Rasp Mine

Zinc – Lead – Silver Project

Project Approval No. 07-0018

January 2011

Waste Management Plan

BHO-PLN-ENV-005

Revised April 2023

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1. Background

1.1. Purpose

A general environmental duty of care exists to manage and control waste materials under Commonwealth and New South Wales legislation. Policies and guidelines become mandatory if referred to in Commonwealth or State Legislation and license or approval conditions.

Broken Hill Operations Pty Ltd (BHOP), a wholly owned subsidiary of CBH Resources Limited (CBH), has developed this *Waste Management Plan* (WMP) to ensure that BHOP meets all legal obligations surrounding waste generation, storage and disposal, and operational waste is suitably managed in accordance with the Environmental Protection License 12559 and Project Approval 07_0018, Schedule 3 Conditions 32, 33 and 33A, at the BHOP site.

1.2. Scope

This WMP applies to any waste generated by employees, contractors and processes at the Rasp Mine located on Consolidated Mine Lease 7 (CML7) in Broken Hill, and all personnel and work activities conducted under the direction of BHOP at the Rasp Mine.

1.3. Objectives

The purpose of this WMP is to ensure the safe and responsible segregation and disposal, storage, or recycling of mineral and non-mineral waste generated by BHOP at RASP Mine. This plan has been created to minimise potential impacts to human health and the environment from waste generation.
The main objectives of this WMP are to:

- maintain compliance with the conditions in the Project Approval, the EnvironmentalProtection License (EP License) and related legislation associated with waste;
- comply with State and Commonwealth legislative requirements and endeavour to meetbest practice industry standards and waste disposal guidelines.
- identify and characterise waste generated on-site;
- minimise waste generation at source;
- ensure waste is managed in a way that minimises the risk of adverse effects of waste disposal on the local and regional environment ensuring that pollution of air, land andwater are prevented; and
- ensure disposal areas are managed and maintained; and
- ensure a waste recycling program is in place to foster the Reduce, Reuse and Recyclephilosophy.
- Ensure the storage of tailings is conducted in a manner that is safe and sustainable in thelong-term.

1.4. Performance targets

BHOP aims to store and dispose of waste in accordance with relevant Australian Standards, legal conditions, and relevant legal obligations, recycle and reuse waste products wherever

economical feasible and practicable.

Various key performance indicators will be used to assess performance against waste management targets seen in **Table 1-1**.

Table 1-1 Waste Management Targets & Performance Indicators

Target area	Objective	Key Performance Indicator
Avoidance at source	Avoid generation of waste through adoption of innovative purchasing practices.	Initiatives adopted by suppliers to prevent or reduce generation of waste (e.g. packaging).
Reducing toxicity in products and materials	Avoid using toxic products and materials where possible.	Safer alternatives to all toxic products and materials identified, and implemented where practicable.
Segregation at source	Segregate all wastes appropriately.	Correct bins provided at suitable locations around the site. Correct segregation of waste.
Storage of waste	Store wastes in appropriate facilities.	Storage areas bunded and/or lined as required to prevent contamination.
Minimisation of waste to landfill	Maximise recycling or reuse of waste.	Preferential use of products that can be reused or recycled. Correct segregation of waste. Identification of recycling opportunities.
Compliance with regulations	Manage all wastes in accordance with relevant legislation.	Correct segregation of wastes. Tracking and recording of regulated wastes. Additional education for roles managing regulated wastes.
Storage of tailings	Safe and sustainable in the long-term	No release of material or contamination of air, land and water as a result of storage.

1.5. Mine Waste Streams

This WMP covers the management of mineral and non-mineral waste, including;

- Mineral Waste
- Non-mineral waste

This WMP provides for suitable management of the waste types listed above, taking into account underground and surface operations at BHOP in accordance with the Project Approval and Environmental License conditions below in section 1.4 and 2.5.

Waste generated will be managed in accordance with relevant legislation and guidelines, including the Protection of the Environment Operations (Waste) Regulation 2014, the Waste Avoidance and Resource Recovery Act 2001, and the Environmental Protection Authority (EPA) Waste Classification Guidelines (EPA, 2014).

1.6. Roles and responsibilities

Table 1-2 Roles and Responsibilities

Title	Responsibility
General Manager	Provide the required resources and support to implement the WMP. Authorise the implementation of the WMP. Participate in annual reviews of the WMP. Review and sign off incident reports to government agencies.
Department Managers	Provide resources required to implement the actions from the WMP and associated procedures. Allocate responsibilities within their department for the implementation of the WMP. Ensure all personnel undertaking works in relation to the WMP are trained and competent; Implement waste management measures as required. Participate in reviews of the WMP. Conduct regular inspections in their area to ensure compliance with waste management procedures. Investigate and report incidents.
Senior Environmental Advisor	Prepare and maintain the WMP. Submit the reviewed waste management plan to Regulatory authorities for review and approval. Monitor and review the standards and procedures required to implement the WMP. Consult with regulatory authorities as required. Undertake waste inspections and monitoring as required. Provide recommendations for continual improvement of the WMP and associated procedures. Record and report on waste disposal data. Report waste management performance via site meetings and reports, and annual environmental reviews required by government agencies. Report incidents to government agencies and prepare and submit written incident reports. Audit waste management practices on a regular basis and provide feedback to relevant site management. Record and follow up on community enquires and complaints, and close out.
BHOP Personnel and Contractors	Record and follow up on community enquires and complaints, and close out. Participate in training to implement the standards and procedures for waste management as required to maintain competency levels. Follow the procedures to implement the WMP in their area. Segregate wastes at the source where appropriate. Use the waste facilities in their area correctly. Look for opportunities to minimise waste generated in their work area.

2. Legal Obligations

2.1. Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) governs the requirements for waste generators in terms of storage and lawful disposal of waste. The POEO Act establishes the waste generator as having responsibility for the correct management of waste, including final disposal.

BHOP will ensure that the mine will comply with the requirements of the POEO Act, through the adoption of a waste hierarchy philosophy of Avoid, Reuse, Recycle and Disposal.

2.2. Waste Avoidance and Resource Recovery Act 2001

The objectives of the *Waste Avoidance and Resource Recovery Act 2001* (WARR Act) are to:

(a) encourage the most efficient use of resources and to reduce environmental harm inaccordance with the principles of ecologically sustainable development (ESD),

(b)ensure that resource management options are considered against a hierarchy of thefollowing order:

i. avoidance of unnecessary resource consumption,

ii. resource recovery (including reuse, reprocessing, recycling and energy recovery),

iii. disposal

(c) provide for the continual reduction in waste generation

(d) minimise the consumption of natural resources and the final disposal of waste byencouraging the avoidance of waste and the reuse and recycling of waste,

(e) ensure that industry shares with the community the responsibility for reducing and dealingwith waste,

(f) ensure the efficient funding of waste and resource management planning, programs andservice delivery,

(g) achieve integrated waste and resource management planning, programs and servicedelivery on a State-wide basis,

(h) assist in the achievement of the objectives of the *Protection of the Environment OperationsAct 1997*.

A waste management plan is a requirement for new developments in NSW. It must be written with reference to the *NSW Waste Avoidance and Resource Recovery Strategy 2014-21*, made under the WARR Act. Waste will be managed in accordance with the waste hierarchy asillustrated by Figure 2-1.

Figure 2-1 Waste Minimisation Hierarchy (NSW EPA)

The production of non-mineral waste will be controlled and reduced through the accurate ordering of materials and the avoidance of over-ordering and potential wastage of materials. All materials, which are available for recycling, will be collected and recycled off-site. Only materials which cannot be reused or recycled will be disposed of to an appropriately licensed facility.

BHOP will investigate possible uses for grey water from the site office, bathhouse and other amenities for re-use around the mine site.

BHOP will manage wastes on site in accordance with legal requirements listed in this section of the WMP. All contractors removing waste from site will be suitably licensed with appropriate governing bodies as required. The movement of trackable wastes will be recorded in accordance with the relevant legislation.

2.3. State guidelines

Other relevant guidelines in the management of waste in NSW include:

2.3.1. *Waste Classification Guidelines (NSW EPA, 2014).*

2.4. Project Approval

Based on the original EA for Application 07_0018, the Department of Planning and Environment (DPE) granted approval in January 2011. There have since been modificationsto the original consent.

The most recent version is Modification 10 (MOD10), dated December 2022, which was for;

- Temporary Tailings Stockpile

Conditions of this Approval relating specifically to waste management are outlined in **Table 2-1** together with the relevant section(s) within this document where the Condition is addressed.

Table 2-1 Project Approval Conditions for Waste Management

Condition	Obligations	Section of the WMP
Schedule 3 Condition 10	Video recording equipment shall be installed to assist in the active management of emissions from the tailings storage facility.	Section 3.2.8
Schedule 3 Condition 32	The Proponent shall: minimise the waste generated by the project; and ensure that the waste generated by the project is appropriately stored, handled, and disposed of, to the satisfaction of the Secretary.	Whole of document
Schedule 3 Condition 33	The Proponent shall prepare and implement a Waste Management Plan for the project to the satisfaction of the Secretary. This plan must: be prepared in consultation with RR, and submitted the Secretary for approval by the end of March 2011; identify the various waste streams of the project; estimate the volumes of tailings and other waste material that would be generated by the project; describe and justify the proposed strategy for disposing of this waste material; describe what measures would be implemented to meet the requirements set out above in condition 32; and include a program to monitor the effectiveness of these measures.	Whole of document Section 3.1 Section 3 Section 3.2.3 Section 3.2.3 Section 3.2.3, 3.6, 3.7, 3.8 Section 3.6, 3.7, 3.9.3, 3.9.4

Condition	Obligations	Section of the WMP
Schedule 3 Condition 33A	The Proponent must update the Waste Management Plan required by condition 33 of this approval by December 2017, unless the Secretary agrees otherwise. The updated plan must include: a long-term waste management strategy; and an action plan for the implementation of the key measures proposed to achieve the strategy. Following approval, the Proponent must implement the plan.	 Section 3.2.9 Section 3.1
Schedule 4 Condition 2	The Proponent shall ensure that the management plans required under this approval are prepared in accordance with relevant guidelines, and include: detailed baseline data; a description of: the relevant statutory requirements (including any relevant approval, licence or lease conditions); any relevant limits or performance measures/criteria; and the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures; a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria; a program to monitor and report on the: impacts and environmental performance of the project; and effectiveness of any management measures (see (c) above); a contingency plan to manage any unpredicted impacts and their consequences; a program to investigate and implement ways to improve the environmental performance of the project over time; a protocol for managing and reporting any: incidents; complaints; non-compliances with the conditions of this approval and statutory requirements; and exceedances of the impact assessment criteria and/or performance criteria; and a protocol for periodic review of the plan.	 Section 3 Section 1.4, 2, 2.5, 3.6, 3.7, 3.9.3 Section 1.4, 3 Section 3, 3.6, 3.7, 3.9.3 Section 3, 3.9 Section 3.6, 3.7, 3.9.3 Section 3.9 Section 3.9.4
Schedule 4 Condition 5	The Secretary must be notified in writing via the Major Projects website immediately after the Proponent becomes aware of an incident. The notification must identify the project (including the development application number and the name of the development if it has one) and set out the location and nature of the incident. Subsequent notification requirements must be given, and reports submitted in accordance with the requirements set out in Appendix 5.	Section 3.9
Schedule 4 Condition 5A	The Secretary must be notified in writing via the Major Projects website within seven days after the Proponent becomes aware of any non-compliance. A non-compliance notification must identify the project and the application number for it, set out the condition of approval that the project is non-compliant with, the way in which it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance. Note: A non-compliance which has been notified as an incident does not need to also be notified as a noncompliance.	Section 3.9
Schedule 4 Condition 6	The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any approved plans or programs of the conditions of this approval.	Section 3.9.3

2.5. EP License Conditions

The NSW Environmental Protection Agency (EPA) issued Environmental Protection Licence No 12559 for the Rasp Mine in December 2012. Conditions of this License are outlined in **Table 2-2** together with the relevant section(s) within this document where the Condition is addressed.

Table 2-2 EP Licence Conditions for Waste Management

Condition	Description
L3.1	The licensee must not cause, permit or allow any waste generated outside the premises to be received at the premises for storage, treatment, processing, reprocessing or disposal or any waste generated at the premises to be disposed of at the premises, except as expressly permitted by the licence.
L8.3	The licensee must ensure waste rock used for the construction of the amenity bund around the Concrete Batching Plant and other surface area works is tested in accordance with Appendix D of BHO-PLN-ENV-011 Construction Environment Management Plan dated December 2017 and ensure that waste rock used does not average lead (PB) fraction of more than 0.5%.
O1.1(b)	Licensed activities must be carried out in a competent manner. This includes: a) the processing handling, movement and storage of materials and substances used to carry out the activity; and b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.

3. Waste generation and management

3.1. General

In accordance with the EP Licence Conditions, BHOP will not cause, permit or allow any waste generated outside the premises to be received at the premises for storage, treatment, processing, reprocessing or disposal or any waste generated at the premises to be disposed of at the premises, except as expressly permitted by the licence.

BHOP will carry out licensed activities in a competent manner, including the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity. The following sections provide characterisation and management measures to competently manage the treatment, storage, processing, reprocessing, transport and disposal of waste generated by BHOP at the RASP mine.

A Waste Rock Management Strategy, Rehabilitation Strategy, and Rehabilitation Management Plan (available on the BHOP website) have been developed by BHOP and will provide information used to formulate a mine closure strategy incorporating methods for long-term mineral waste management. These activities are currently underway listed in

Table 3-1**.**

Table 3-1 Long-term waste management options being under investigation

Aspect	Method for Investigation	Status
Tailings	A TSF capping and closure methodology involving the use of inert waste rock. Ideally, suitable waste rock will be placed on top of the completed tailings storage facility once the tailings have sufficiently consolidated to allow safe operation of heavy equipment.	Developed and approved in MOD6.
Stockpiled Waste	Options analysis study into various dust management approaches including the use of revegetation to stabilise stockpiled waste material.	Options analysis conducted and preferred method (inert waste rock capping identified).
Waste rock utilisation	Utilising the placement of inert (<0.5% Pb content) waste rock over 'free areas' to minimise dust emissions and stabilise landforms, as outlined in Air Quality Assessment for the Rasp Mine Modification 4, Pacific Environment Limited, March 2017, and Rasp Mine – Waste Rock Classification Report, Pacific Environment Pty Ltd, March 2017.	Approved for progressive placement as part of MOD6.
Waste rock utilisation	Conducting waste rock trials to confirm the effectiveness of waste rock covers in controlling dust emissions.	Started, monitoring to continue during progressive placement.
Waste Rock utilisation	Waste rock geochemical analysis and characterisation to determine the long-term stability of inert waste rock.	Long term Geochemical Degradation Assessment for Waste Rock conducted by ERM for MOD6. EMM consultants conducted further investigation for development of the Waste Rock Management Strategy which has been approved by NSW Resources Regulator for adoption into the Forward Program and RMP.

3.2. Mineral waste

3.2.1. Characterisation of mineral wastes

Ore excavated during mining operations is processed by crushing and flotation at the processing plant to ultimately produce high quality lead and zinc concentrates. The majorwastes produced during mining and mineral processing are waste rock and tailings (**Table 3-2**).

In 2022, CBH and EMM commenced the process of combining the extensive site exploration drill core assay program and the existing and ongoing detailed geochemical characterisation program to expand the overall geochemical dataset and to provide the framework within which the site geology block model may be developed to inform waste rock emplacement.

With the detailed geochemical datasets supplied by ERM and PEL providing the initial characterisation framework (and with the current and ongoing sampling and testing programs conducted by CBH and EMM being incorporated to verify this framework), this expanded dataset has been used to develop geochemical criteria for material handling. The criteria will be incorporated into the site geology block model and will be used to identify waste rock types (ie. PAF/NAF and SD/NMD) and manage waste rock on site.

To increase sample representativeness in line with the waste rock types

(lithologies) and amounts of waste rock anticipated to be generated during site activities, as well as providing information on waste rock currently emplaced above ground across the site, a site sampling and analysis plan has been developed and is outlined in the Waste Rock Management Strategy.

Table 3-2 Mineral waste classifications

Waste	Characterisation
Waste rock	Previous ERM (ERM 2021) and PEL (PEL 2017) studies concluded that the bulk of the waste rock is likely to be composed of garnet pelite, psammopelite and garnet spotted psammopelite. Only very minor quantities of dolerite and garnet quartzite have been observed in the waste rock. No carbonate minerals were identified. The samples mostly consisted of quartz and very slow to slow reacting silicates (eg plagioclase, potassium feldspar, kaolinite and illite). Chlorite (a mineral with intermediate reactivity) was present in most samples. Garnet was identified in all samples, which may provide fast reacting silicate buffering. The sulphides galena and sphalerite were identified in one sample only (one of the two psammopelite samples classified as PAF). ERM concluded that the potential for acidic drainage was low, with total sulfur contents in the majority of samples <0.3 % S, indicating that even in PAF samples the capacity for acid generation was likely to be limited. While 4 % of samples (two psammopelite samples) were identified as PAF and 17 % of samples were identified as uncertain, all rock type groupings (including the psammopelite rock type) had average NPR values ≥ 2. ERM concluded that the characterisation was consistent with site observations, which indicated that acidic drainage had not been identified at the surface of the site since mining commenced in the 1880s. A Waste Rock Management Strategy has been developed with the assistance of EMM consulting and approved by NSW Resources Regulator for adoption into the Forward Program and RMP.
Tailings	Testing and mass balance calculations indicate that the general tailings composition consists of; zinc (0.4%), lead (0.4%), silver (8 parts per million (ppm)), iron (3.3%), sulphur (1.2%), arsenic (460ppm), bismuth (70ppm), cadmium (trace) and antimony (45ppm). Tailings properties have been defined through testing (and from historic mining operations on the site) as: water/solids ratio - 50% solids (after thickening); water/solids ratio - 55% to 60% solids (at point of discharge from back fill plant); 80 tph (average solids only), 40 tph to TSF, 40 tph to underground; 80 tph (liquid only); 62 m3/h volumetric flow; 80% passing 200 micro-metres (after de-sliming); dry settled density for TSF2 ranges from 1.50 to 1.65 t/m3

3.2.2. Waste rock management

In the original EA it was predicted that approximately 250,000 tonnes (t) of waste rock would be produced each year for a production rate of 750,000 t of ore. This has since increased to over 400,000 t averaged per year for an average production rate per year of 650,000 t of ore. In 2020, BHOP conducted an organisational restructure that would result in a reduced mining extraction/production rate of up to 500,000 t of ore per year. This reduced rate was also reflected in MOD6. The reduced production rates would result in approximately 390,000 tonnes of waste rock being generated. BHOP has elected to place required waste rock underground to fill voids and stopes as part of void management and management of ground or strata failure risks. It is also more economic to dispose of waste rock underground. With the approval of MOD6, up to 16,000 t per year of waste rock (<0.5% Pb) will be placed on the surface to cover free areas as part of progressive rehabilitation and capping.

In order to reduce environmental, safety and health risks the following management measuresfor waste rock will be followed:

- Inert waste rock will be used for capping of free areas and other surface areas as defined in the Rehabilitation Management Plan, backfill, used as road base (to minimisedust generation), or be used as source material to construct cell bunds in Blackwoods TSF2.
- Waste rock from underground mining will be deposited in underground voids if theybecome available.
- Where there are no voids available, waste rock is to be stored in Kintore Pit orunderground drives until back-loading into underground voids becomes available.
- Prior to surface application, waste rock will be tested to confirm Lead and Sulfur levels are acceptable.
- Non-inert waste rock will be disposed of in Kintore Pit, BHP Pit and Little Kintore Pit and later cappedwith inert waste rock.

3.2.3. Tailings management at TSF2

The tailings waste from ore processing was approved to be deposited aboveground in both the historic tailings facility (TSF1) and in the disused Blackwood Pit (TSF2) (Figure 3-1). BHOP has chosen to deposit tailings in TSF2 only and not use TSF1. This decision was made based on the greater capacity of TSF2 (3.1 Mt) compared to the capacity of TSF1 (970,000 t).

TSF2 is nearing full capacity for tailings storage. The MOD6 approval will allow BHOP to create a new tailings storage facility in Kintore Pit (TSF3). Once a new boxcut and portal has been established and the current mine portal at the base of Kintore Pit has been plugged, tailing and waste rock will be able to be co-deposited in Kintore Pit (TSF3). This will provide an additional (approximately) 13 years of tailings and waste rock storage. Tailings will continue to be deposited in TSF2 from the Processing Plant, dried and then harvested for dry deposition and compaction in Kintore Pit (TSF3). TSF2 will be divided into three cells to be rotated between deposition of tailings, drying (to 10% moisture) and harvesting, harvested tailings will then be trucked to TSF3 for deposition. The process of preparing Kintore Pit for tailings deposition will require the back filling of some of the higher underground levels with waste rock, it will also create space for waste rock within Kintore Pit. MOD10 will allow for the storage of stacked tailings in the western portion of TSF2 whilst TSF3 is under construction. Based on the location of the TSF2, the facility was assessed to be a “High A” hazard category facility by the DSC. This consequence category invoked the most conservative design criteria presented in the DSC and ANCOLD design guidance for a TSF. BHOPs dam safety surveillance monitoring program for the TSF2 will continue, which is detailed in the BHOP Tailings Maintenance and Operating Manual.

In the original EA (2009), it was also planned for tailings to be placed underground, via the Backfill Plant, to fill mining voids. However, BHOP underestimated the amount of mine development that was required to access the Main Lode and Western Mineralisation ore bodies.

The need to undertake more underground mining development than anticipated has reduced the capacity of underground voids to accept both waste rock and

tailings material from the Backfill Plant. As waste rock is disposed underground, there is no void space underground for the backfill of tailings.

A summary of tailings and waste rock placement as predicted in the original EA (at a production rate of 750,000 t) and what has actually been placed since commencement of operations is provided in **Table 3-3**.

Table 3-3 Summary of Proposed (EA) and Actual Placement of Waste Rock and Tailings

Year (to 30 June)	EA Tailings in Underground back fill per year (t)	EA Tailings deposited in TSF1 (t)	EA Tailings deposited in TSF2 (t)	EA Waste Rock U/G (t)	Actual[1]/ Predicted[2] Tailings in TSF2 (t)	Actual waste rock placed underground (t)	Actual waste rock stored Kintore Pit (t)	Actual Total waste rock (t)
2012	97,969	273,281	0	250,000	322,111[1]	47,527	150,000[3]	197,527
2013	195,938	195,138	0	250,000	574,833[1]	230,607	150,000[3]	380,607
2014	195,938	195,138	0	250,000	486,749[1]	223,473	163,304	386,777
2015	216,563	216,563	0	250,000	499,598[1]	223,611	228,942	452,553
2016[1]	247,500	88,281	159,219	250,000	555,837[1]	265,369	96,888	362,257
2017[1]	292,475	0	278,438	250,000	622,161[1]	215,897	76,578	292,475
2018[1]	309,375	0	309,375	250,000	644,828[1]	332,702	121,864	444,566
2019[1]	309,375	0	309,375	250,000	578,472[1]	357,792[2]	134,706[1]	492,792[1]
April 2021[1]	309,375	0	309,375	250,000	469,049[1]	318,816	-	338,220
April 2022	309,375	0	309,375	250,000	392,600	197,140	83,923	281,063
May – Dec 2022	206,250	0	206,250	250,000	369,413	114,571	148,072	262,643
TOTALS	**2,690,133**	**968,401**	**1881,407**	**2,750,000**	**5,413,302**	**2,833,356**	**1,438,891**	**4,028,644**

3.2.4. Tailings transportation

Tailing disposal pipes are installed in a culvert under the road from the plant site to the eastern side of TSF2. The tailing main is 225 mm HDPE pipe with 4 discharge spigots of 160 mm slotted HDPE pipes located at regular intervals along the side of the TSF. The discharge pipes will be slotted to allow delivery to the bottom of the TSF to minimise the risk of erosion of the easterly Pit wall. The slotted discharge pipes will be progressively buried as tailing is deposited.

The pipes are butt welded and include flange connections where valves are required. Isolation rising stem gate valves will be installed to enable selection of which discharge spigots will be active. All pipework containing tailing outside of the Pit is bunded to contain any tailing in the event of a rupture or damage to the pipework. **Figure 3-1** shows the layout of the delivery and return lines between the processing plant and TSF2.

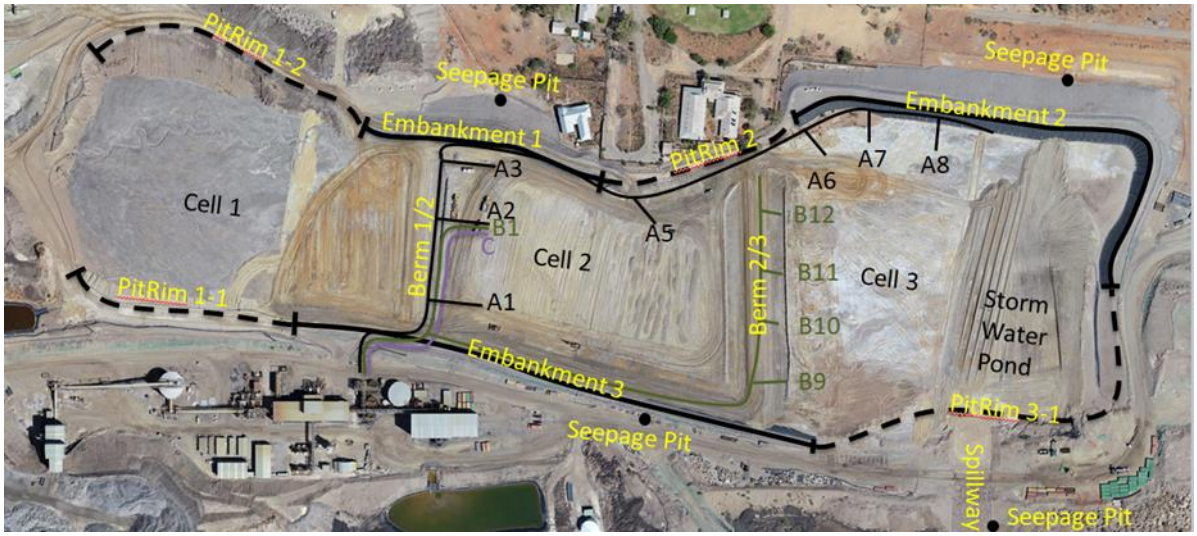


Figure 3-1 Layout of the Delivery and Return Lines at Blackwood Pit

When tailings in TSF2 are sufficiently dry (10% moisture) thin layers (up to 1.0m) will be harvested using an excavator and dozer then transported up the current mine haul road in 60t haul trucks to TSF3. The dried tails would be placed in horizontal layers (approx. 250 mm thickness) in Kintore Pit (TSF3), which would then be compacted using a roller. It is expected that the average transfer rate of tailings from TSF2 to TSF3 would be 170 t per hour. MOD10 has approved the temporary storage of tails in Cell 1 until the preparation of Kintore Pit for receiving tailings.

3.2.5. Tailings wastewater recycling

A decant pump is available to recover wastewater from the eastern cell of the TSF2.

3.2.6. Solid tailing waste

Tailings have been characterized as being relatively quick draining during the initial stages of deposition and then become a low permeability mass as consolidation proceeds. The permeability of the tailing near the base of the Pit is likely to reduce to approximately 5 x 10- 10 m/s and the density of the tailing near the Pit bottom to increase to 1.7 and 1.9 t/m3.

During the placement of tailing into the Pit, a portion is expected to flow into the partially filledvoids that extend into the Pit. However, the fresh tailing are expected to settle in the old workings over a relatively short distance as the water is released from the high solids content tailing with blocking of the voids.

3.2.7. Tailings seepage

Blackwoods Pit TSF2

The connection of the old and new workings is through a deep level transport drive at Level 1480 (approximately 450m depth) that is well below the bottom of the Pit and near thebottom of the old workings. Groundwater is drawn down to at least this level by pumping fromShaft 7.

The only migration from the tailings in Blackwood Pit is likely to be seepage water from the tailings, with minor short distance migration of tailings into the partially filled old mining voids. Due to the low permeability of the tailings the slowly released water

from the tailings is expected to seep into the old workings, and be collected as part of the ongoing mine dewatering at Shaft 7 and from mine dewatering within the Western Mineralisation. The macro permeability of the old working and surrounding rock mass on the side and below the Pit facilitate the collection of released water from the tailings and prevent the bath-tub effect forming in the Pit which could develop if the Pit perimeter was of very low permeability. Onthis basis it is expected that the tailings in the Pit will be a drained mass of low permeability.

The east side of the Pit comprises intact rock and minimal mine workings. As such it is possible that perched water may develop along the east side of the site between the lease boundary and the Pit edge, due to the possibility that the upper rock zone around the Pit may be of slightly higher permeability than the deeper high strength rock mass. To monitor for this, two bores with piezometers are installed along the east side of the Pit to a depth of approximately the base level of the Pit adjacent to the bore. The Site Water Management Plan provides information and management requirements for groundwater monitoring, including the bore GW11. The Site Water Management Plan also provides for contingency measures should monitoring indicate impacts related to TSF management be considered to pose an unacceptable environmental risk.

The tailings are subject to wind forces creating potential for dust generation. To mitigate this risk to air quality, a water ring main with water sprinklers will be installed to keep those areas of the tailing which are dry beaches damp. This spray system to provide dust suppression will be augmented when necessary with the addition of a dust suppressant to the spray water to crust and stabilize the tailing surface.

The EA for MOD4 describes the TSF extension and further management of tailings seepage. The TSF extension design was prepared by Golder Associates and incorporates controls to minimise the potential risk of seepage from the facility. These include:

- compacted rockfill embankments;
- a filter sand layer on the upstream slope of each embankment;
- seepage collection drains installed in the filter sand along the upstream toe of each embankment;
- a 2 mm thick high density polyethylene (HDPE) geo-membrane liner on the upstream slope of Embankment 2 and a 2 mm think linear low density polyethylene (LLDPE) liner on the upstream slopes of Embankments 1 and 3; and
- upstream toe drains and seepage collection pits to collect any potential seepage.

As part of the Design Report, Golder completed seepage modelling along representative cross sections of each TSF2 embankment to analyse potential seepage rates from future tailings. Golder concluded that seepage from Embankments 1 and 2 are expected to be negligible because water would not pond near them due to the shape of the tailing beach.

Seepage from Embankment 2 is also expected to be very low and effectively negligible. Golder noted that any damage or defects in the geomembrane may result in some seepage, however this would be temporary and effectively contained and managed by

the seepage collection system.

Kintore Pit TSF3

Preparation works for TSF3 include the filling of mining access drives beneath the Pit, installation of an engineered plug to seal underground workings, installation of a seepage collection system at the base of the Pit, relocation of 260,000 t of material from the Waste Rock Tipple to the base of the Pit to act as a bridging layer upon which the tailings will be deposited, water management infrastructure and other minor works.

An extensive drainage system will collect and direct seepage within Kintore Pit through the installed Decline Plug to be managed by the underground mine water management system. BHOP considered the potential for seepage from tailings placement in Kintore Pit to impact groundwater quality and engaged Golder to conduct an assessment of this risk. Golder expected that there would be no or negligible seepage from dried tailings placed into Kintore Pit, as the material is partially saturated during placement, would be compacted to a high density and there is no free water expected on the tailings during operation.

3.2.8. Tailings Dust Control

Three levels for dust management are proposed during operation of the TSF2, including:

- Water pumped through the current tailings placement system;
- Installation of automatically activated sprinkler system with the application of water with a predictive meteorological forecasting system; and
- Application of chemical dust suppressant through the water sprays.

The first management level for dust mitigation is the placement of water through the tailings distribution system. This would provide a spread of water over the tailings surface to suppress dust generation. This is the management strategy under current operating conditions.

The second level of dust management for the TSF was discussed in the original EA, which indicated that dust mitigation measures were to be introduced as the tailings level was raised closer to the surface. These measures consisted of the installation of a sprinkler system around the perimeter of the TSF2 with water applied through a number of strategically located high capacity sprayers.

In addition, meteorological forecasting would be used to predict meteorological conditions for the coming day(s) to determine, at a minimum one day in advance, when an elevated risk of dust emissions may occur (e.g. based on wind speed, direction, rainfall and atmospheric stability).

The third level for dust control during the operations of the TSF2 is the application of a chemical dust suppressant through the water spray system. This chemical agent can be added to the water to extend the control of dust through wind entrainment. This would be particularly useful if there are longer delays or breaks in tailings deposition or where the application of water is not desirable.

Schedule 3 Condition 10 of the Project Approval requires that video recording equipment be installed to assist in the active management of emissions from the

tailings storage facility. Cameras for this purpose have been installed at the Mill Control Room and are operational.

During routine inspections of TSF by process plant personnel, the generation of dust from the sides or surface of the facility, including specific locations, are recorded on the daily record sheet.

In addition to the above management measures, the Air Quality Management Plan (BHO-PLN-ENV-001) outlines requirements for dust monitoring. Real time meteorological and dust monitoring is implemented at a number of locations around TSF2; TEOM1 (located in south and to the west of the Pit), TEOM2 (located adjacent and north of the Pit), PM2.5 Beta Attenuated Monitors alongside each TEOM, and portable PM10 monitors at other points around the TSF2.

During the operation of TSF3 an augmentation to the existing PM monitoring will include a mobile PM / wind speed monitoring unit that can be placed close to the TSF surface and progressively moved as the TSF is filled.

3.2.9. TSF rehabilitation

In accordance with the Rehabilitation Management Plan and Rehabilitation Strategy, at the cessation of tailings disposition in TSF2, a final covering of inert waste rock will be placed over the top of the tailings to avoid the potential for dust generation as the tailings stabilise and consolidate. Storm water will be directed away from the TSF cover to minimise water infiltration.

3.2.10. Concrete Waste

Modification 4 (MOD4) of the project approval included the installation of a concrete batching plant (CBP) for the manufacture of fibrecrete and concrete for use at the Mine. Construction waste will be managed in accordance with the approved Construction Environment Management Plan (BHO-PLN-ENV-011) dated December 2017 and kept on EPA file DOC17/609105-02.

Wastes that would be generated during the operation of the CBP include:

- Wash-out from the Agi truck and general hose-down cleaning. The Agi trucks and generalclean-outs would be washed out into a collection settling sump. The solids consist of aggregates, cement and water.
- The solids would be removed from the sump and disposed either to an underground stopeor tailings storage facility;
- IBCs from Admixture materials. Empty IBCs would be washed out and returned to themanufacturer, and
- Steel fibre bags. Empty bags would be disposed of as part of general waste collection andremoved from site.

One truck per shift (two trucks per day) will discharge approximately 0.5 m^3 concrete waste, totalling approximately 1 m^3 per day. Washing out of agi-bowls will occur in a designated area that will be contained and maintained to prevent the entry of contaminated waste into the environment or mine water system.

3.3. Non-mineral waste

3.3.1. Non-mineral waste characterisation

Non-mineral waste (general, recyclable, regulated and hazardous) are generated during construction works and mine operations, particularly at maintenance workshops, stores, administrative offices and change house facilities. Management and disposal strategies forthese waste streams are identified in Table 3-4.

Table 3-4 Non-Mineral Waste Types and Management

Waste type	Waste categories	Storage and disposal method
General Waste	Food scraps (putrescible waste) Food wrappers Non-recyclable plastics (packaging) Rope Rubber (hydraulic) hoses Polystyrene cups Damaged pallets or wooden products Rubber bands, metal clip binders, pens Damaged air filters Plastics	To be stored on-site in wheelie bins or bulk bins for collection and off- site disposal by waste disposal contractor or a licensed waste disposal contractor, respectively.
Recyclable waste	Light and heavy vehicle tyres Scrap metal Aluminium cans Glass bottles Paper Cardboard Toner cartridges	Scrap metal is collected for recycling. Tyres to be reused as markers or for other delineating purposes. If unable to be reused, they will be collected by a licensed contractor for off-site disposal. There is a recycling facility for aluminium cans and / or glass bottles in Broken Hill. BHOP will utilise this service for recyclable waste. Paper and cardboard is collected for recycling. Toner cartridges to be provided to Planet Ark for recycling as part of the Cartridge-Planet Ark Program.
Regulated waste	Oils Grease Lubricants Oily rags Contaminated soils Oil contaminated absorbents Oil filters Oily water Coolant Contaminated hoses Contaminated drums	Regulated waste to be stored on-site in drums or designated bins in a bunded area and collected by a license contractor for recycling at a regulated facility.
Hazardous Waste	Lead acid batteries Chemicals Reagents Contaminated drums/containers Explosive product packaging	The long term disposal of explosive packaging will occur as part of backfill for stopes. Other hazardous waste is to be stored on-site in a bunded area and collected by a licensed contractor for recycling or disposal off-site at a regulated facility.

3.4. Non-mineral waste management

Disposal is viewed as the last option in the management of waste, only if the avoidance, re-use or recycling of the waste in question is not practical. The following systems are implemented atthe mine in regard to waste disposal -

Only transport operators or companies that are licensed by the appropriate authorities are contracted to remove waste from the mine site.

Waste vehicle tyres are stored on site and disposed of at appropriately licensed facilities on an as needs basis.

Waste materials, which cannot be either re-used or recycled, are to be sent to a licensed landfill that may accept that category of waste. Only an experienced waste contractor should remove the waste off site.

Removal of waste materials at end of mine occurs as part of the mine rehabilitation closure plan.

All waste is disposed of in accordance with the *Environmental Guidelines: Assessment, Classification & Management of Liquid and Non-liquid Wastes* (DECC, 1999) or as specified in Schedule 1 of the POEO Act.

At the point of generation, waste is directly transferred to local based waste receptacles for transportation to disposal, reuse or recycling facilities. A colour coding system is utilised where by waste receptacles are colour coded to separate the different waste streams for recycling and disposal, as per **Table 3-5** below.

Table 3-5 Waste receptacle description

Type of waste	Receptacle description
Municipal waste	Skip bins
Recyclable waste	Blue wheelie bin (paper/cardboard)
Waste oil	Bulk waste oil tank and re-purposed drums (temporary)
Oily rags and oily absorbents	IBCs

Note: Receptacles will be clearly labelled at all times to ensure employees are aware of thewaste separation requirements.

3.4.1. Wastewater

Wastewater is generated from wash bays, processing operations and as sewage from change house and amenities. The wastewater management system has been designed to maximise recycling and beneficial use of site water.

Wastewater from the wash bays is captured and directed through an oil / water separator and sediment separator, prior to either:

- re-used as wash-down water;
- used as dust control across the site;
- used in processing; or
- allowed to evaporate.

Where wastewater from the vehicle wash bays is not re-used as wash-down water, the water will be discharged to a settling dam (or sequence of settling dams where required to achieve water quality) prior to re-use.

The oil collected from the oil water separators is stored in IBCs within an appropriately bunded facility beside the workshop until such time as the waste oil can be collected by the licensed waste disposal contractor for disposal.

The sediment collected from the wash bays will be collected in dedicated sumps to be stabilised before being transported. The stabilised sediments will be collected and transported to the BHP Pit or active TSF where the sediment will be deposited.

3.4.2. Sewage

Sewage is managed using the existing surface sewerage facilities and infrastructure within the property. Sewage from septic tanks is collected for disposal at municipal waste operations by a licenced contractor. Effluent from the site offices, change house and other amenities is connected to and disposed of via Broken Hill's reticulated sewerage system.

3.5. Application of the Waste Hierarchy

3.5.1. Reduction

For any construction activities, specifications of construction material quantities for contractors will be as accurate as possible to avoid the over-ordering of materials and the potential for excess waste.

The ordering of stock during the operation of the mine will be regularly reviewed to ensure efficient stock control and to avoid wastage.

The use of degreasers is regulated in the workshop areas to ensure the efficiency of the oil-water separator.

All waste areas are clearly identified as waste storage areas. This includes bins and other receptacles for domestic waste, and which would be marked according to the type of waste accepted, eg. scrap metal, oil filters and oily rags, other recyclables, general waste, etc.

Clear written instructions are erected at appropriate locations detailing recycling and waste separation information.

3.5.2. Reuse

Used tyres will be reused as signposts, delineation around the site, or incorporated into batters/walls, where deemed suitable by a qualified engineer. Waste water from wash bays will be reused as per section 3.4.1.

3.5.3. Recycling

BHOP provides appropriate storage areas or receptacles for all materials that are suitable for recycling. The main recyclable waste materials generated by the mine and their primary source(s) are as follows -

Paper and cardboard: Paper and cardboard are disposed of in blue skip bins for collection by Broken Hill City Council. Glass and aluminium: there are no glass and aluminium recycling facilities currently available in Broken Hill. Should this service become available, BHOP will utilise this service for recyclable waste. The material is therefore currently disposed of to landfill.

Metal: used metals are stored for reuse or recycled as scrap metal and placed into large skip bins, which are collected by a metal recycler as sufficient quantities are available.

Waste Oil is collected within bunded fuel storage, refuelling and maintenance areas and stored within waste oil bins once it has passed through an oil-water separator. The waste oil is removed from site by a licensed waste oil contractor for recycling.

Batteries are removed from site by a licensed waste contractor.

Miscellaneous recyclables: printer cartridges are stored at appropriate locations prior to delivery to Planet Ark recycling facilities as part of their Cartridges-Planet Ark Program.

3.5.4. Disposal

With the exception of waste rock and tailings, there is no long term storage of any waste materials on the mine site. A licensed contractor is engaged to regularly remove waste for the site.

3.6. Monitoring

Department managers are responsible for ensuring that waste is managed in their operational areas in accordance with this WMP.

Waste handling and storage facilities are managed by operational staff within each department. Waste quantities, including hazardous materials (eg. waste oil/grease), will be monitored accordingly by operational staff. Collection schedules will be arranged as required.

Departments will conduct their own monthly inspections on waste storage, treatment and disposal on a regular monthly basis to ensure compliance with procedures and this WMP. These facility inspections will be incorporated into existing workplace inspections and carried out by the relevant area personnel.

3.7. Audits

Environmental personnel will undertake monthly inspections of waste storage locations to check that appropriate waste management is being undertaken in accordance with WMP requirements, legal obligations and Australian Standards.

Waste management inspections will be carried out and kept on file on the CBH Resources internal server. Inspection results will be kept and managed in accordance with BHOP record keeping requirements.

Audits of offsite waste facilities that receive BHOP waste/recyclables will be carried out every 4 years. Records of these audits will be kept on file as per the BHOP record keeping requirements.

3.8. Training

Waste management requirements are incorporated into existing induction and awareness training systems. The Senior Environmental Advisor will review these regularly to ensure currency.

Additional waste specific communication will be included in Tool Box Talks and rolled out across the site on an as required basis.

Where gaps in knowledge are identified through waste management inspections/audits, additional training will be provided to relevant personnel.

3.9. Improvement Opportunities

There are a number of ways in which BHOP can reduce the amount of waste it is sending to landfill. BHOP is currently investigating:

- Implementing general recycling bins in workshops and offices
- Viability of recycling workboots

- Engaging a community group to collect 10c cans and bottles collected from crib rooms as collection services become available

3.10. Reporting and Corrective Actions

3.10.1. Incident Reporting

Internal

All incidents involving non-compliance with waste management requirements shall be recorded and reported on the INX Incident Reporting System.

The Department responsible for the area where the incident occurred is responsible for reporting and investigating the incident.

The Senior Environmental Advisor will be notified of all waste related incidents.

External

Notification shall be made immediately to each relevant authority when material harm to the environment is caused or threatened in accordance with the *Protection of the Environment Legislation Amendment Act 2011*.

Environmental incidents (refer Project Approval Schedule 4 Condition 5 and the EP Licence) which cause or threaten to cause harm to the environment or breaches limits or performance measures in the approval are also required to be reported to:

- Department of Planning and Infrastructure
- Environment Protection Authority,
- Division of Resources and Energy, and
- Other relevant government agencies eg BHCC, Health, WorkCover, Fire and Rescue.

BHOP will provide a written notification immediately on becoming aware of the incident. A full report will then be submitted within 30 days of the incident.

Environmental non-compliances (refer Project Approval Schedule 4 Condition 5A and the EP Licence) are also required to be reported to:

- Department of Planning and Infrastructure

BHOP will provide a written notification, as required, within seven days of the date of the incident.

The Senior Environmental Advisor is responsible for preparing reports to government agencies which are signed off by the General Manager prior to submission.

3.10.2. Complaints

Any complaints regarding the management of on-site waste will be directed to the relevant Department Manager and the Senior Environmental Advisor for investigation and rectification.

Complaints and actions arising from a complaint will be recorded in a complaints register to be maintained by the Senior Environmental Advisor.

3.9.1. Reporting of performance

Waste management data will be documented and reported in each Annual Environmental Management Report. The information will include the quantities and type of waste removed off site for recycling or disposal, the contractor engaged to remove the wastes, and the final destination for all waste products. Details will be provided on the implementation success of the WMP and any areas that require improvement will be highlighted. Regular measurements of waste rock and tailings are to be included in the Environmental Management Report along with general waste reporting.

BHOP will provide regular reporting on the environmental performance of the project in relation to waste management on its website, in accordance with the reporting arrangements in any approved plans or programs of the conditions of the Project Approval(Schedule 4, Condition 6).

3.9.2. Management Plan Review

In accordance with the Project Approval, Schedule 4, Condition 4, the WMP will be reviewed within three months of:

- the submission of an annual review;
- the submission of an incident report;
- the submission of an independent audit report; or
- any modification of the conditions of this approval (unless the conditionsrequire otherwise).
- BHOP will review, and if necessary revise the WMP to the satisfaction of the Secretary. This is to ensure the WMP and associated procedures are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the project.
- The WMP will also be reviewed if there are significant changes to the site's operations.
- The annual review will reconsider the risks presented by waste, options to reduce the waste generated, changes in reuse and recycling local opportunities.

4. References

Environmental Planning and Assessment Act 1979

NSW EPA 2014, *Waste Classification Guidelines*.

Protection of the Environment Operations Act 1997

Waste Avoidance and Resource Recovery Act 2001

Protection of the Environment Operations (Waste) Regulation 2005

Waste Avoidance and Resource Recovery (WARR) Act 2001

BHOP 2010, *Environment Assessment*.

BHOP Environmental Protection Licence 12559

PEL 2017, *Rasp Mine Waste Rock Classification.*

ERM 2021, *Long term Geochemical Degradation Assessment for Waste Rock MOD6 Waste Rock Management, Rasp Mine.*

EMM 2022, *Waste Rock Management Strategy.*

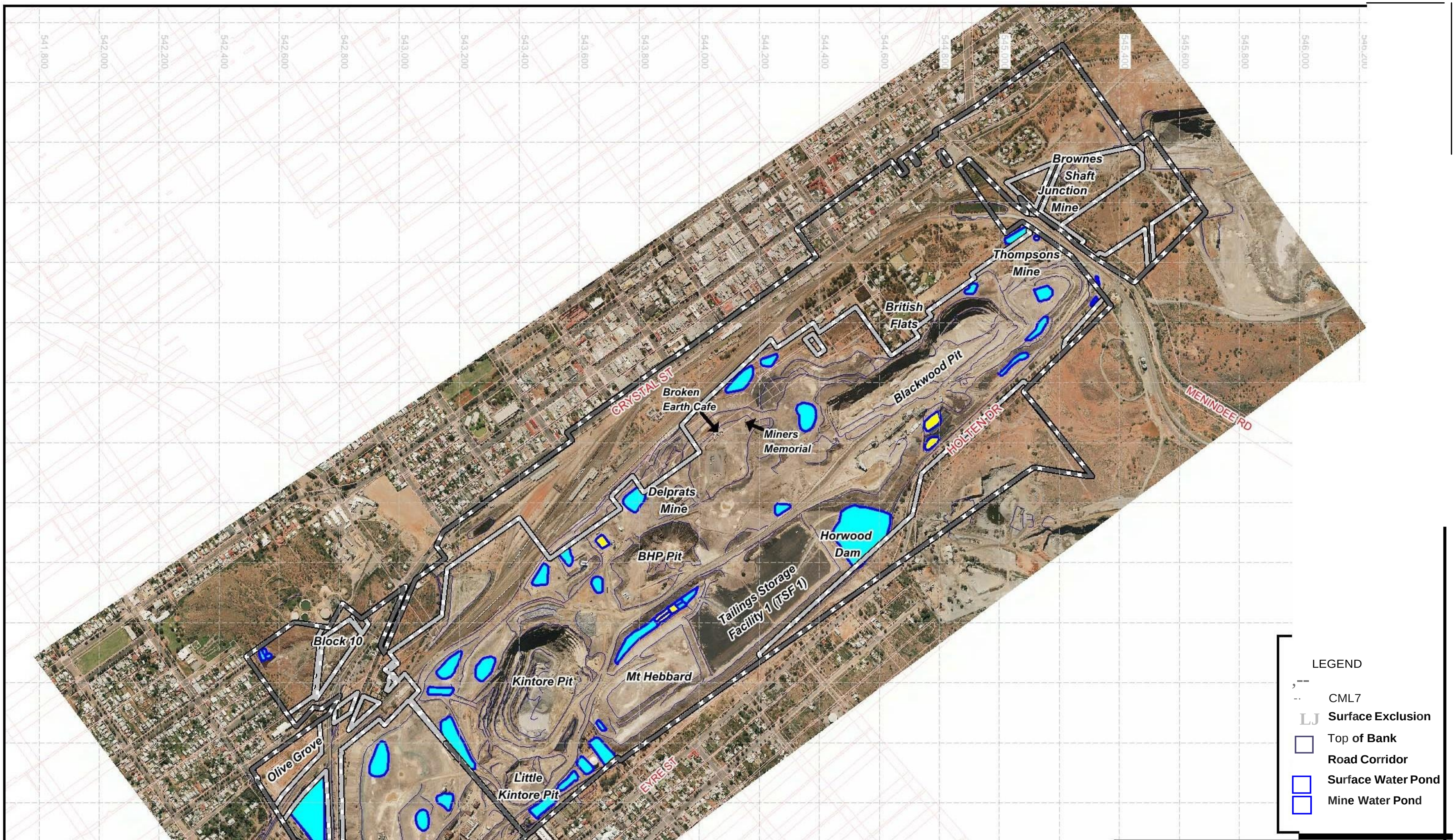
Golder Associates 2017, *Design Report for the Blackwood Pit Tailing Storage Facility Extension.*

5. Definitions & Acronyms

AMD	Acid and Metalliferous Drainage
ESD	Ecologically Sustainable Development
NAF	Non-Acid Forming
NMD	Neutral Mine Drainage
PAF	Potentially Acid Forming
Pb	Lead
SD	Saline Drainage
S	Sulfur
WRMS	Waste Rock Management Strategy

6 Appendix 1

Site Plan



PROJECT: BH D CBH Ras p M.

TITLE: Mine Featu meCbs u re Pla n res (P lan 2, ESG 3)

DATE: 14th August 2015

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Mining Titles, Cadstre and Local Government Areas supplied by the NSW Government, Tenure and Aerial Photograph (April 2012), Mine Features supplied by CBH.

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

MGA94 Zone 54

WORKSPACE: \Maps\W0016.wor REMSION A

Justin Michael Consulting does not guarantee the accuracy or completeness of the map and does not make any warranty about the data. Justin Michael Consulting is not under any liability to the user for any loss or damage (including consequential loss or damage) which the user may suffer resulting from the use of this map.

7. Appendix 2

DPE Resources Regulator Correspondence

Our ref: OUT17/47194

Mr Rob Williamson
Broken Hill Operations Pty Ltd
130 Eyre Street
Broken Hill NSW 2880

30 January 2018

Dear Mr Williamson

RASP MINE (Consolidated Mining Lease 7 (1973), Mining Purpose Leases 183, 184, 185 & 186 (1992)) – BROKEN HILL OPERATIONS PTY LYD – Notice of assessment for security (Assessed Deposit)

An assessment of the security deposit required under CML7**,** MPL's 183, 184, 185, 186 has been made under section 261BC of the *Mining Act 1992* by a delegate of the Secretary. The reason for this assessment is to secure funding for the fulfilment of rehabilitation obligations under CML7**,** MPL's 183, 184, 185, 186 in relation to Rasp Mine.

The Assessed Deposit is determined to be $**12,196,000**.

This is no change in the current security deposit held by the NSW Department of Planning and Environment (the Department).

The assessment considered the submitted Rehabilitation Cost Estimate (RCE) dated 16 October 2017. The Department identified this RCE to be less than the estimate determined by the Ministers Review (24/09/2015).

The Department notes that the final land use for Rasp Mine is currently being considered as part of the wider Line of Lode Working Group chaired by the Department of Premier and Cabinet. The outcome of this working group will inform the closure requirements and rehabilitation commitments for CML7, including the level of heritage items to be retained as part of the consideration for land use for the post mining environment on CML7 and associated titles.

Review of the Assessed Deposit

If you disagree with the assessment of the security deposit, you may apply to the Minister for Resources for a review of the Assessed Deposit under s.261BD of the *Mining Act 1992*.

Applications for review of this assessment must be made using Form AD17, and lodged within 28 days of receipt of this letter. Form AD17 is available on the Department's website at the following address: http://www.resourcesandenergy.nsw.gov.au/miners-and-explorers/applications-and-approvals/titles-application-forms/mining-act-forms

If you require additional information regarding this letter, please contact Christine Fawcett, Orange office, on 02 6391 3242 or by email to minres.environment@industry.nsw.gov.au

Yours sincerely

David Humphris
A/Assistant Director Environmental Operations
Division of Resources and Geoscience
NSW Department of Planning and Environment

Signed under delegation from the Secretary of the Department of Planning and Environment.