



# Rasp Project Modification 6

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## Tailings Management and Underground Access

State Significant Development Modification Assessment (MP07\_0018 MOD 6)

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*Cover image: Kintore Pit (proposed third Tailings Storage Facility) (2022); Source: Broken Hill Operations Pty Ltd*

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# Executive Summary

Broken Hill Operations Pty Limited (BHO), a wholly owned subsidiary of CBH Resources, owns and operates the Rasp Mine (the project), an underground zinc, lead and silver mine located within the City of Broken Hill local government area in western New South Wales (NSW). BHO purchased the mine in 2001 and operates under project approval MP07\_0018 granted on 31 January 2011. The project has been modified 8 times and allows mining operations at the Rasp mine until 31 December 2026, including extraction of up to 750,000 tonnes of ore per annum and deposition of tailings into the Blackwood Pit tailings storage facility (TSF2).

BHO proposes to modify the project approval under Section 4.55(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to improve the project's tailings management to ensure the mining operation can continue through the remainder of the approved mine life. The key components of the modification application include using an existing pit, the Kintore Pit, as a TSF (TSF3), relocation of the underground mine access portal from the Kintore Pit to a new boxcut and portal, revised internal ore haulage routes, and ancillary activities.

The Department has reviewed the modification application and considers that the proposed modification is within the scope of section 4.55(2) of the EP&A Act, as the application is substantially the same development as last modified under section 75W of the EP&A Act, and would not significantly increase the environmental impacts of the project as approved.

The Department publicly exhibited the modification application and accompanying documents for 2 weeks in September 2021, in accordance with the requirements of the EP&A Act, and received one public submission by way of comment, advice from 11 government agencies, and a submission from Council. The key issues raised by the community and NSW public authority were largely related to lead exposure and associated health implications in Broken Hill due to historic and existing lead mining operations, particularly by vulnerable populations such as children and low-income individuals.

The Department has undertaken a comprehensive assessment of the merits of the modification application and supporting information in accordance with the relevant requirements of the EP&A Act, including the relevant 'matters for consideration', considering all information provided by BHO, government agencies and in the public submission. Although the proposal would comply with the project approval criteria for air quality during construction and operations and operational noise criteria, the Department acknowledges that there would potentially be temporary incremental air quality, health and noise impacts due to the proposed construction works given proximity of the project site to privately-owned residents.

Based on this assessment and in consultation with the key agencies (EPA, NSW Health and Resources Regulator), the Department considers that community concerns and residual impacts can be effectively addressed and managed through implementation of the revised conditions, particularly relating to air quality, health and noise conditions as well as updated rehabilitation, reporting and auditing requirements. The benefits of the proposal were also considered, including effective resource utilisation, optimised use and filling of the existing mine void (Kintore Pit) and local/regional economic opportunities, including ongoing employment of more than 200 full-time operational jobs.

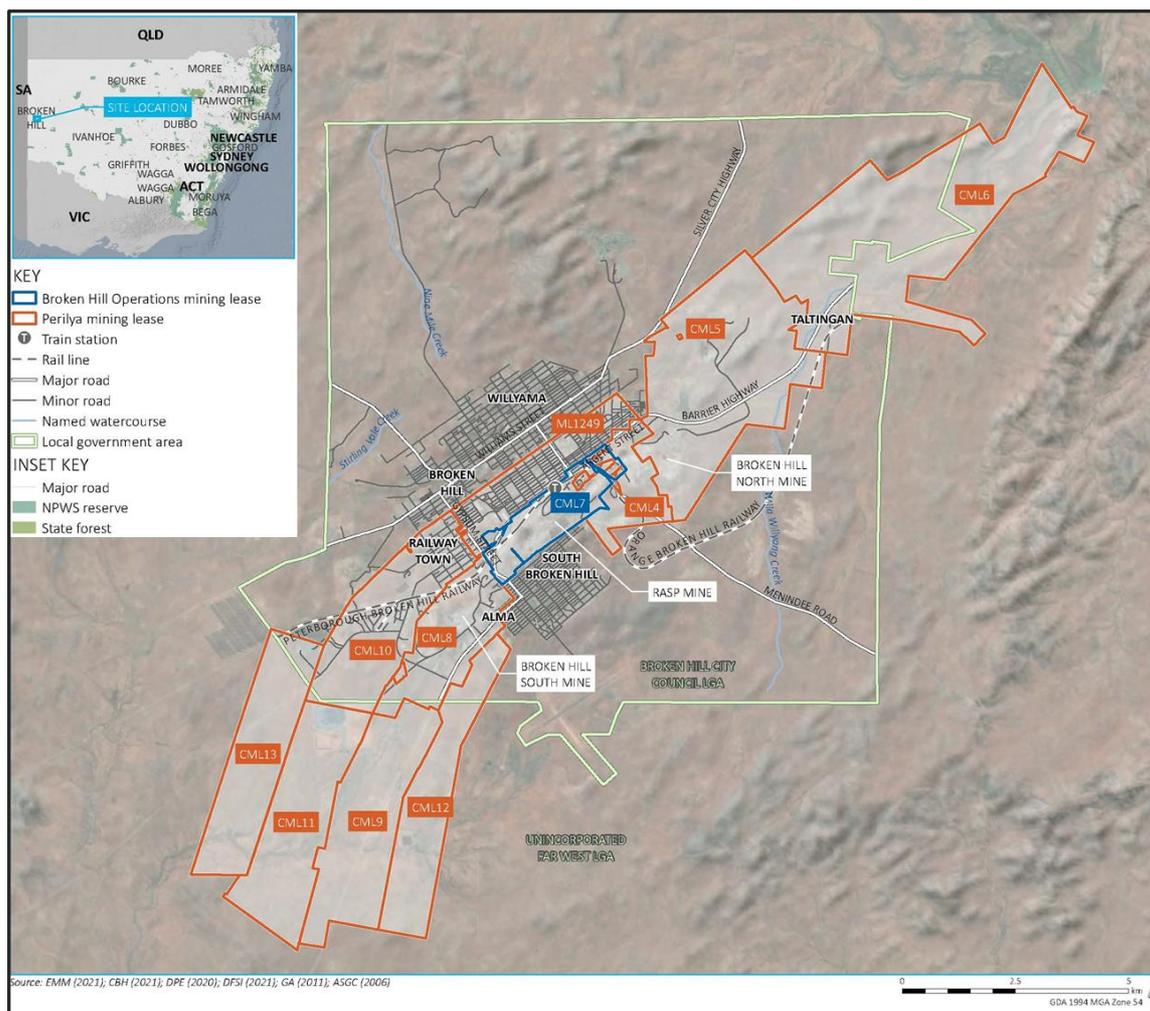
On balance, the Department considers that the benefits of the proposal outweigh its costs and is in the public interest and approvable, subject to the revised conditions.

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# 1 Introduction

Broken Hill Operations Pty Limited (BHO), a wholly owned subsidiary of CBH Resources, owns and operates the Rasp Mine (the project), an underground zinc, lead and silver mine located within the City of Broken Hill local government area in western New South Wales (NSW) (see **Figure 1**). The project is located on land leased from Crown Lands, within Consolidated Mining Lease 7 (CML7), with a small area of the mine also within ML1249 under a sublease arrangement with the adjoining mine operator (Perilya Broken Hill Limited).



**Figure 1 | Regional context (Source: Additional Information - MOD 6)**

The mine has operated almost continually since the 1880s and is located in an area dominated by mining infrastructure, including historic mining buildings and structures, as well as commercial and residential developments immediately adjacent to the mine. The project is a major employer in the region and employs 186 full-time equivalent operational employees.

BHO purchased the mine in 2001 and operates under project approval MP07\_0018 granted on 31 January 2011.

## 2 Proposed modification

The project approval has been modified 8 times and allows BHO to:

- carry out mining operations until 31 December 2026;
- extract up to 750,000 tonnes per annum (tpa) of ore, limited to 8.45 million tonnes (Mt) of ore over the life of the project;
- process the ore, including crushing, milling and flotation, to produce a lead/zinc/ silver concentrate;
- deposit tailings generated from the processing of ore into the Blackwood Pit tailings storage facility (TSF2)<sup>1</sup> and as backfill into underground workings;
- emplace waste rock from underground mine development in underground workings and in the historical Kintore open cut pit, which also has a portal to access the underground workings;
- operate a rail load out area and transport of concentrate by rail to smelter and port facilities; and
- undertake other ancillary activities and rehabilitate the site.

BHO proposes to modify the project approval to incorporate the following key elements without changing the approved life of project (Modification 6 – MOD 6):

- **New tailings storage facility (TSF3):** use the Kintore Pit as a TSF by transferring dried tailings harvested from TSF2, along with co-disposal of waste rock.
- **Underground mine access portal:** relocated from the Kintore Pit to a new box cut and portal, along with an associated new decline to connect into current underground workings.
- **Ore haulage routes:** to reflect the changed location of the portal and tailings disposal.
- **Other ancillary activities:** including periodic crushing of non-ore material up to once a week and three times per year in Kintore Pit or BHP Pit, and use of excess suitable waste rock for rehabilitation, including rehabilitation of the 'free areas'<sup>2</sup>.

BHO also seeks administrative amendments to the project approval including revising the noise impact assessment criteria to align with contemporary guidelines and adjusting the reporting period for the project's Annual Review to calendar year (due by 31 March the following calendar year).

A detailed summary of the proposal is provided in **Table 1** and full details are available in the Modification Report (see **Appendix A1**), Submissions Report (see **Appendix A2**) and additional information provided by BHO (see **Appendix A5**).

**Figure 2** and **Figure 3** detail the key elements of the proposal including the proposed new box cut and the new mine ore and tailings harvesting haulage routes.

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<sup>1</sup> The approval also allows deposition of tailings into TSF1; however, BHO has chosen not to use this TSF since 2017 due to financial and capacity constraints associated with developing this facility.

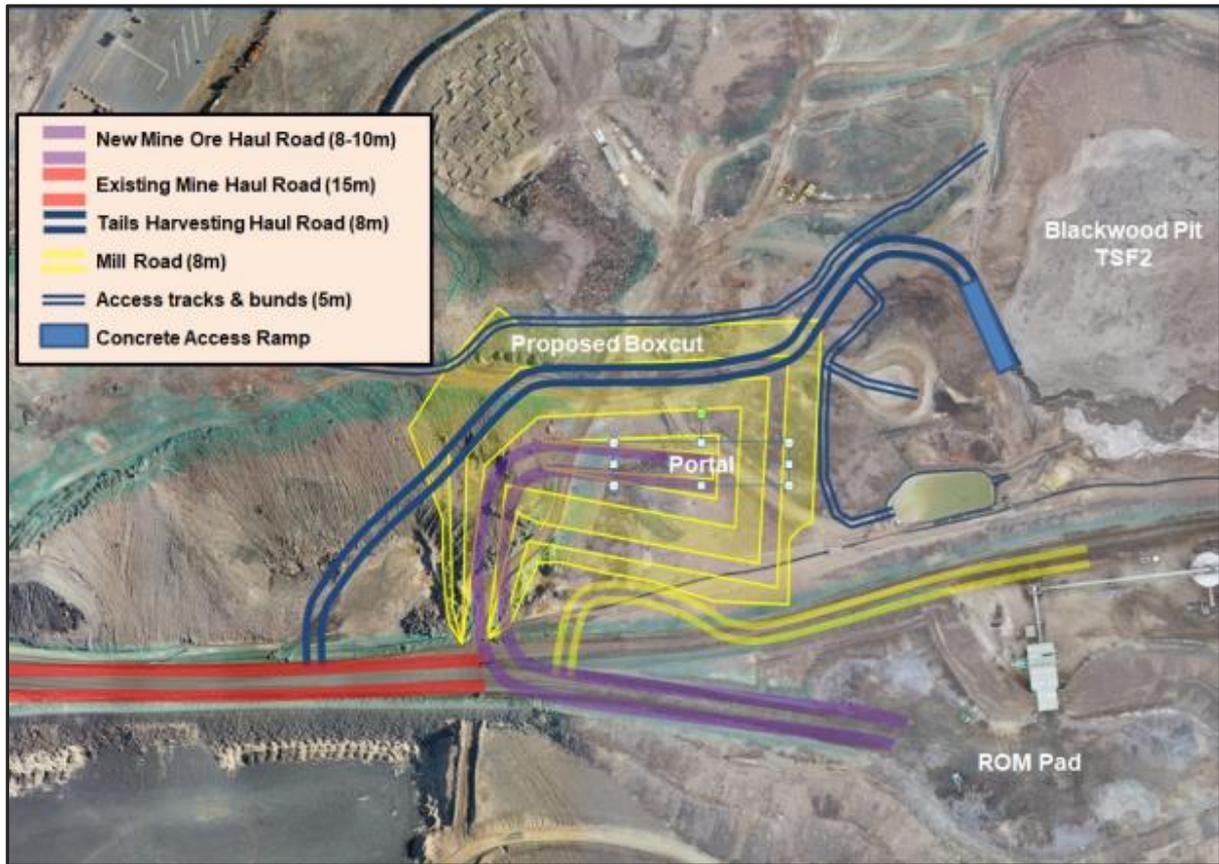
<sup>2</sup> Free areas cover historic waste rock and tailings emplacements, and extensive non-active mining areas that are not disturbed by the project but contribute to the wind-blown dust from the project site

**Table 1 | Summary of proposed changes**

Component Approved Project	Proposed Modification
<p><b>Tailings deposition</b></p> <ul style="list-style-type: none"> <li>• Deposit tailings in TSF1 and TSF2.</li> </ul>	<ul style="list-style-type: none"> <li>• Convert the Kintore Pit into a new TSF (TSF3) with a total estimated capacity of 4.3 Million m<sup>3</sup> (Mm<sup>3</sup>).</li> <li>• Harvest and transfer of 480,000 tpa (about a total of 2.4 Mm<sup>3</sup>) of dry tailings from TSF2 to TSF3 until the end of project life (2022-2026).</li> <li>• Co-place excess waste rock from underground mining into TSF3.</li> </ul>
<p><b>Underground mining access</b></p> <ul style="list-style-type: none"> <li>• Use Kintore Pit to access the underground mine.</li> </ul>	<ul style="list-style-type: none"> <li>• Close the underground mine access portal within Kintore Pit (with a decline plug).</li> <li>• Construct and use a new access portal and decline to the underground mine through excavation of a new boxcut.</li> <li>• Relocate the underground mining access and relevant services (portable buildings used for underground equipment, crib, phone lines and a 22 kV overhead power line and substation) from Kintore Pit to the new boxcut.</li> </ul>
<p><b>Haulage routes</b></p> <ul style="list-style-type: none"> <li>• A number of sealed haul roads including between TSF2 and Kintore Pit and the Mill Road (between the Run of Mine (ROM) pad and the mill plant):</li> <li>• Total length of 2,050 m.</li> </ul>	<ul style="list-style-type: none"> <li>• Two new sealed haulage roads (see <b>Figure 3</b>) for transportation of: <ul style="list-style-type: none"> <li>○ harvested tailings from TSF2 to TSF3 (2,283 m); and</li> <li>○ mine ore between the new boxcut/access portal and the ROM Pad (325 m).</li> </ul> </li> <li>• Alteration of the sealed Mill Road (384 m, extended by 30 m).</li> <li>• Upgrade of the existing unsealed access track between the haul road to the TSF2, site lookout/observation point, process water pond and site construction area.</li> <li>• Total length of 2,638 m.</li> </ul>
<p><b>Ancillary Activities</b></p> <ul style="list-style-type: none"> <li>• Periodic surface crushing and storage in the Kintore and BHP Pits.</li> <li>• Use for backfilling underground mining.</li> <li>• Screen the crushed waste with less than 0.5% Pb content and use sub-50 mm waste for road capping, and sub-200 mm for TSF embankment construction and rehabilitation (at closure).</li> </ul>	<ul style="list-style-type: none"> <li>• Efficient use of existing facilities for improved waste rock management.</li> </ul>
<p><b>Construction hours</b></p> <ul style="list-style-type: none"> <li>• During standard hours (7 am to 6 pm Monday to Friday, 8 am to 1 pm Saturday, and no activities on Sundays or public holidays), except for the Emergency Egress Ladder construction.</li> </ul>	<ul style="list-style-type: none"> <li>• Boxcut excavation works, new decline (surface activity/trucking) and TSF2 harvesting preparation: standard hours.</li> <li>• The new decline (underground activities) and TSF3 preparation works: 24-hours, 7-days per week.</li> <li>• Allow for additional after-hours construction works.</li> </ul>
<p><b>Employment</b></p> <ul style="list-style-type: none"> <li>• Operations: 218 full-time employees and contractors, with a further 200 casual contractors for specialist services.</li> </ul>	<ul style="list-style-type: none"> <li>• Additional 20 contractors during construction and 6 full-time employees during operations.</li> </ul>



**Figure 2 | Project layout – approved and proposed components (Source: Additional Information - MOD 6)**



**Figure 3 |** Proposed design of the new haul roads and access tracks (Source: Modification Report – MOD 6)

## 2.1 Modification justification

The modification was proposed based on BHO’s 2020-2026 mine production plan with a strategy for producing lower volume of higher grade material for the remained mine life (until 2026), based on a maximum ore extraction of 500,000 tpa, production of 146,000 tpa of waste rock (to surface from underground mining), and deposition of 440,000 tpa of wet tailings into TSF2.

This has led to more waste rock being disposed of underground with only TSF1 and TSF2 used for tailings disposal to date with no underground emplacement. The original Environmental Assessment for the project underestimated the volume of waste rock from mine development that would be generated to access the target ore bodies with an estimated annual 2.25 Mt predicted between 2012 and 2020 against an actual produced annual tonnage of more than 3.22 Mt.

BHO contends that the Kintore Pit TSF3 is required to enable mining operations to continue beyond September 2022 as at that time, the capacity of TSF2 would be exceeded based on current mining and processing rates.

## 3 Statutory context

### 3.1 Scope of modification

On 31 January 2011, the project was approved under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) under delegation of the then Minister for Planning.

Under clause 6 of Schedule 2 of the *Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017*, the project was transitioned to State significant development by order, which took effect by publication in the NSW Government Gazette on 4 July 2018.

A modification application under Section 4.55(2) of the EP&A Act was submitted to the Department of Planning and Environment (the Department) on 8 September 2021.

The Department has reviewed the modification and considers that the application is substantially the same development as last modified under section 75W of the EP&A Act (Modification 4, approved on 6 September 2017), would not significantly increase the environmental impacts of the project as approved, and would not change the approved mining areas, mining, processing or transport methods and schedule of land.

Consequently, the Department considers that the proposed modification is within the scope of section 4.55(2) of the EP&A Act.

### 3.2 Consent authority

The Minister for Planning (the Minister) is the consent authority for the modification application. However, under the Minister's delegation dated 9 March 2022, the Director, Resource Assessments, may determine the application. This is because BHO has not made any reportable political donations, there were no objections from the public and Broken Hill City Council (Council) did not object to the proposal.

### 3.3 Mandatory matters for consideration

In accordance with section 4.15(1) and section 4.55(3) of the EP&A Act, the following must be considered in granting the modification application as relevant to the application:

- environmental planning instruments or proposed instruments;
- any planning agreement;
- *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation);
- likely impacts of the modification application, including environmental impacts on both the natural and built environments, and social and economic impacts;
- suitability of the site;
- any submissions;
- the public interest; and
- the reasons for granting approval for the original application.

The Department has considered the relevance of these considerations for the modification application below.

### ***Environmental planning instruments or proposed instruments***

A number of environmental planning instruments apply to the modification, including:

- *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (the Mining SEPP);
- *State Environmental Planning Policy No 55—Remediation of Land* (SEPP No 55 – Remediation of Land); and
- *Broken Hill Local Environmental Plan 2013*.

The Department has considered the proposed modification against the relevant provisions of these instruments, including BHO's consideration of the relevant instruments in its Modification Report. The Department considers that the proposed modification can be carried out in a manner that is generally consistent with the aims, objectives and provisions of these instruments.

### ***EP&A Regulation***

There are no additional considerations relevant to the modification application in the EP&A Regulation.

### ***Likely impacts of the modification application***

The likely impacts of modification are considered in **section 5** of this report.

### ***Suitability of the site***

The modification would not change the approved project site boundaries and would utilise existing mine voids, assisting in overall rehabilitation of the site. The Department considers that this modification application would not result in significant changes that would alter the conclusions made as part of the original assessment and subsequent modifications under Part 3A.

### ***Submissions***

In accordance with clause 10 of Schedule 1 of the EP&A Act, modification applications to State significant developments under section 4.55(2) must be publicly exhibited for a minimum of 14 days. The Department publicly exhibited the modification application and notified and sought comment from Council and previous submitters and advice from relevant Government agencies. The Department also made the application available on its website, as discussed further in **section 4** of this report.

### ***Public Interest***

The consideration of the public interest is provided in **section 6** of this report.

### ***The reasons for granting the consent for the original application***

In determining the original application, the Director-General concluded that the benefits of the project outweighed the impacts and imposed a range of strict conditions to appropriately manage the impacts. The Department has considered the proposed modification against the reasons for determining the project and is satisfied that the proposed modification does not affect the decision that was previously made.

## **3.4 Objects of the EP&A Act**

The Department has assessed the proposed modification against the objects of the EP&A Act. The objects of the most relevance to the decision on whether or not to approve the proposed modification are found in Section 1.3 of the EP&A Act and are:

- Object 1.3(a): to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources;
- Object 1.3(b): to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment;
- Object 1.3(c): to promote the orderly and economic use and development of land;
- Object 1.3(e): to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats;
- Object 1.3(f): to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage);
- Object 1.3(i): to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State; and
- Object 1.3(j): to provide increased opportunity for community participation in environmental planning and assessment.

The Department is satisfied that the proposed modification encourages the proper management and development of resources, including facilitating the continued operation of the project (Object 1.3(a)), and the promotion of the orderly and economic use of land (Object 1.3(c)) as through utilisation of existing mine voids.

The Department considers that the proposed modification may be carried out in a manner that is consistent with the principles of ecologically sustainable development (Object 1.3(b)). The Department's assessment has sought to integrate all significant environmental, social and economic considerations.

The Department has carefully considered the environmental impacts of the proposed modification, including potential impacts on the natural, cultural and built environments (Object 1.3(e) and (f)). The Department's consideration of these matters is provided in **Section 5**.

The Department publicly exhibited the modification application and consulted with Council and relevant Government agencies (Objects 1.3 (i) and (j)).

### **3.5 Impacts on biodiversity values**

Under Clause 30A(2)(c) of the *Biodiversity Conservation (Savings and Transitional) Regulation 2017*, the Department and its Biodiversity, Conservation and Science Directorate (BCS) consider that the proposed modifications would not result in an increase in impacts on biodiversity values, and are satisfied that a Biodiversity Development Assessment Report is not required to be submitted with the modification application.

## 4 Engagement

### 4.1 Department's engagement

The Department publicly exhibited the modification application and accompanying documents from Wednesday 8 September 2021 to Tuesday 21 September 2021. Public submitters on the original project application and previous modifications were notified of the modification application and invited to make a submission. The Department also consulted with Council and the relevant government agencies throughout the assessment process.

### 4.2 Submissions

During the exhibition, the Department received one public submission, advice from 11 government agencies, and a submission from Council (see **Appendix A2**).

All the relevant documents are available on the Department's website, including submissions and agency advice, BHO's Submissions Report, responding to matters raised during exhibition, additional agency advice on BHO's Submissions Report and additional information provided by BHO to support the modification application (see **Appendices A2 to A5**).

### 4.3 Key issues – Community

The community submission provided comments and raised concerns for the project's waste disposal locations, the project's management of dust and airborne lead impacting human health, and concerns for impacts to community health from current and future operation of the project.

Additional representations provided by the public submitter following the exhibition period re-iterated concerns for impacts to the community from dust lift off from the project site due to current operations. It also included concerns for issues raised in the original environmental assessment for the project and subsequent modifications, noting that these issues have been previously considered and assessed in the original assessment and are not specific to this modification.

### 4.4 Key issues – Government agencies

A summary of the key matters raised and recommendations by the government agencies, including Council, throughout the assessment process is provided in **Table 2**.

**Section 5** provides details of the Department's consideration of these matters.

**Table 2** | Summary of Government Agency Advice

Government agency	Key issues and recommendations
<b>Environment Protection Authority</b> (EPA)	<ul style="list-style-type: none"><li>recommended a condition to limit the project's annual ore extraction and processing to 500,000 tpa, or at a higher rate up to 750,000 tpa subject to a revised Air Quality Impact Assessment;</li><li>recommended a condition to develop and implement a Construction Air Quality Management Plan and update the project's Air Quality Management Plan to include proactive and reactive measures specific to managing dust emissions from</li></ul>

Government agency	Key issues and recommendations
	<p>all activities associated with tailings harvesting prior to commencement of tailings harvesting; and</p> <ul style="list-style-type: none"> <li>noted a variation to the project's Environment Protection Licence (EPL) would be required should the modification be approved.</li> </ul>
<b>Dams Safety NSW</b>	<ul style="list-style-type: none"> <li>noted the Kintore Pit is an old mining void with no built embankments and could be used as a stable facility for tailings storage;</li> <li>the modification could potentially impact the TSF2 (a prescribed dam) from blasting and potentially subsidence associated with the new boxcut development within the TSF2 dam notification area, which is regulated and monitored by Dams Safety NSW; and</li> <li>considered the potential impacts would be similar to those from the existing mining operations and did not make any recommendations.</li> </ul>
<b>Heritage NSW (Aboriginal)</b>	<ul style="list-style-type: none"> <li>no issues with the proposal.</li> </ul>
<b>Resources Regulator</b>	<ul style="list-style-type: none"> <li>requested additional information and advised it was satisfied with BHO's response on post mining land use, rehabilitation objectives, completion criteria for the main project's components, including Kintore Pit (proposed TSF3) and Blackwood Pit (TSF2); and</li> <li>requested to review draft conditions for the proposal should it be approved.</li> </ul>
<b>Heritage Council of NSW (Historic)</b>	<ul style="list-style-type: none"> <li>noted two State heritage items are near the site but are separated from the location of the proposal and would not be impacted; and</li> <li>confirmed no local items would be impacted by the proposal.</li> </ul>
<b>Biodiversity, Conservation and Science Directorate (BCS)</b>	<ul style="list-style-type: none"> <li>the proposal does not require any vegetation removal and impacts to threatened species are considered unlikely; and</li> <li>recommended that when accessing the old mine workings, the area should be assessed for bat occupancy using ultrasonic audio recorded and notification given to BCS if any signs of bats identified. BHO has committed to this request.</li> </ul>
<b>Crown Lands</b>	<ul style="list-style-type: none"> <li>requested notification given prior to blasting events due to potential associated impacts to Crown Lands reserves, including the café and memorial; and</li> <li>noted that all Crown land, reserves and roads within a Mining Lease (with surface rights), or mining related activity, must be subject to a Compensation Agreement issued under section 265 of the <i>Mining Act 1992</i>; however, the Department considers that this obligation is outside of the scope of assessment for the proposal under the EP&amp;A Act.</li> </ul>
<b>Mining, Exploration and Geoscience (MEG)</b>	<ul style="list-style-type: none"> <li>noted the modification is required for continued operation of the project, the proposal would not result in sterilisation to resources near surface and would optimise production, aid in effective resource recovery and extraction, regional jobs security and State's mineral royalties; and</li> <li>requested to review draft conditions should it be approved.</li> </ul>
<b>The Water Group</b> within the Department (DPE Water)	<ul style="list-style-type: none"> <li>recommended revision of the site water management plan to include changes to water infrastructure, reporting on water take and potential impacts to water sources.</li> </ul>

Government agency	Key issues and recommendations
<b>Transport for New South Wales</b> (TfNSW)	<ul style="list-style-type: none"> <li>did not raise any issues and requested a copy of the determination.</li> </ul>
<b>NSW Health</b>	<ul style="list-style-type: none"> <li>noted that the proposal's Human Health Risk Assessment adequately addressed local community health impacts related to air emissions, noise and water; and</li> <li>requested information in the Submissions Report on additional mitigation measures to manage the predicted increases in the lead content in soil during the proposal's 12-month construction period and did not raise any further concerns.</li> </ul>
<b>Broken Hill City Council</b> (Council)	<ul style="list-style-type: none"> <li>satisfied there would be no additional operational noise impacts on surrounding residential receivers;</li> <li>due to the predicted temporary associated noise impacts, proposed limiting construction (except for the Kintore Pit) to daytime hours only and no works on public holidays. Council reviewed the Submissions Report and did not raise further concerns; and</li> <li>noted unlikely transport, dust, heritage, health and rehabilitation impacts, and the proposal supporting continued mining operation, employment opportunities, and Broken Hill's economic stability.</li> </ul>

## 5 Assessment

The Department has assessed the modification application and supporting information in accordance with the relevant requirements of the EP&A Act, including the matters for consideration, as set out in Section 4.15(1) of the EP&A Act. A list of the key documents that informed the Department's assessment is provided in **Appendix A**.

The proposal requires no additional land clearing and vegetation removal, would not impact any Aboriginal or historic cultural heritage items and does not seek to change the approved project's mining methods and external transportation routes.

However, historic mining operations in Broken Hill, including at the Rasp mine since the 1880s, has been contributing to the elevated blood lead levels in children, background lead concentration and content in surface soil around the town. There have been improvements in community lead exposure and children's blood lead levels since the start of initiatives and educational programs in 1996. These include the LeadSmart<sup>3</sup> education program, a joint initiative between NSW Government and Broken Hill community (the EPA, NSW Health, Broken Hill Environmental Lead Program, Child and Family Health Centre, and Maari Ma Aboriginal Health).

The Broken Hill Lead Reference Group (chaired and co-ordinated by Council) was also established, and requirements imposed by approval conditions for participations by the mining operators in Broken Hill (BHO and Perilya Broken Hill Limited).

Nevertheless, there are still community and NSW public authority concerns over lead exposure and associated health implications in Broken Hill due to historic and existing lead mining, particularly by vulnerable populations such as children and low-income individuals.

<sup>3</sup> LeadSmart: <https://leadsmart.nsw.gov.au/>

The Department therefore considers the key assessment issues relate to potential air quality, health and noise impacts, particularly during the temporary construction works given proximity of the project site to privately-owned residents. The Department's consideration of other issues relevant to the proposal is provided in **section 5.3** of this report.

## 5.1 Air quality and health

The proposal has the potential to temporarily increase the project's air quality impacts at privately owned receivers as well as minor incremental increases in lead exposure during the proposed construction period (up to 12 months).

Although the NSW EPA's criteria would not be exceeded, the Department has considered these as the key assessment issues due to the existing and historically elevated background concentrations and lead exposure (via air and soil) in Broken Hill and the exposed historic waste rock and tailings emplacements areas ('free areas') within the project site that are not disturbed by the current operations but contribute to the wind-blown dust from the project site.

### Methodology

The Air Quality Impact Assessment (Air Assessment) was completed in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (EPA 2017) (Approved Methods) and the Human Health Risk Assessment (Health Assessment) in accordance with the relevant guidelines, including 2012 enHealth guidelines and the National Health and Medical Research Council (NHMRC) dose-response target levels for metals.

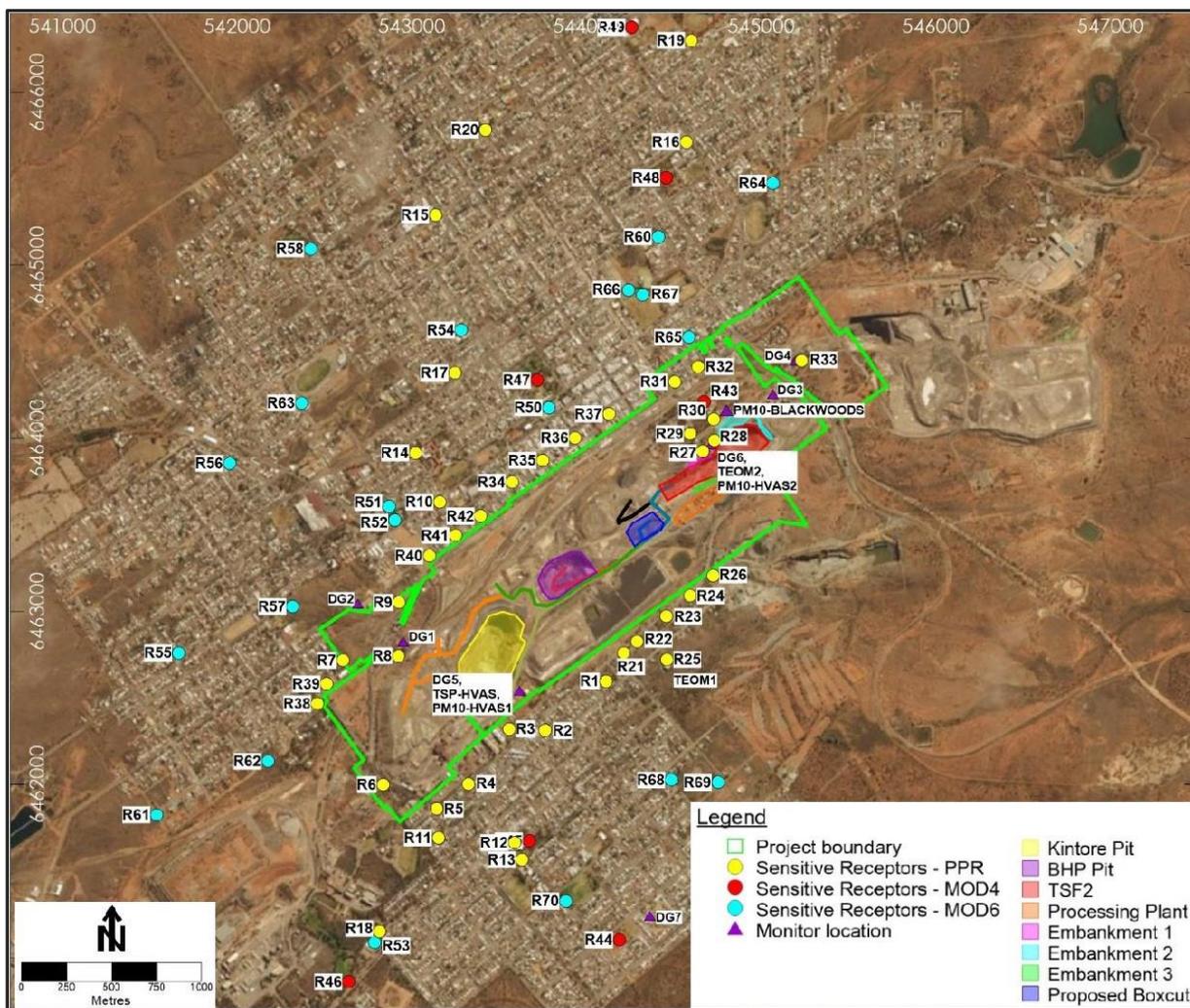
The assessments considered the worst-case scenario based on the MOD 6 operational maximum annual extraction rate of 500,000 tpa using the new mine access portal, and undertaking of the proposed construction activities for up to 12 months as a conservative estimate as well as progressive rehabilitation. It is noted that the worst-case operating scenario considered a lower extraction rate than the previously assessed and approved (up to 750,000 tpa).

The Air Assessment predicted worst-case incremental and cumulative increases in ground-level particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>, particles with diameters of less than 10 µm and 2.5 µm, respectively), total suspended particles (TSP) and lead concentration in TSP and deposition at surrounding sensitive receiver locations due to the proposed modification activities, over the remaining life of the mining operations (until December 2026).

**Figure 4** shows the locations of the 12 monitoring stations (including 3 High Volume Air Samplers, 2 Tampered Element Oscillating Microbalances and 7 Dust Deposition Gauges) and 70 privately-owned representative residences (R1-R70) (sensitive receivers surrounding the project area).

The Health Assessment was informed by the Air Assessment and predicted likely impacts on public health (at the 70 privately-owned representative residences), focusing on heavy metals concentration in particulate matter as potential chemicals of concern, with total lead (including both soluble and insoluble) as the primary focus.

The Health Assessment considered incidental ingestion of metals through soil by calculating the annual average dust deposition rate and existing soil metal concentrations, and inhalation exposure based on the annual average metal concentration in PM<sub>10</sub>.



**Figure 4 |** Locations of air quality monitoring stations and sensitive receivers (Source: Modification Report (MOD 6) – Appendix C1 Air Quality Assessment)

The Health Assessment also modelled blood lead (BPb) levels for 1-2-year-old children (the most susceptible group) based on exposure to lead through incidental ingestion of soil or dust, inhalation (airborne PM<sub>10</sub>), and background intakes from the diet, reticulated drinking water, soil and maternal contribution of lead in blood.

### Mitigation measures

The following key existing measures to manage and mitigate dust emissions from the project site would be continued:

- use of water carts/sprays and chemical suppressants for the existing haul roads and other trafficable areas;
- upgrade of the TSF2 water sprinkler system to accommodate the tailings harvesting operations;
- transport ore concentrate in covered containers;
- regular application of chemical dust suppressant to the exposed areas within the project site, including the 'free areas'; and
- use of an enclosed primary crusher building under negative pressure.

The Air Assessment was based on the following key additional mitigation measures at the site and commitments to minimise the modified project's emissions and subsequent air quality and health impacts, which were updated in the Submissions Report:

- use of larger haul trucks for the proposed harvesting and transferring of dried tailings from TSF2 to TSF3 (50 t - 60 t trucks compared to the currently used 40 - 50 t trucks for haulage purposes);
- minimise dust emissions from the site by:
  - use of water trucks during construction works; and
  - seal the new haulage roads for the ore and harvested tailings and the altered Mill Road;
- permanent in-pit storage of material excavated from the boxcut in Little Kintore Pit and BHP Pit; and
- revision of the relevant plans and programs, as required in the project approval, including the Air Quality and Lead management plans and develop a rehabilitation program and schedule for capping of the 'free areas'.

## Air quality predictions

### Construction

**Table 3** summarises the modelling predictions of incremental (project-only) and cumulative (project and background) ground-level PM<sub>10</sub>, PM<sub>2.5</sub>, TSP and lead concentration and deposition at surrounding sensitive receiver locations associated with the proposed construction works. The modified project is predicted to comply with ambient particulate matter and heavy metal criteria set in the EPA's Approved Methods and the project approval's air quality criteria during the proposed 12-month construction period.

**Table 3 | Predicted maximum air quality impacts during construction**

Parameter (Unit)	Averaging Period	Project Approval Criteria	EPA Criteria	Maximum Incremental	Maximum Cumulative
Lead concentration (µg/m <sup>3</sup> )	Annual	-	0.5	0.023	0.24
Lead deposition (µg/m <sup>3</sup> )	Annual	-	Not applicable	0.06	0.06
TSP (µg/m <sup>3</sup> )	Annual	90	90	1.3	36.6
PM <sub>10</sub> (µg/m <sup>3</sup> )	Annual	25	25	0.9	13.5
	24-hour	50	50	14.2	46.6
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	Annual	-	8	0.3	5.5
	24-hour	-	25	4.0	19.0
Dust Deposition (g/m <sup>2</sup> /month)	Annual (incremental)	2	2	0.5	Not applicable
	Annual (Cumulative)	4	4	Not applicable	3.4

## Operations

**Table 4** summarises the modelling predictions of incremental and cumulative ground-level PM<sub>10</sub>, PM<sub>2.5</sub>, TSP and lead concentration and deposition at surrounding sensitive receiver locations for the modified project's operation.

With implementation of the proposed mitigation measures, operation of the modified project would be compliant with the EPA's Approved Methods criteria and the project approval's air quality criteria.

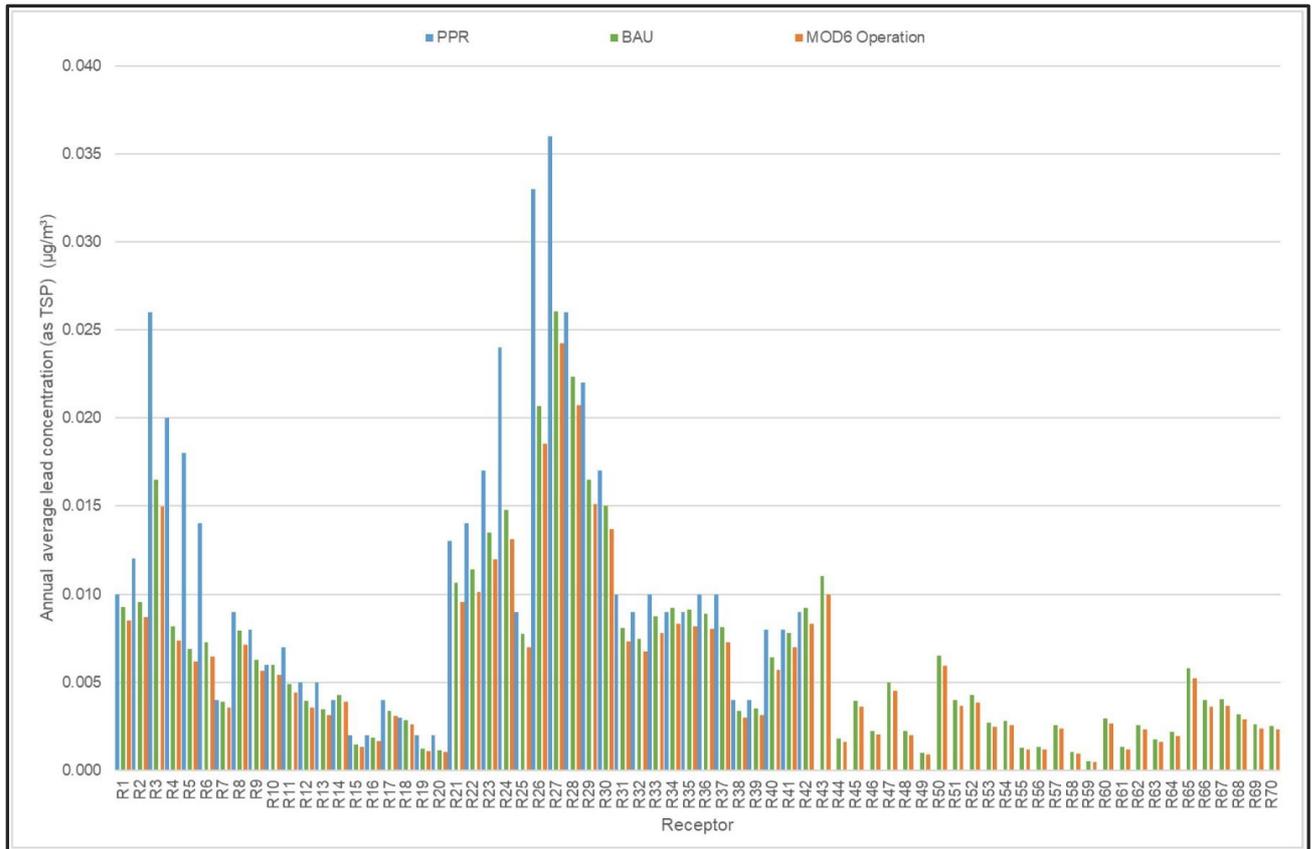
**Table 4 | Predicted maximum air quality impacts during operations**

Parameter	Averaging Period	Project Approval Criteria	EPA Criteria	Maximum Incremental	Maximum Cumulative
Lead concentration (µg/m <sup>3</sup> )	Annual	-	0.5	0.024	0.241
Lead deposition (µg/m <sup>3</sup> )	Annual	-	NA	0.067	0.067
TSP (µg/m <sup>3</sup> )	Annual	90	90	1.8	37.0
PM <sub>10</sub> (µg/m <sup>3</sup> )	Annual	25	25	1.0	13.6
	24-hour	50	50	6.4	46.9
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	Annual	-	8	0.3	5.5
	24-hour	-	25	1.9	18.9
Dust Deposition (g/m <sup>2</sup> /month)	Annual (Increment)	2	2	0.3	NA
	Annual (Total)	4	4	NA	3.6

**Figure 5** shows the predicted annual average lead concentrations at receiver locations for three operational scenarios:

- Business as usual (BAU) – representing an extraction rate of 720,000 tpa;
- Preferred Project Report (PPR) as part of the original application in 2010 – representing an extraction rate of 750,000 tpa; and
- MOD 6 operations at the lower extraction rate of 500,000 tpa.

Overall, the proposal would not significantly change the project's predicted incremental and cumulative operational impacts, although it would result in a minor reduction in cumulative lead concentration and dust deposition rate compared to the calculated impacts associated with the BAU and PPR modelling scenarios).



**Figure 5 | Predicted annual average lead concentration in TSP for project operation (Source: Modification Report (MOD 6) – Appendix C1 Air Quality Assessment)**

### Health impacts

The predicted incremental increase in lead concentration in soil during the construction stage was in the range of 0.03 - 2 mg/kg, representing 0.005 - 0.43% of existing lead concentrations. The highest incremental increase in lead concentration in soil was estimated at R26, R3, R24, R23 and R21 (located on the southern edge of the project boundary), and ranging between 0.43% at R26 and 0.23% at R21 (see **Figure 4**).

Minor predicted increases in BPb levels for 1-2-year-old children at these locations were within the margin error of  $\pm 2 \mu\text{g/dL}$  (between 0.011 and 0.021  $\mu\text{g/dL}$ ), and therefore considered unchanged.

During operations, the predicted BPb levels for 1-2-year-old children at R46, R45 and District 2 (R43, R44, R68, R69, R70), District 6 (R10, R34-R37, R41, R42, R47, R50) and District 7 (R7, R9, R38-R40, R51, R52, R57, R62) were higher than the NHMRC Pb management goal of 5  $\mu\text{g/dL}$ , similar to the existing situation (e.g. lead in soil of 700 – 2,450 mg/kg). The Health Assessment concluded that the impacts of the modified project’s operation would be essentially the same for the existing operations for the remainder of the life of the project and therefore negligible.

The modelled incremental health impacts of the proposal due to a range of other relevant heavy metals through incidental ingestion and inhalation exposure were predicted to be below the relevant health guidelines.

The existing project approval includes conditions to protect the public health in Broken Hill, requiring BHO to implement a range of measures to the satisfaction of the Planning Secretary, including implementation of a lead management plan, revision of the Health Assessment every 5 years and

contributions to public health blood lead monitoring and education programs about the associated health risks. These public health management measures would continue.

### **Recommended conditions**

The Department has recommended the following changes to the relevant conditions of the existing project approval:

- limiting the on-site extraction rate to a maximum of 500,000 tpa to be in-line with the assumptions made in the air quality, health and noise assessments supporting the proposal, with the opportunity to increase the extraction rate to 750,000 tpa subject to a revised air quality impact assessment;
- updates to the air quality impact assessment criteria and monitoring to include annual and 24- hour limits for PM<sub>2.5</sub> emissions in accordance with the EPA's Approved Methods and the updated *Approved Methods for the Sampling and Analysis of Air Pollutants (2022)*;
- sealing and maintenance of the internal routes between the TSF2 and TSF3, the mine ore route between the new boxcut/access portal and the and Run of Mine Pad and the altered Mill Road;
- updates to the Air Quality Management Plan conditions to contemporise the monitoring, measuring and mitigation requirements and accounting for the proposed modification activities; and
- updates to the Lead Management Plan and updated Human Health Risk Assessment conditions, including consultation with the EPA and NSW Health and triggering revision of the Air Quality Management Plan or Lead Management Plan should monitoring data identify the project is contributing to increased blood levels.

### **Summary**

The EPA was satisfied with the Air Assessment and recommended conditions, including proactive and reactive mitigation strategies for all significant emission sources, and limiting annual ore extraction and processing rate to 500,000 tpa (or to a maximum 750,000 tpa subject to a revised air quality impact assessment) in-line with the assumptions in the Air Assessment, noting that the EPA would include its requirements in the variation to the project's EPL should the modification be approved.

With implementation of the proposed mitigation measures, the Department and EPA consider that the short-term predicted incremental changes to the air quality impacts of the approved project during construction would be minor and that the operational impacts would remain largely unchanged.

The Department and NSW Health consider implementation of appropriate and feasible management and mitigation measures as fundamental in minimising lead emissions and exposure pathways in Broken Hill. The existing project approval requires BHO to review and update any relevant management plans, strategies and programs following approval of any modification application. Furthermore, the revised conditions of approval would require BHO to incorporate the additional requirements to the satisfaction of the Planning Secretary and in consultation with the relevant agencies, including EPA and NSW Health.

Consequently, the Department considers that air quality and health impacts of the modified project can be appropriately managed to an acceptable level, subject to the recommended conditions.

## 5.2 Noise and vibration

Potential noise and vibration impacts are a key consideration in the Department's assessment of the proposal due to the proximity to residential receivers.

The noise generated during the proposed construction works would be associated with the boxcut, transportation of waste materials and the preparation works for the TSF2 and TSF3, with blasting and construction relating to the boxcut (lasting approximately 5 months) being the most noise-intensive activity.

During operation, the proposal would generate noise from tailings harvesting and transportation of tailings to the TSF3; however, noise impacts would be similar to the existing project.

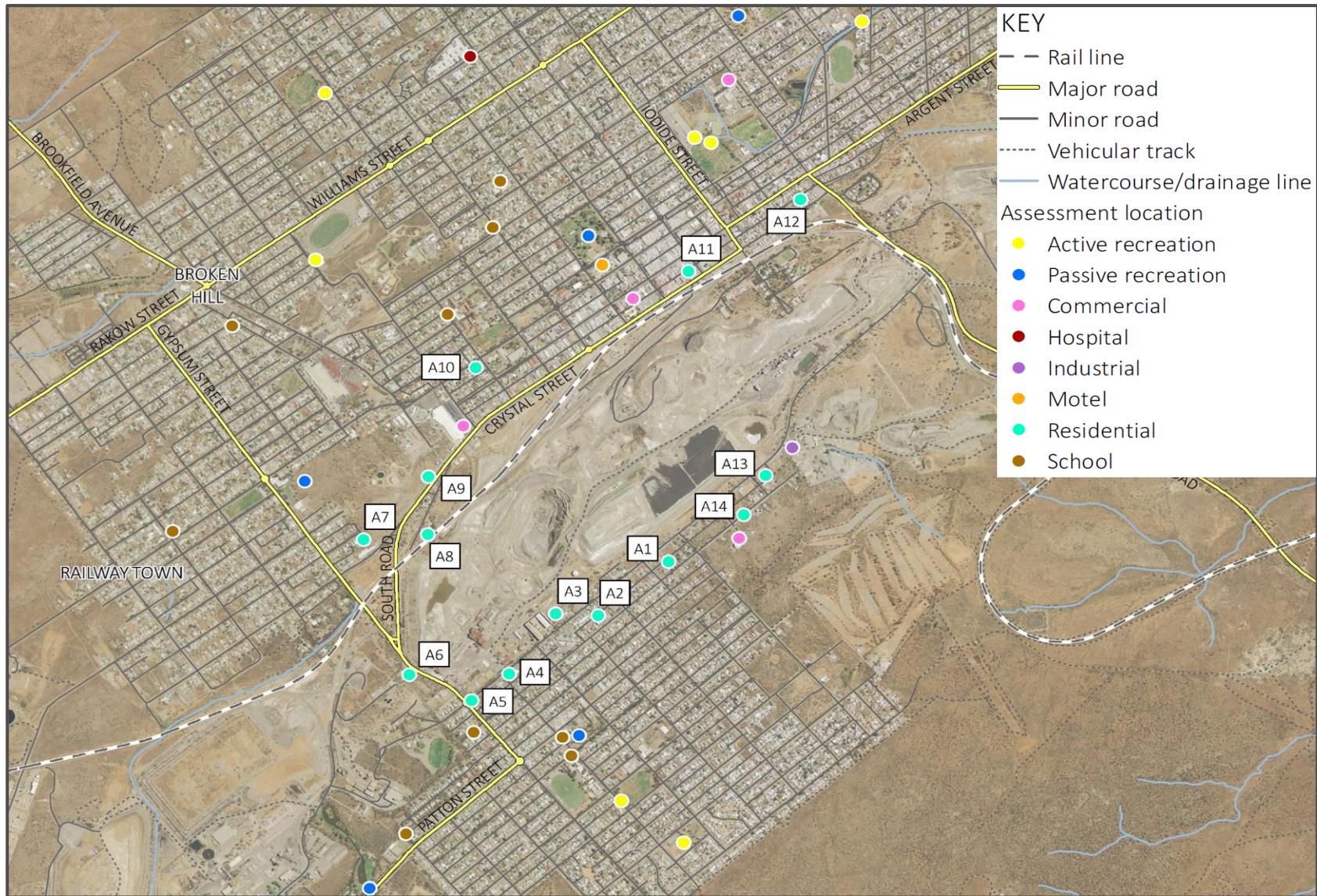
### Methodology

The noise and vibration assessment (Noise Assessment) was completed in accordance with the relevant guidelines, including the NSW EPA's 2017 *Noise Policy for Industry 2017* (NPfI), 2017 *Implementation and transitional arrangements for the Noise Policy for Industry*, and the 2009 *Interim Construction Noise Guideline* (ICNG). Construction and operational impacts were assessed against 14 representative residential receiver locations surrounding the project site (A1-A14) which is consistent with the receivers assessed for the original project and prior modifications (see **Figure 6**).

Worst-case construction noise levels were modelled under 10 different scenarios based on the stage of the construction activity. Construction during standard day-time hours (Monday to Friday 7 am to 6 pm and Saturday 8 am to 1 pm) and out-of-hours works on Saturdays (during daylight, between 7 am and 8 am and 1 pm to 6 pm), and no work on Sundays or public holidays were assessed for all scenarios.

The Noise Assessment also considered that TSF3 preparation works (within the Kintore Pit) would occur 24 hours, 7 days a week. Maximum noise levels of future operations and concurrent night works at TSF3 and the potential to cause sleep disturbance to receivers was also considered.

The Noise Assessment considered construction impacts against noise management levels (NMLs) which were adopted for each of the 14 representative receivers in accordance with the ICNG. Construction NMLs were based on rating background levels (RBLs) determined during previous noise assessments. However, in the case of receiver A7, where ambient background noise monitoring completed in June 2019 higher background noise levels were adopted. Receivers A1, A2, A13 and A14 which were based on the minimum day-time period RBL of 35 decibels (dB) in accordance with the NPfI and ICNG.



**Figure 6 | Noise Impact Receivers (Source: Additional Information - MOD 6)**

## Mitigation measures

The following key existing measures to manage and mitigate noise emissions from the project site would be continued:

- undertaking independent noise audits and implementation of the project's Noise and Blast Management Plan;
- proactive timing of operational activities during day-time hours;
- installation of cladding, enclosures and noise bunds surrounding high noise emitting infrastructure such as the primary crusher, conveyors and batching and slumping processes and haul roads; and
- ongoing maintenance of plant and equipment and noise awareness training for employees and contractors.

The Noise Assessment also provided for additional mitigation measures and commitments which have been proposed to reduce the modified project's noise impacts on surrounding receivers, with a key focus on reducing construction related noise, including:

- on-site enforcement of noise mitigations through toolbox talks, regular identification of noisy activities and scheduling of respite periods;
- vehicle noise reduction through use of broadband audible reverse alarms, minimising movement of materials and plant, conservative driving training and reducing queuing adjacent to residential receivers;
- reducing machinery noise through locating/orienting away from sensitive receivers, using suitable but quiet machinery, not permitting 'warm-ups' outside of standard day-time hours and using noise mufflers;
- all construction work (except for works within the TSF3) to be undertaken in day-time hours;
- noise bunding for the new tailings harvesting haul road around the west side of the proposed boxcut;
- harvesting and transfer of tailings during day-time hours only; and
- revision of the project's Noise and Blast Management Plan.

## Operations

Operation of the proposal would result in exceedances of the day-time noise criteria by at least 2 dB, up to a maximum of 5 dB at 4 receivers as described in when compared to the existing noise limits set in the project approval. However, in accordance with the NPfI, the day-time criteria at representative receivers A1, A2, A13 and A14 should now be set at 40 dB (as the minimum RBL + 5dB), which, if adopted, would result in no exceedances of the operational criteria during day-time hours.

**Table 5 | Summary of project approval operational noise predictions during day-time hours**

Receiver	Existing $L_{Aeq,15min}$ noise levels (dB)	Predicted $L_{Aeq,15min}$ noise levels (dB)	Project approval limit $L_{Aeq,15min}$ dB (day hours)	Proposed day-time criteria limit $L_{Aeq,15min}$ dB (day hours)
A1	<40	<40	38	40
A2	<40	40	38	40
A13	<40	40	38	40
A14	<40	<40	35	40

The EPA advised that they had no objections to the Department revising the project's operational noise criteria in line with the NPfl and as a result of updated ambient noise monitoring completed at representative receiver A7.

No exceedances of the operational project noise criteria is anticipated during evening and night hours; however, during the unlikely worst-case scenario of stability category F temperature inversion with a 2 m/s source-to-receiver wind (adverse meteorological conditions), the night-time criteria would be exceeded by 2 dB at A13 and 1 dB at A14, which is considered a negligible increase. Operation of the proposal would also not exceed the NPfl screening criteria for sleep disturbance during noise-enhancing meteorological conditions.

The Department agrees that revision of the day-time noise criteria for A1, A2, A13 and A14 is acceptable due to the changes that have occurred in guidelines since the project was first approved and A7 due to updated noise background monitoring. The Department considers that BHO can continue to manage operational noise impacts with existing mitigation measures and conditions; however, has recommended the described changes to noise impact criteria at A1, A2, A7, A13 and A14 and also recommends additional operating conditions to reduce impacts during adverse meteorological conditions.

## Construction

### *Noise*

Construction of the proposal would take around 42 weeks, with BHO proposing to complete construction in several stages as follows:

- **Boxcut** – 21 weeks across 3 stages.
- **Haul Roads** - occurring concurrently with stages 1 and 2 of the boxcut.
- **New decline surface activities** – 9 weeks following completion of the boxcut.
- **TSF3 preparation works** – 12 weeks following new decline activities.
- **TSF2 tailings harvesting preparation works** – 1 week – overlap with TSF3 works.

Construction of the boxcut concurrently with haul road upgrades represents the most significant noise source compared to other construction activities, with construction of the boxcut stages 1 and 2 (both during and outside of construction of the haul and access routes) exceeding the ICNG NMLs for the day-time criteria at receivers A13 and A14 by up to 3 dB as summarised in **Table** . Following construction of the boxcut, noise impacts would continue to reduce as construction would be naturally shielded by the TSF2 and TSF3.

The Department notes that construction works during Saturday out-of-hours would result in additional exceedances of the ICNG NMLs at representative receivers A1, A2, A3, A13 and A14 up to a maximum of 8 dB.

**Table 6 | Summary of exceedances of the ICNG NMLs**

Receiver	Construction scenario				ICNG NMLS LAeq,15min dB	
	Boxcut S1 (with haul road construction)	Boxcut S2 (with haul road construction)	Boxcut S3	TSF 3 and new decline trucking	Standard Day-time hours	Saturday OOH <sup>1</sup>
A1	42 (43)	41 (43)	-	-	45	40
A2	43 (44)	44 (45)	-	-	45	40
A3	44 (46)	45 (47)	-	-	49	44
A13	48	39 (47)	-	-	45	40
A14	45 (46)	43 (47)	-	-	45	40

1. Equivalent to the revised operational criteria

The Department has considered a variety of factors when assessing day-time construction noise impacts of the proposal including:

- the short-term nature of the high noise intensive activities (specifically the boxcut and concurrent road works lasting less than 6 months);
- the project approval which permits exceedances of the operational noise limit criteria during certain construction activities, provided the amenity criteria for urban/industrial areas is not exceeded (up to 65 dB);
- additional mitigation measures described by BHO to apply all reasonable and feasible measures to reduce noise impacts during construction, as detailed above;
- a record of minimal noise complaints received from the community, with one complaint received in 2018 during previous construction works which was addressed immediately and no noise complaints received relating to the Modification 4 construction activities;
- proposed increases to the day-time operational noise criteria for receivers A1, A2, A13 and A14 to 40 dB in line with the minimum RBLs described in the NPfl and increases to the A7 noise criteria due to ambient monitoring undertaken at the site; and
- the social and economic impacts of the proposal not proceeding.

On balance of the above, the Department considers that the project's operational noise criteria may be exceeded during construction of the boxcut during standard construction hours (that is Monday to Friday 7 am to 6 pm, Saturday 8 am to 1 pm), and has recommended additional construction day-time criteria should apply for representative receivers that exceed the operational noise criteria in accordance with the noise modelling as detailed in **Table 6**. During proposed out of hours on a Saturday – that is 7 am to 8 am and 1 pm to 6 pm – the operational noise limits apply.

For 24-hour, 7 days a week construction works for the TSF3, exceedances of the project approval night out-of-hours works during the unlikely worst-case night-time temperature inversion conditions (stability category F) and 2 meters per second (m/s) winds (adverse meteorological conditions), is expected by 1 dB at A1 and A10 (35 dB to 36 dB) and by 2 dB at A2, A13 and A14 (35 dB to 37dB).

The Department notes that no exceedances of the evening and night operational noise criteria is anticipated during other meteorological conditions measured (wind as per ISO 9613) and no exceedances of the NPfl screening criteria for sleep disturbance is expected during the proposed night works for the TSF3 during noise-enhancing meteorological conditions. As such, it is considered that potential impacts during adverse meteorological conditions can be appropriately managed by BHO, with the Department recommending additional operational conditions requiring further management of noise during these times.

### *Blasting*

Surface blasting is required for the excavation of the boxcut and installation of the underground mine access portal. Blasting at all locations excluding the TSF1 within the ground vibration limits imposed by the project approval would be achieved using a maximum charge of 75 kg. At TSF1, ground vibration limits would be exceeded at 75 kg, and as such a limit of 35 kg at this location was recommended in order to remain within the project approval ground vibration limits.

BHO would continue to manage potential impacts from blasting vibration, overpressure and flyrock through the implementing the existing blasting management plan managing additional impacts of the proposal by:

- engaging a qualified project supervisor for the works;
- recording mine blasting data for confirmation of modelling;
- conservatively starting blasting at 35 kg near the TSF1;
- conducting no free-face blasting; and
- implementing a flyrock clearance zone of 300 m for the Café, Miners Memorial and Cameron Pipe Band Hall and closing of Federation Way and Holten Drive.

Dams Safety NSW considered that potential impacts of the proposal on TSF2 would be similar to existing impacts, with notification requirements regulated by Dams Safety NSW, noting that potential impacts would need to continue to be monitored and kept within the project approval ground vibration limits. Crown Lands recommended that potential impacts to Crown Lands utilised for memorial tourism be considered including conditioning vibration levels to be in compliance with relevant guidelines to ensure structural integrity of the reserve's infrastructure.

### **Recommended conditions**

The Department has recommended the following changes to the project approval:

- revision of the noise impact criteria at receiver A7 in accordance with background monitoring and revision of the day-time criteria at receivers A1, A2, A13 and A14 to a maximum of 40 dB;
- limiting construction associated with Modification 6 to standard day-time hours and Saturday out-of-hours, in accordance with revised day-time criteria where exceedances of the operational noise criteria is expected;
- inclusion of construction activities within the project approval operating hours, including allowing for the new decline (underground activities) and TSF3 preparation works to be completed 24 hours a day, 7 days a week;
- inclusion of additional operating criteria to minimise noise emissions from the project during adverse meteorological conditions and carrying out regular monitoring to ensure compliance with conditions of the approval; and
- revision of the Noise and Blast Management Plan to include construction activities associated with the proposal and notification to relevant government agencies.

## Summary

In considering the predicted noise impacts resulting from construction, the Department notes that without the proposal BHO would be unable to manage tailings on-site and mining operations would need to cease before the end of 2022, which would have significant social and economic implications for both BHO and the community. The Department has also considered the temporary nature of the construction works and recommended that increased construction noise criteria be applied at 5 representative receivers during standard construction day time hours.

The Department also considers that proposed construction works during Saturday out-of-hours may be permitted, providing BHO adheres to the day-time operational noise criteria.

BHO have also committed to a number of construction noise mitigations which provide reasonable and feasible measures to reduce impacts to the receivers.

Regarding the minor predicted exceedances of the night criteria by 1 to 2 dB (in adverse meteorological conditions) the Department has recommended additional operating conditions to minimise noise impact of the project during adverse meteorological conditions and considers that the minor increases in rare occurrences could be effectively managed.

During operations, noise impacts are expected to be similar to the existing project and BHO have committed to a number of additional mitigation measures to further reduce operational noise impacts such as implementing noise bunding surrounding the proposed harvest tailings route and only transferring tailings between the TSF2 and TSF3 during day-time hours.

Potential noise and vibration impacts resulting from the blasting can be appropriately managed by existing mitigation measures and conditions.

The Department has recommended a number of conditions to further reduce noise impacts of the proposal to receivers including reviewing and updating the project's Noise and Blast Management Plan.

With the proposed recommended conditions in place, the Department considers that receivers would maintain a reasonable level of amenity during the proposed works.

## 5.3 Other issues

**Table 5** summarises the Department's consideration of other issues relating to the proposal.

**Table 5** | Assessment of other issues

Issue	Findings	Recommendations
Rehabilitation	<ul style="list-style-type: none"><li>• Post mining landforms impacted by the proposal relate to the:<ul style="list-style-type: none"><li>○ Kintore Pit (TSF3) which will be sealed and backfilled with tailings and waste rock, and capped with inert waste rock to a gently sloping final landform);</li><li>○ Little Kintore Pit which is proposed to be backfilled with waste rock from the boxcut to form a permanent shallow stormwater detention pond to capture runoff from the capped Kintore Pit (TSF3) landform; and</li><li>○ new portal in the boxcut would be sealed and partially backfilled with waste rock to form a permanent stormwater detention pond to capture surface water which is expected to evaporate or seep to groundwater.</li></ul></li></ul>	<ul style="list-style-type: none"><li>• Revise the Rehabilitation Strategy and Rehabilitation Management Plan.</li><li>• Inclusion of the new standard conditions relating to rehabilitation (in accordance with the requirements of the <i>Mining Act 1992</i>).</li></ul>

Issue	Findings	Recommendations
	<ul style="list-style-type: none"> <li>BHO proposes to mitigate potential risks associated with the waste rock lead content, potentially acidic forming rock and mineralised rock drainage by segregating waste rock into low lead (&lt;0.5%) and low sulphur (&lt;0.2%) for waste rock capping, disposing of rock with &gt;0.2% sulphur with the dry tailings in TSF3.</li> <li>BHO committed to implementation of measures in the approved Mining Operation Plan and revise the project's Rehabilitation Strategy and Rehabilitation Management Plan in consultation with the Resources Regulator.</li> <li>The Department and Resources Regulator consider that changes to the project's rehabilitation strategies resulting from the modification can be appropriately managed through revision of the existing management documents and inclusion of new standard conditions relating to rehabilitation.</li> </ul>	
<b>Slope stability, liquefaction and inrush</b>	<ul style="list-style-type: none"> <li>Potential risks of slope stability were identified due to an historic tailings slope located in the north wall of the Kintore Pit and the waste rock pile located in the south-west of the Kintore Pit.</li> <li>BHO assessed that the progressive placement of dry tailings against the historic tailings slope would increase slope stability and also proposed to support the slopes during tailings and waste rock placement and apply safety bunds to mitigate any slope destabilisation risk.</li> <li>No inrush or inundation risks to underground workings were identified for activities associated with TSF1 and TSF2.</li> <li>Liquefaction of tailings material in TSF1 during blasting was considered unlikely. Tailings in TSF2 were considered to be marginally at risk for static liquefaction.</li> <li>Dams Safety NSW advised that potential impacts to the TSF2 (as a prescribed dam) from blasting would be similar to existing impacts of current operations, noting that mining in the Blackwood (TSF2) Notification Area is currently regulated by Dams Safety NSW in accordance with the <i>Dams Safety Act (1978)</i>.</li> <li>BHO proposes to mitigate liquefaction risk by monitoring movement of the TSF2 embankment, revising relevant management plans including the Principal Hazard Management Plan in accordance with the <i>Work Health and Safety (Mines and Petroleum Act) 2013</i>, maintaining moisture content of the dried tailings for the TSF3, installation of a decline plug in the TSF3, installation of waste rock buttresses over old workings, appropriately managing surface water and implementing ground vibration limits during blasting.</li> <li>The Department and Resources Regulator consider that BHO have adequately assessed the potential impacts of the modification to slope stability, liquefaction and inrush and that any additional impacts can be managed through revision of existing management plans including the project's Principal Hazard Management Plan, Water Management Plan and Noise and Blast Management Plan.</li> </ul>	<ul style="list-style-type: none"> <li>Include relocated and additional surface water infrastructure relating to the modification in the project's Water Management Plan.</li> <li>Include activities associated with the modification in the project's Noise and Blast Management Plan, including notification to relevant agencies.</li> <li>Comply with existing conditions.</li> </ul>
<b>Traffic</b>	<ul style="list-style-type: none"> <li>Minor increases in traffic on public roads would occur for delivery of supplies and equipment; however, increases</li> </ul>	<ul style="list-style-type: none"> <li>Revise the roads to be sealed and maintained</li> </ul>

Issue	Findings	Recommendations
	<p>would not be discernible from current deliveries, resulting in negligible impacts to offsite traffic and transport.</p> <ul style="list-style-type: none"> <li>On-site vehicle interaction at the proposed junction of the new tailings harvesting haul road to the existing mine haul road was identified as a principal hazard (see <b>Figure 3</b>). Management of the internal traffic would incorporate the detailed design and be in accordance with the project's existing Principal Hazard Management Plan for Roads and Vehicles.</li> <li>The proposed alteration to the Mill Road would improve intersection visibility and site traffic safety by creating a 90° intersection and re-aligning it with the new ore haul route.</li> <li>TfNSW made no objections or comment on the proposal.</li> <li>The Department considers that the internal road works would improve safety conditions to reduce potential road and safety risks. The Department also considers minimal impacts to off-site traffic would occur as a result of the modification.</li> </ul>	<p>(Table 6) to reflect the proposed changes.</p> <ul style="list-style-type: none"> <li>Comply with existing conditions.</li> </ul>
Water	<ul style="list-style-type: none"> <li>The proposal would not require any additional water use. However, project's raw water consumption has increased since the original project approval due to operation of the concrete batching plant, surface drilling and truck washing and maintenance.</li> <li>Negligible seepage is anticipated from the TSF3, and any rainfall that infiltrates the TSF3 would be collected by the underground water management system.</li> <li>BHO proposes to manage any potential seepage through shaping of the surface to form a depression which collects runoff (to be removed through either natural evaporation or pumping).</li> <li>The Department and DPE-Water are satisfied that potential construction or operational impacts of the modification would not impact surface water or groundwater supply or quality, subject to the existing and recommended conditions, including updated Water Management Plan, reflecting the proposed mitigation measures.</li> </ul>	<ul style="list-style-type: none"> <li>Revise the Water Management Plan to include details of reporting on water take and surface water management infrastructure impacted by the proposal.</li> <li>Comply with existing conditions.</li> </ul>
Social and economic	<ul style="list-style-type: none"> <li>The project currently employs 186 full-time employees, 32 full-time contractors and over 200 casual contractors that provide specialist services when required, and the proposal would engage an additional 6 full-time employees and 20 contractors during construction.</li> <li>The proposal would allow continuation of mining operations and the project's benefits throughout the mine life, including the significant employment and economic opportunities for the Broken Hill community and broadly for the NSW through mineral royalties.</li> </ul>	<ul style="list-style-type: none"> <li>Comply with existing conditions.</li> </ul>
Visual	<ul style="list-style-type: none"> <li>The proposal would not impact the visual amenity of the site, with the top of the final landform of the proposed TSF3 located below existing mining landforms when viewed from Broken Hill City and the boxcut would also not be visible.</li> </ul>	<ul style="list-style-type: none"> <li>Comply with existing conditions.</li> </ul>

## 6 Evaluation

The Department has undertaken a comprehensive assessment of the merits of the modification application and supporting information in accordance with the relevant requirements of the EP&A Act, including the relevant 'matters for consideration', considering all information provided by BHO, government agencies and in the public submission.

The proposed modification would be contained within the approved project's site boundary on already disturbed land. As such there would be no additional impact on biodiversity or Aboriginal cultural heritage. The Department notes that although many historic heritage sites exist within the project area, no known items are within proximity to the proposed modification that would be impacted, with BHO continuing to implement existing heritage mitigation measures to ensure protection of any item within the project site.

The Department has carefully assessed the proposal in accordance with the relevant NSW policies and guidelines in consultation with the key government agencies and considers the key assessment issues relate to air quality, health, noise and vibration.

The Department's assessment carefully considered the key issues raised in the community submission relating to any increase in lead exposure given the existing elevated lead background concentrations in Broken Hill. The Modification Report found that there would be a small incremental increase in lead concentration and deposition at receiver locations during the construction period. However, the predicted levels are below the EPA and project's air quality criteria and predicted changes to the associated health impacts were negligible. The existing conditions require BHO to contribute to public BPb testing and other management measures to monitor and mitigate any associated health risks.

The Department has assessed the noise and vibration impacts from the proposal in consultation with the EPA and acknowledges that construction works would exceed the ICNG Noise Management Levels at some representative receivers during the most noise intensive activities (being the boxcut construction); however, these activities would last less than 6 months and not proceeding with the modification would result in mining operations needing to cease before the end of 2022.

During operations, the proposal would comply with the existing noise criteria at most representative receivers and would comply with the proposed revised criteria for A1, A2, A7, A13 and A14 which aligns with contemporary noise guidelines and is based on revised background monitoring. The Department has therefore recommended revised operational noise criteria, temporary construction day-time criteria and additional operating conditions to ensure compliance with the noise criteria during adverse meteorological conditions.

In addition to the recommended changes to air quality, health and noise conditions in the existing approval, the Department has recommended other updates, including revision of the Rehabilitation Strategy and Rehabilitation Management Plan to manage potential impacts of the proposal to the project's final landform (in accordance with the requirements of the *Mining Act 1992*) in consultation with Resources Regulator and MEG, and revision to the Water Management Plan to manage the changes to surface water infrastructure in consultation with DPE Water.

The Department also recommended administrative changes including updates to the definition table (adding the modification details in the definition table, changes to current government agency and stakeholder names), contemporary reference documents, as well as the Department's current reporting

and auditing requirements, including access to information and updating and staging of studies, strategies and plans conditions.

Under the existing project approval, BHO is required to review and revise any relevant monitoring and management plans within 3 months of approval of a modification application to the satisfaction of the Planning Secretary and in consultation with the relevant agencies.

The Department's assessment has also considered benefits of the proposed modifications through conversion of the Kintore Pit to a TSF, which would optimise the use and filling of the existing mine void and allow continuation of the project's operation for the remainder of the mine life (until 2026), as TSF2 would reach capacity by September 2022.

Furthermore, the proposal would allow continued economic benefits of the project to Broken Hill community, including more than 200 full-time operational jobs.

The Department considers that the proposed modifications can be undertaken without significant environmental impacts beyond those already assessed and approved and that any other residual impacts can be adequately managed and mitigated by the revised project approval and updated management plans and monitoring programs, in consultation with relevant agencies.

On balance, the Department considers that the benefits of the proposal outweigh its costs and is in the public interest and approvable, subject to the revised conditions.

## 7 Determination

The Department has drafted an Instrument of Modification (see **Appendix B**) for the proposed modification, as well as a consolidated version of the approval as modified (see **Appendix C**).

It is recommended that the Director, Resource Assessments, as delegate of the Minister for Planning:

- **considers** the findings and recommendations of this report;
- **determines** that the application (MP07\_0018 MOD 6) falls within the scope of section 4.55(2) of the EP&A Act;
- **accepts and adopts** all of the findings and recommendations in this report as the reasons for making the decision to approve the modification;
- **modifies** the approval (MP07\_0018); and
- **signs** the attached Instrument of Modification (**Appendix B**).

**Recommended by:**



15/03/2022

**Emily Murray**

A/Senior Environmental Assessment Officer  
Resource Assessments

**Recommended by:**



15/03/2022

**Mandana Mazaheri**

Team Leader  
Resource Assessments

The recommendation is **Adopted / ~~Not adopted~~** by:



16/3/2022

**Steve O'Donoghue**

Director - Resource Assessments

as delegate of the Minister for Planning

# Appendices

## Appendix A – List of Key Documents

**A1 - Modification Report:** Refer to folder “Modification Application” on the Department’s website at

<https://pp.planningportal.nsw.gov.au/major-projects/projects/mod-6-new-tailing-storage-facility>

**A2 - Submissions:** Refer to folder “Submissions” on the Department’s website at

<https://pp.planningportal.nsw.gov.au/major-projects/projects/mod-6-new-tailing-storage-facility>

**A3 - Submissions Report:** Refer to folder “Response to Submissions” on the Department’s website at

<https://pp.planningportal.nsw.gov.au/major-projects/projects/mod-6-new-tailing-storage-facility>

**A4 – Agency Advice:** Refer to folder “Agency Advice” on the Department’s website at

<https://pp.planningportal.nsw.gov.au/major-projects/projects/mod-6-new-tailing-storage-facility>

**A5 – Additional Information:** Refer to folder “Additional Information” on the Department’s website at

<https://pp.planningportal.nsw.gov.au/major-projects/projects/mod-6-new-tailing-storage-facility>

## Appendix B – Instrument of Modification

Refer to folder “Determination” on the Department’s website at

<https://pp.planningportal.nsw.gov.au/major-projects/projects/mod-6-new-tailing-storage-facility>

## Appendix C – Consolidated Project Approval

Refer to folder “Consolidated Consent” on the Department’s website at

<https://pp.planningportal.nsw.gov.au/major-projects/projects/mod-6-new-tailing-storage-facility>