metals	µg/Nm3	1000	246.05	72.3	680	30.9	201
Volatile Organic Compounds	mg/Nm3	40	0.52	0.724	0.669	0.681	0.005
Vent Shaft 2014							
Element	Units	EPL Limits	Avg.	11-Feb-14	7-Jul-14	22-Oct-14	2-Dec-14
Stack PM Concentration	mg/Nm3	20	5.55	4.2	6.616	8.111	3.255
Nitrogen Oxides (NOx as NO2)	mg/Nm3	350	11.61	36.54	2.61	2.05	5.23
Total Heavy Metals	µg/Nm3	1000	121.78	97.4	88.7	117	184
Volatile Organic Compounds	mg/Nm3	40	0.94	1.16	0.039	1.279	1.279

Table 20: Emission Testing Results

Mill Baghouse 2015							
Element	Units	EPL Limits	Avg.	11-Feb-15	10-Jun-15	2-Sep-15	8-Dec-15
Stack PM Concentration	mg/Nm3	20	7.96	10.6	14.8	5.06	1.39
Total Heavy Metals	µg/Nm3	1000	155.30	286	47.2	100	188
Mill Baghouse 2014							
Element	Units	EPL Limits	Avg.	12-Feb-14	8-Jul-14	22-Oct-14	2-Dec-14
Stack PM Concentration	mg/Nm3	20	5.55	4.99	3.799	7.55	5.85
Total Heavy Metals	µg/Nm3	1000	232.25	126	229	187	387

All results were within the monitoring criteria and no incidents were recorded.

Table 21: Detailed Vent Shaft Results 2015

Release Point Parameter	Unit of Measure									Licence Limit
Emission Point Source ID (NSW EPA)	1	Vent Shaft Release Point								
Round		1		2		3		4		
Date of testing	dd-mm-yy	11/02/2015		10/06/2015		2/09/2015		8/12/2015		
Exhaust Velocity	m/sec	11.5		11.2		10.9		10.4		
Average stack temperature	°C	34.8		10.7		22.0		22.3		
Moisture	%	2.41		2.50		2.37		2.32		
Dry standard stack flow rate	Nm^3/min	11684		11996		11588		11029		
Carbon dioxide concentration	%	0.179		0.00		0.00		0.0216		
Oxygen concentration	%	20.9		21.0		20.9		20.8		
Total solid particulates	mg/Nm^3	1.28		3.49		4.50		0.842		20.0
emission rate	g/min	15.0		41.9		52.1		9.29		
Type 1 and Type 2 substances	mg/Nm^3	0.0723		0.680		0.0309		0.201		1
emission rate	g/min	0.845		8.16		0.357		2.22		
Oxides of nitrogen as (NO_2)	mg/Nm^3	4.34		2.61	<	2.05	<	2.05		350
emission rate	g/min	50.7		31.4	<	23.8	<	22.7		
Volatile organic compounds	mg/Nm^3	< 0.724	<	0.669	<	0.681	<	0.00468		40
emission rate	g/min	< 8.46	<	8.02	<	7.89	<	0.0516		

The results from sampling conducted on the vent shaft release point during this round are consistent with historical data and can be considered in the average range. All parameters were recorded well below the licence limit.

Table 22: Detailed Mill Baghouse Results 2015

Release Point Parameter	Unit of Measure					Licence Limit
Emission Point Source ID (NSW EPA)	2	Mill Baghouse Release Point				
Round		1	2	3	4	
Date of testing	dd-mm-yy	11/02/2015	10/06/2015	2/09/2015	8/12/2015	
Exhaust Velocity	m/sec	20.1	19.8	19.3	18.7	
Average stack temperature	°C	31.2	13.3	16.4	25.0	
Moisture	%	2.10	1.26	1.18	1.73	
Dry standard stack flow rate	Nm^3/min	487	496	496	471	
Carbon dioxide concentration	%	0.0400	0.0400	0.0400	0.456	
Oxygen concentration	%	20.9	20.9	20.9	20.4	
Total solid particulates	mg/Nm^3	10.6	14.8	5.06	1.39	TBD
emission rate	g/min	5.18	7.33	2.51	0.656	
Type 1 and Type 2 substances	mg/Nm^3	0.286	0.0472	0.100	0.188	TBD
emission rate	g/min	0.139	0.0234	0.0494	0.0884	

The results from sampling conducted on the mill baghouse release point from this round can be considered comparable to historical results from this source. There are currently no permit limits specified for this release point.

3.3 Erosion and Sediment

The majority of the existing batters were constructed during former mining operations and consequently the surfaces of the batters consist predominantly of weathered rock. It is not practical to reshape the slopes, as most of the slopes are on the mining boundary, steep and predominantly comprise of large rock aggregate. The process of erosion over the years since the slopes were formed has removed most of the finer materials and the existing surface now comprises relatively large and coarse rock resulting in a self- armoured surface with limited erosion potential.

To limit further erosion of the batters, surface water is diverted by shaping the top area of the landform to allow surface water to drain away from the crest of the slopes. Where this is not possible, open drainage channels divert surface water away from the batter face.

Storage ponds effectively serve as sediment control ponds and limit the movement of sediment throughout and off site. Ponds are routinely inspected quarterly and after significant rain events. Inspections consist of a visual assessment for erosion, flooding, rubbish, algal growth or significant sediment build up.

Erosion and Sediment Control is managed through the Erosion and Sediment Control Procedure.

Monitoring during the reporting period did not identify any serious erosion issues. Due to the low rainfall over the reporting period, there was limited erosion observed.

3.4 Water Usage

Raw water and potable water are supplied by Essential Water with take off valves at the Eyre Street entrance. Raw water (288 ML/annum), water from the town supply, is supplied untreated to the project via existing connections.

Approximately 300 ML/annum of water is reclaimed onsite from various sources to be recycled for the Project, mainly from underground dewatering. If necessary, the reclaimed water will be treated onsite to ensure that it is suitable for use as process water in both the processing plant and underground operations. The sources for the reclaimed water include:

- No. 7 Shaft dewatering (95 ML);
- mine underground operations dewatering (135 ML);
- TSF decant pond (116 ML); and
- stormwater containment dams (amount dependent on extreme rain events as insufficient runoff is collected for pumping during normal rainfall events, therefore no allocation has been made).

Reclaimed water will be returned after treatment at the back fill plant to the process water tank which has a three hour holding capacity or to the Silver Tank which has a capacity of 8 ML.

Water Management

The site water management plan encompasses responses to the relevant planning conditions as outlined in the project approval. The SWMP includes a ground water monitoring programme, sediment control plan, surface water monitoring and maintenance plan, a water balance and communication plan.

Raw Water Monitoring

Raw water is used for firefighting and specific parts of mill processing. Hydrants are located adjacent to the office buildings on Eyre Street, the truck wash facility, workshop and Kintore Pit portal.

Raw water was required for dust control and general construction works where recycled water was not considered feasible (due to potential for cross contamination or unsuitability for the purpose of the intended use).

3.5 Potable Water

Water from the town supply is treated at the Mica Street treatment plant and supplied to the Project via existing connections and is used for showers, toilets, and laundry. Average usage of potable water is 9 ML/annum. Potable water is supplied to the offices, workshop, core shed and processing facility.

3.6 Surface Water Monitoring

There are no natural water courses or creeks flowing through the site. The drainage network layout restricts runoff leaving the active area of the site up to the 1 in 100 year event.

Surface water monitoring includes a weekly visual inspection of water storage facilities, freeboard and structural integrity. The tailings storage facility and the processing events dam are inspected and levels checked monthly. Quarterly water quality samples are taken from dams when the water levels are above 20% capacity.

Surface water analysis for the reporting period was compared to the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 – livestock water quality.* Samples are couriered to ALS, a NATA accredited laboratory for analysis. The majority of the surface water storages do not comply with the guidelines and exceed thresholds for conductivity, pH, lead, zinc and sulphates. However, this is considered typical of surface waters in an operational metalliferous mine, and indicates that high metals are likely attributed to mineralisation of naturally sulphate rich or elevated lead and zinc occurrence in near surface soils (EES, 2013). All waters were contained within the containment structures with no off site discharges during the reporting period.

Stormwater Ponds

Monitoring of water quality of the following stormwater ponds is carried out if the ponds contain water. The water quality results are used to compare with groundwater monitoring bores near the four ponds. The pond water quality of S1-A, S31-1, S31-2, S44, S49, S9B-1 and S9B-2 are measured at least twice a year when the pond has contained water for at least one week and the volume of stored water is at least 20% of the pond capacity. Water results from run off into ponds S31-1 and S31-2 are related to historic mining operations classified as heritage listed slag heaps.

Water sample results are provided in Table 23, and indicate that stormwater has not been an issue throughout the reporting period due to a very dry season and lack of rain. Zinc and Lead are elevated in some cases as would be expected in concentrated areas such as S49 Dam. All water was contained within the containment structures with no off site discharges during the reporting period.

Table 23: Stormwater Pond Water Quality

Sample	Date	pH	EC µS/cm	Sulphates mg/L	Lead mg/L	Zinc mg/L	Iron mg/L
Guideline	**-**	**6 – 9**	**7500**	**1000**	**0.1**	**20**	**NA**
S49 Top Inflow	24/08/2015	6.01	1800	1050	1.25	347	<0.05
S49 Dam	24/08/2015	5.72	795	372	0.434	82.3	<0.05
S49 Ryan Street Weir	24/08/2015	6.2	49	13	0.064	1.75	<0.05
S31-1 Fed Way	24/08/2015	5.96	940	454	1.18	128	<0.05
S31-1 Federation Way	12/01/2015	6.5	676	306	2.4	75.7	<0.05
S9-B2 Bowls Club	24/08/2015	6.5	607	212	0.22	15.5	<0.05

***N/A refers to ponds that did not have adequate water to sample.**

Horwood Dam

Monitoring of surface water in Horwood dam is conducted at least once a year after storm events and when the level of water is within 300 mm ($\pm$ 20mm) from discharge occurring. No water was discharged from Horwood Dam during the reporting period. Monitoring results from the reporting period are presented in Table 24.

Table 24: Horwood Dam Water Quality

Sample	Date	pH	EC µS/cm	Sulphates mg/L	Lead mg/L	Zinc mg/L	Iron mg/L
Guideline	**NA**	**6 – 9**	**7500**	**1000**	**0.1**	**20**	**NA**
Horwood	13/05/2015	6.57	16500	7850	1.65	1390	0.1
Horwood	24/08/2015	6.34	10800	4490	2.43	848	0.05
Horwood	2/09/2015	6.54	10600	4220	1.43	816	0.05

3.7 Ground Water

The regional groundwater near the site is depressed due to long term pumping from the underground mines in the area. This results in the depressed groundwater level below the site being more than 100m below the surface level, with a hydraulic gradient into the site at depth. The groundwater monitoring program is undertaken with the purpose of recording perched groundwater movement. Perched groundwater refers to surface water that has infiltrated into the near surface moderate to high permeability material generally comprising of granular soils and rock drill. The perched ground water exists for short periods of time after rainfall events and generally seeps laterally over the low permeability bedrock surface below the near surface permeable material. The rainfall events at Rasp mine site indicate that the perched groundwater has the potential to surface seep rather than seep into the regional groundwater. Considering the depth of the regional groundwater, it is assumed that there is little hydraulic connection between the shallow perched groundwater and the regional groundwater.

Rasp's ground water monitoring program is outlined in the Site Water Management Plan. The objective of the ground water monitoring program is to;

- Provide a program to monitor seepage movement within and adjacent to the tailings storage facility;

- Provide details of parameters and pollutants to be monitored and background local perched groundwater parameters;
- Establish a contingency measure in the event that an unacceptable impact is identified.

The existing monitoring boreholes provide an early warning sign if seepage is occurring near the CML7 lease boundary. Water from mine dewatering at Shaft 7 and from the mine decline will form part of the groundwater monitoring program. Samples of groundwater are collected every three months, water permitting.

Table 25: Average Groundwater Values for 2015

Sample ID#	Lead (mg/L)	Zinc (mg/L)	Iron (mg/L)	Cadmium (mg/L)	Manganese (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Total Alkalinity (mg/L)	Sulphate as SO4 (mg/L)	Chloride (mg/L)	Bicarbonate Alkalinity CaCO3 (mg/L)	Electrical Conductivity (µS/cm)	pH Value (pH)	Total Dissolved Solids (mg/L)
GW01	1.03	272.00	4.23	0.21	309.00	305.50	457.50	1655.00	1.50	5035.00	1255.00	1.50	10950.00	5.28	10850.00
GW03	1.70	318.50	1.21	1.79	336.25	591.00	403.75	2430.00	15.00	4967.50	2947.50	15.00	15000.00	6.28	12625.00
GW04	0.12	33.55	0.06	0.27	68.00	600.50	513.00	2507.50	222.00	4552.50	2615.00	222.00	14400.00	7.25	11675.00
GW05	0.40	318.50	0.48	0.95	413.00	539.50	739.25	2897.50	133.50	6905.00	2717.50	133.50	16625.00	6.62	14875.00
GW06	0.81	235.64	1.49	0.80	281.56	509.13	528.38	2372.50	93.00	5365.00	2383.75	93.00	14243.75	6.36	12506.25
GW07	0.76	226.55	0.81	0.95	274.70	560.03	546.09	2551.88	115.88	5447.50	2665.94	115.88	15067.19	6.63	12920.31
GW08	0.53	203.56	0.71	0.74	259.32	552.29	581.68	2582.34	141.09	5567.50	2595.55	141.09	15083.98	6.71	12994.14
GW09	0.13	92.58	0.05	1.23	92.34	747.75	467.00	1345.25	284.25	3060.00	1832.50	284.25	10177.50	7.72	8622.50
GW10	0.01	74.37	0.05	0.62	51.70	577.33	486.33	2053.33	188.00	4333.33	2110.00	188.00	13033.33	7.03	10633.33
GW11	0.01	47.65	0.06	0.27	38.33	168.50	149.75	586.50	91.50	1630.00	431.25	91.50	4220.00	7.25	2982.50
GW12	0.05	71.53	0.05	0.71	60.79	497.86	367.69	1328.36	187.92	3007.78	1457.92	187.92	9143.61	7.33	7412.78
Baseline	2.25	3330.00	1.57	6.32	907.00	472.00	395.00	3550.00	40.00	9660.00	1360.00	22.00	13900.00	5.80	8000.00

*Note: Baseline levels based on water collected from Shaft 7 in August 2011 (Section 11.3.1 Site Water Management Plan). Values exceeding a variation of 30% over baseline have been highlighted with the exception of pH.

Most values are within a 30% variance over baseline however chloride, bicarbonate alkalinity and total dissolved solids show a lot of variability across all of the bores Table 25: Average Groundwater Values for 2015. Although seasonal or other non-mining influences have not been characterised at the Rasp Mine, these water quality monitoring results will act to establish initial baseline parameters and trigger levels for the monitoring program. In the interim and until trends in chemical parameters have been established, groundwater quality results for August 2011, will be used as baseline data for assessing changes in groundwater and perched groundwater quality results.

The locations of the monitoring bores are shown in Figure 18 with the function of each bore listed in Table 26.

Table 26: Location and function of Mine Dewatering Samples and Groundwater Monitoring Boreholes

Groundwater Borehole ID/ Mine Dewatering	Location	Function / Purpose
GW01, GW02	South east of Mt Hebbard	To monitor if seepage is occurring from Mt Hebbard
GW03, GW04, GW05, GW06 GW07, GW08, GW09	East of TSF 1	To monitor potential seepage flows from TSF 1 towards the CML7 mine lease boundary
GW10	Downstream of Horwood Dam	To monitor potential seepage north of Eyre Street Dam.
GW11, GW12	Proposed east of Blackwood Pit	Proposed borehole to monitor potentially perched water as a result of potential groundwater mounding from TSF water
GW13, GW14, GW15	Adjacent to storage areas S44, S31-1 and S31-2	To monitor if movement of perched groundwater is occurring from the storages.
GW16	To the west of storage area S49.	To monitor potential seepage west of S49.
Shaft 7	Shaft 7	To assess groundwater quality of pumped water from Shaft 7
Mine Dewatering	Decline at Kintore Pit	To assess groundwater quality at decline

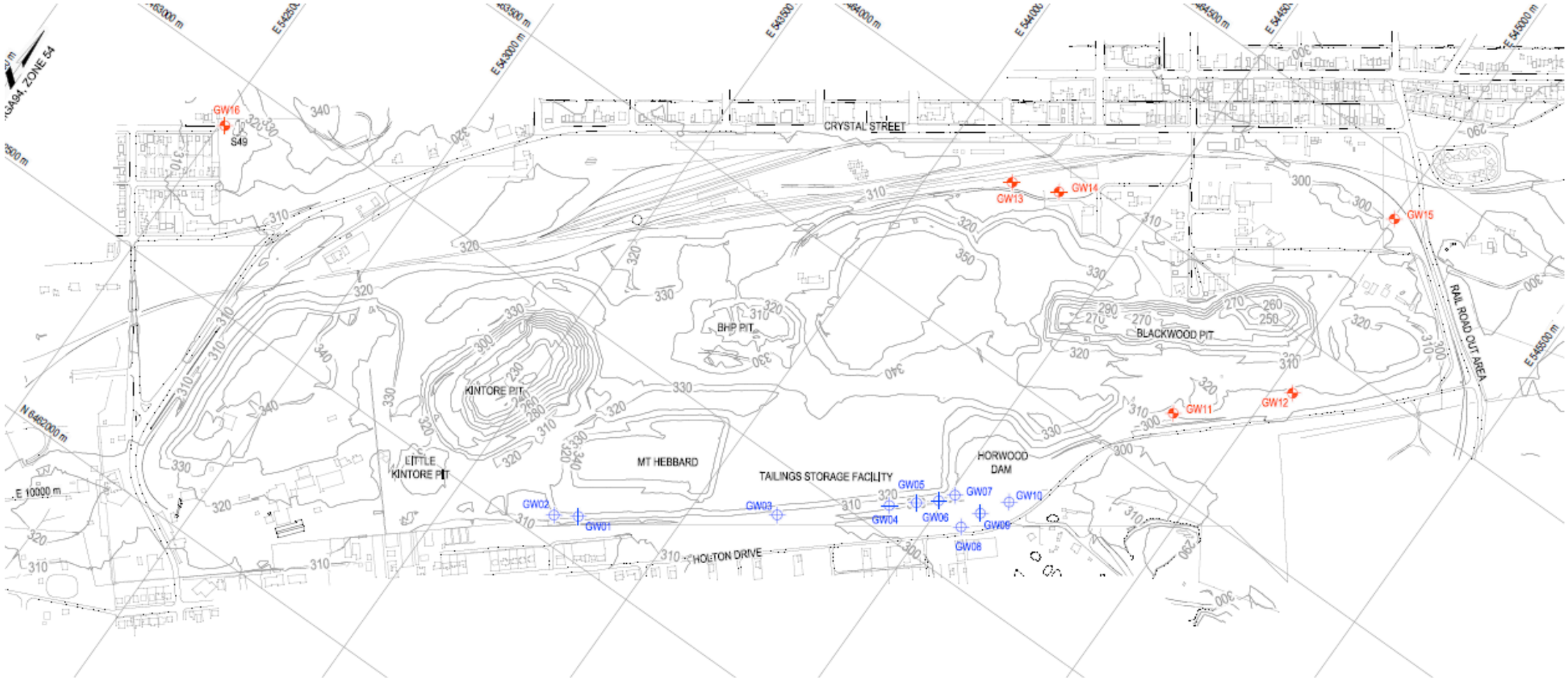


Figure 18: Monitoring Bore Locations (All locations currently installed)

Groundwater levels showed a steadying or very slight decrease in levels during the reporting period (Table 27). Levels in the piezometers can be attributed to low rainfall during the reporting period.

Table 27: Groundwater Bore Depths

	Depth TOC			
Sample	Min.	Max.	Avg. 2015	Avg. 2014
GW01	7.25	7.25	7.25	7.22
GW03	3.6	3.64	3.62	3.56
GW04	2.88	2.92	2.9	2.91
GW05	3.38	3.61	3.495	3.46
GW06	2.66	2.75	2.705	2.71
GW07	2.75	2.84	2.795	2.60
GW08	1.87	1.87	1.87	1.71
GW09	2.97	3.17	3.07	2.93
GW10	1.58	1.87	1.725	1.76
GW11	10.17	10.62	10.395	10.60
GW12	37.1	37.1	37.1	21.94

*Note bores GW2, GW13, GW14, GW15 and GW16 were all dry for the duration of the reporting period

Water from Mine Dewatering

Sampling of mine dewatering from shaft 7 and the mine decline forms part of the groundwater monitoring program. Sampling is carried out at the mine water pond in S22, where water from underground is discharged in to individual storage pond compartments. The central three compartments in S22 are lined for storage of underground water and to limit the risk of possible mixing of underground water with surface water runoff also being stored in S22. Samples taken at the central compartments in S22 are representative of the decline and shaft 7 samples. Sampling from mine dewatering is carried out monthly. All measured parameters were within 30% of the baseline levels for both shaft 7 and the UG supply during 2015 (**Error! Reference source not found.**).

Table 28: Shaft 7 and UG Water

Sample ID#	Lead (mg/L)	Zinc (mg/L)	Iron (mg/L)	Cadmium (mg/L)	Manganese (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Total Alkalinity (mg/L)	Sulphate as SO4 (mg/L)	Chloride (mg/L)	Bicarbonate Alkalinity CaCO3 (mg/L)	Electrical Conductivity (µS/cm)	pH Value (pH)	Total Dissolved Solids (mg/L)
U/G Supply	1.26	1008.46	0.89	2.28	312.77	500.73	243.13	1278.48	10.70	5017.27	946.46	10.70	10575.96	6.45	10023.74
Shaft 7	1.26	1008.46	0.89	2.28	312.77	500.73	243.13	1278.48	10.70	5017.27	946.46	10.70	10575.96	6.45	10023.74
Baseline	2.25	3330	1.57	6.32	907	472	395	3550	40	9660	1360	22	13900	5.8	8000

*Note: Baseline levels based on water collected from Shaft 7 in August 2011 (Section 11.3.1 Site Water Management Plan). Values exceeding a variation of 30% over baseline have been highlighted with the exception of pH.

3.8 Contaminated Land

The majority of the surface land area that makes up the Rasp Mine is historic mining waste material including waste rock emplacements and tailings.

The storage and handling of diesel fuels, lubricants and oils, and waste rock material are the only aspects of the operation that have the potential to contribute to contaminated land.

There were no spills or land contamination incidents reported to the EPA during the reporting period due to the incidents being under the 205 litre threshold.

3.9 Hydrocarbon Management

The main streams of hydrocarbons managed on site include:

- Fuel (diesel); storage and distribution;
- Grease oils and lubricants; storage distribution and recovery for recycling; and,
- Solvents used in the parts washer.

Fuel

Diesel is stored in two tanks each with a capacity of 68,000L. These self-bunded tanks are located east of the workshop on a constructed concrete re-fuelling station. The facility has been designed and manufactured in accordance with AS1940 and AS1692. BHOP has provision for diesel storage on its Dangerous Goods Licence, UN 00C1 Diesel 150,000 L. Surface distribution of diesel is by direct collection from the fuel browser. The tanks operate on a float and cut-off system that prevents overfilling of the tanks.

Rasp's fuel management system enables monitoring of fuel usage by each vehicle and piece of plant. This assists with maintenance and security as well as providing an accurate reporting mechanism for the collecting of data for NPI and NGERS reporting.

Grease, oils and lubricants

Lubricants and oils are stored in individual pods located on a portable bund. A storage facility for these lubricants and oils has been constructed on the western side of the main workshop. It consists of a raised concrete pad incorporating drainage to a sump to facilitate cleaning.

Solvents

Oil solvent used for cleaning of mechanical parts at the workshop is removed by a contractor on a fixed maintenance schedule.

Processing Reagent Storage

All reagents are stored in a purpose built storage facility designed to prevent contamination and capture spillage.

The reagents stored here include:

- Hydrated Lime

- Copper Sulphate
- Methyl isobutyl carbinol
- Sodium metabisulphite
- Sodium ethyl xanthate
- Sodium isopropyl xanthate
- Flocculant

All quantities and map with locations are reference in the Pollution Incident Response Management Plan.

3.10 Flora and Fauna

The site is a highly disturbed environment that provides little value as native flora and fauna habitat. There have been no threatened flora, fauna or species habitat identified at the Rasp Mine.

3.11 Weeds

Weeds are managed on an as needs basis with Trevor Hicks Pest Control engaged to spray any weed infestations. There have been no reported outbreaks during the reporting period.

3.12 Blasting

Blast monitors are installed at five locations around site as per licence requirements. A roving blast monitor is also utilised for determining more information about ground conditions and vibration movement at various locations. When a blast complaint is received, the person is given the opportunity to have the roving monitor placed at their location. The aim of this is to assess community impact and also to gather information for future blast design. The Environment Protection Licence limits are given in Table 29 and Table 30.

Table 29: Overpressure Sound Level and Ground Vibration (excluding Block 7, Western Mineralisation and Main Lode)

Location	Airblast Overpressure (dB – Lin Peak)	Ground Vibration	Allowable Exceedance
Residence on privately owned land	115	5	5% of the total number of blasts in any 12 month annual return reporting period
Residence on privately owned land	120	10	0%

Table 30: Overpressure Sound Level and Ground Vibration (Block 7, Zinc Lode)

Location	Airblast Overpressure (dB – Lin Peak)	Ground Vibration	Allowable Exceedance
Residence on privately owned land	115	3 (interim)	5% of the total number of blasts in any 12 month annual return reporting period
Residence on privately owned land	120	10	0%

As per Project Approval, blasting times are stipulated for production blasting and only occur between 6.45am and 7.15pm on any day. Development firing usually occurs at the end of every shift however under certain circumstances firings are completed during the shift.

Airblast overpressure of 115 dB was exceeded less than 5% of the time for the total number of blasts over the reporting period. All other airblast criteria were met.

A total of 121 production blasts and 1785 development blasts were fired at Rasp mine outside of Block 7 in the Western Mineralisation and the Main Lode mine site over the reporting period. 9 blasts exceeded 5mm/sec and no blasts exceeded the absolute limit of 10mm/sec. This gives a total exceedance rate of 0.5%, well within licence limits.

432 blasts were conducted in Block 7 Zinc Lode, with only 1 blast exceeding 3mm/sec. total exceedance rate was 0.23%, well below licence limits.

3.13 Operational Noise

During the reporting period noise was generated by operation activities, movement of heavy vehicles and delivery trucks leaving and entering site.

Operational Noise Criteria and Control Measures

The length and height of the existing earth bund along the southern haul road (from Kintore Pit to ROM pad) has been extended during the reporting period See Figure 2, page 25.

Operational Noise Monitoring

Quarterly noise monitoring was completed as per the Pollution Reduction Program (PRP) on EPL 12559. Four noise assessments have been undertaken since November 2014. EMGA Mitchell McLennan Pty Limited (EMM) completed the analysis for all assessments.

A final summary report was produced by EMM for submission to the EPA. Currently a licence variation has been sought to close out the PRP.

3.14 Visual, Stray Light

All light towers around machinery have been designed to face light away from residents. There were no light complaints for the reporting period.

3.15 Indigenous Heritage

There are no known significant indigenous sites within CML7.

3.16 Natural and Social Heritage

BHOP has engaged GML Heritage to prepare a Conservation Management Strategy (This work is ongoing). This is to allow sufficient consultation to occur particularly with Broken Hill City Council. Discussions have occurred with DPE and BHOP has sought an extension to the completion of this work. The final document will be a Conservation Management Plan including an updated inventory of all heritage items on site.

3.17 Spontaneous Combustion

Products with high sulphur content (tailings, ore and concentrate) are prone to spontaneous combustion. Combustion is caused by the oxidation of the sulphides, which is an exothermic

chemical reaction that causes heat build-up, and the remaining sulphides to start smouldering. In extreme cases the sulphides may burn producing a flame. Requirements for combustion to occur are high sulphur material, oxygen, moisture and sufficient material to generate heat build-up. No incidences occurred during the period.

3.18 Bushfire

Restriction of Fires on Site

No incidences occurred during the period

Fire Control

Hydrants supplied with town water are located on site have fireboxes with hoses located nearby. BHOP has a fully equipped fire truck available at all times to respond to fires. BHOP also has a trained mines rescue team for the purpose of firefighting.

3.19 Mine Subsidence

Subsidence Monitoring

No incidences occurred during the period.

3.20 Methane Drainage/Ventilation

Methane is routinely monitored for underground workings and during underground drilling. No methane ventilation issues occurred during the reporting period.

3.21 Public Safety

The mine site is clearly signposted and fenced to restrict any unauthorised access. The majority of the BHOP surface area of CML7 is fenced and secured by locked gates or is bunded to discourage access. Therefore, the only significant public safety exposures will be if there is illegal or unauthorised public access to the CML7.

The control plan for such exposures are:

- Public access to the lease will be strictly controlled via security gates.
- All visitors accessing the site will be required to report to the administration office prior to entering and after existing the lease.
- All visitors to the lease will undergo a visitor's induction before entering the lease and will be accompanied by a fully inducted employee or contractor at all times.
- All contractors will have to undergo the appropriate induction prior to commencing any work on site.
- Regular inspections are undertaken of the lease boundary to check that the site fences are fit for purpose and that site access gates are secure.

Visitors to the mine are only allowed on site with management approval and are required to undertake a visitor briefing (induction), and are accompanied by a site representative at all times. Visitor briefing cards are distributed to ensure key information is readily at hand for visitors. Visitors must follow site policies and conform to personal protective equipment (PPE) requirements.

All employees and contractors complete a general induction and work area specific inductions where required (e.g. underground, mill).

3.22 Radiation

During the reporting period, BHOP's Radiation Licence to Sell/Possess no. RML43782 was converted to a new Radiation Management Licence no. 5063802. The renewal period on this licence is two years. The radiation officer monitors all renewal dates via the central compliance register. An external contractor conducts six monthly inspections of the individual radiation gauges on site.

3.23 Environmental Incident Management

All environmental incidents are reported via the Rasp Incident Management Procedure. A summary of the incidents for the reporting period are shown in Table 31. Rasp maintains a Pollution Incident Response Management Plan on the CBH Resources website in accordance with EPA requirements.

A total of eight environmental incidents were registered during the reporting period. The majority of incidents related to the management of leaks and spills on site. As a result of BHOP's open reporting culture, these incidents were promptly reported. There were no reportable EPA incidents during the reporting period. The majority of incidents related to minor spillages.

Table 31: Environmental Related Incidents for Reporting Period

Date	Reference	Event Type	Event Subtype	Description	Actual / Potential	Status	Close Out
4-Jan-15	960	Environmental	Spill	while delivering shotcrete 100lt of concrete was spilled on Eyre Street	Minor / Minor	Closed - Late	9-Mar-15
12-Apr-15	1024	Environmental	Spill	Defoamer reagent spill	Moderate / Moderate	Closed - Late	27-Aug-15
5-May-15	1037	Environmental	Spill	Telly Handler tine punctured an hole in a plastic tote	Minor / Moderate	Closed - Late	25-Jun-15
7-Jun-15	1072	Environmental	Spill	Diesel spill at Blackwoods Pit	Moderate / Moderate	Closed - On Time	9-Jun-15
23-Aug-15	1119	Environmental	Spill	Lime sock Blockage	Minor / Minor	Closed - Late	10-Sep-15
6-Oct-15	1145	Environmental	Spill	Emulison spill	Significant / Significant	Pending - Late	

Date	Reference	Event Type	Event Subtype	Description	Actual / Potential	Status	Close Out
6-Oct-15	1146	Environmental	Other	oily waste in general waste skip bin	Minor / Minor	Closed - Late	17-Dec-15
21-Oct-15	1152	Environmental	Other	Incorrect storage of hydrocarbons and batteries	Minor / Moderate	Closed - Late	2-Dec-15
8-Dec-15	1177	Environmental	Spill	tails spill 8/12/15	Moderate / Moderate	Closed - Late	18-Feb-16

4. COMMUNITY RELATIONS

4.1 Environmental Complaints

During the period of the AEMR BHOP has maintained a register for community complaints and concerns. A total of eight complaints (Table 32) were received over the reporting period all related to blasting vibration. BHOP has made significant steps to improve blasting over the reporting period. All complainants were followed up, contacted and complaints closed out.

Table 32: Complaints Register

Date of Complaint	Reason for Call	Comment
26th February 2015	Blasting (Vibration)	Complaint made to EPA by anonymous person. Caller indicated they live in Wills Street
2nd March 2015	Blasting (Vibration)	Complaint made to EPA, EPA formally requested follow up by Rasp Mine
23rd April 2015	Blasting (Vibration)	Large blasts were reported to the Environmental Officer. Monitor was set up at premises and vibration levels were within licence limits
11th May 2015	Blasting (Vibration)	Anonymous complaint received by EPA, blasting data was requested and sent to EPA
29th May 2015	Blasting (Vibration)	Informal complaint received from resident in Argent Street. Tech Services were informed of complaint
31st August 2015	Blasting (Vibration)	Informal complaint received from resident in Argent Street. Tech Services were informed of complaint
22nd July 2015	Blasting (Vibration)	Formal complaint received by EPA, EPA requested formal investigation. Investigation was also sent to mines inspector
27th July 2015	Blasting (Vibration)	Formal complaint to EPA received from resident, blast monitor was set up at premises, vibration levels within licence limits

5. REHABILITATION

5.1 Buildings

There were no buildings erected or demolished during the year.

5.2 Rehabilitation and Disturbed Land

Table 33 and Table 34 detail disturbed areas. No new areas were disturbed during the reporting period.

Table 33: Rehabilitation Summary

	Area Affected / Rehabilitated (hectares)		
	To date 16/4/2014-31/12/2015	**Last Report 1/4/2014-16/12/2014**	**Next Report 1/1/2016 – 31/12/2016**
A: MINE LEASE AREA			
A1 Mine lease(s) Area	226.4	226.4	226.4
B: DISTURBED AREAS			
B1 Infrastructure area (other disturbed areas to be rehabilitated at closure including facilities, roads)	64.5	64.5	64.5
B2 Active Mining Area (excluding items B3 – B5 below)	11.5	11.5	11.5
B3 Waste emplacements, (active / unshaped / in or out-of-pit)	1.92	1.70	2.27
B4 Tailings emplacements (active / unshaped / uncapped)	3.8	3.8	3.8
B5 Shaped waste emplacement (awaits final vegetation)	0.0	0.0	0.0
ALL DISTURBED AREAS	77.2	77.2	77.2
C REHABILITATION			
C1 Total Rehabilitated area (except for maintenance)	149.1	149.1	149.1
D REHABILITATION ON SLOPES			
D1 10 to 18 degrees	4.1	4.1	4.1
D2 Greater than 18 degrees	14.7	14.7	14.7
E SURFACE OF REHABILITATED LAND			
E1 Pasture and grasses	N/A	N/A	N/A
E2 Native forest / ecosystems			
E3 Plantations and crops	2.6	2.6	2.6
E4 Other (include non-vegetative outcomes)	151.3	151.3	151.3

Table 34: Maintenance Activities on Rehabilitated Land

	Area Treated (ha)		
NATURE OF TREATMENT	**Report Period**	**Next Period**	**Comment / control strategies / treatment detail**
Additional erosion control works (drains re-contouring, rock protection)	0	0	N/A
Re-covering (detail further topsoil, subsoil, sealing etc)	0	0	N/A
Soil treatment (detail – fertiliser, lime, gypsum etc)	0	0	N/A
Treatment / Management (detail – grazing, cropping, slashing etc)	0	0	N/A
Re-seeding / Replanting (detail – species density, season etc)	0	0	N/A
Adversely Affected by Weeds (detail – type and treatment)	0	0	N/A
Feral animal control (detail – additional fencing, trapping, baiting etc)	0	0	N/A

There are currently no previously rehabilitated areas apart from a small waste rock trial carried out in 2015 approx. 2200m2 was covered.

6. ACTIVITIES PROPOSED IN THE NEXT AEMR PERIOD

At the time of writing, the following activities were proposed for the 2016 reporting period (Table 35).

Table 35: Works Schedule

Activity	Proposed Completion Date	Status
Conservation Management Plan (heritage)	June 2016	Drafted management strategies, for review by Council
Finalise MOP for 2015-2018 period	March 2016	Document has been submitted with amendments, waiting on final approval
Dust suppression chemical spraying	June 2016	Chemical have been delivered to site and will gradually be applied to free areas and batter slopes
Waste Rock Trial on batter slopes approximate area 3500m2	Ongoing – proposed start July 2016	Proposed areas have been identified, method has been developed (Figure 19)

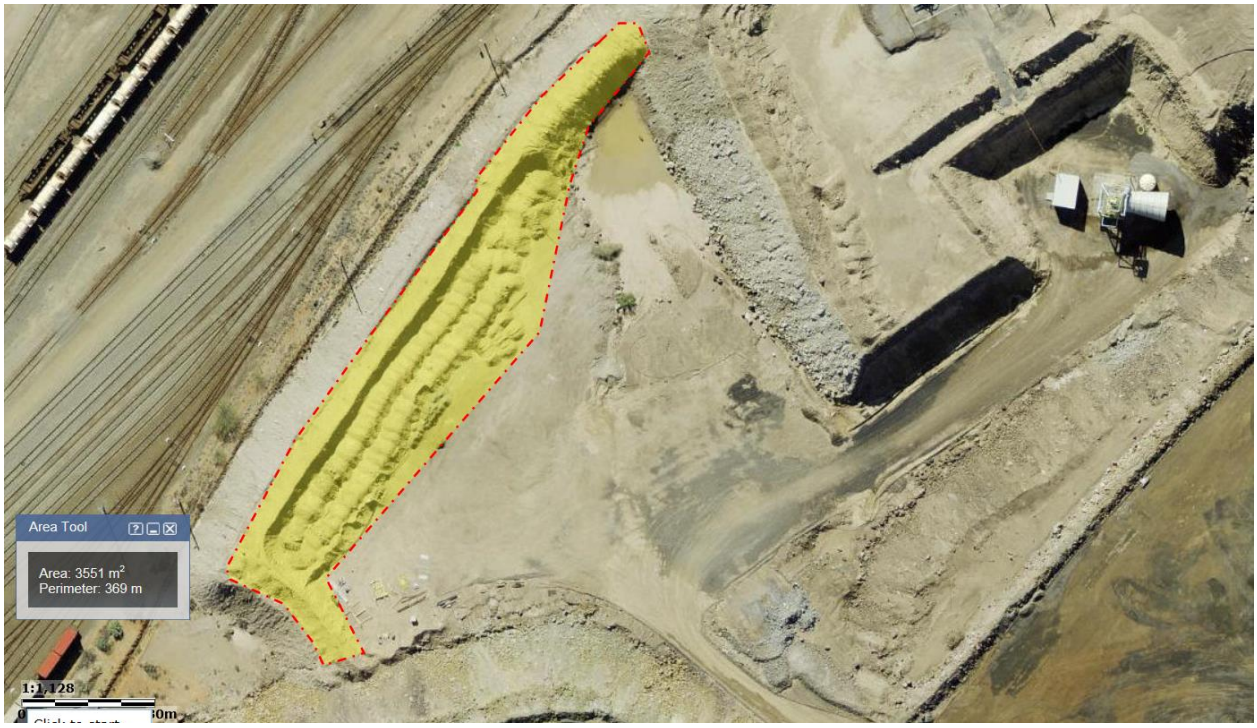


Figure 19: Proposed waste rock trial area, northern lease boundary adjacent main vent shaft