

BENGALLA MINE

MODIFICATION 5 REPORT

*for Bengalla Mining Company Pty
Limited*

26 November 2021



DOCUMENT CONTROL

Document Status

Version	Description	Reviewed by	Approved by	Date issued
01	Final Report for Modification Application	JB	CW	26/11/2021

Document Details

Project Name	Bengalla Mine
Document Title	Modification 5 Report
Client	Bengalla Mining Company Pty Limited
Client Address	Locked Mail Bag 5, Muswellbrook NSW 2333
Author	James Bailey & Associates Pty Ltd
Author Address	6/127-129 John Street, Singleton NSW 2330
Our Reference	<i>J:\Projects\2111 Bengalla MOD5\02 Modification Report\Report\211126 Bengalla MOD5 Modification Report_Final.docx</i>

EXECUTIVE SUMMARY

The Modification

Bengalla Mining Company Pty Limited (BMC) operates the Bengalla Mine (Bengalla) in the Upper Hunter Valley of NSW. Bengalla is approved by Development Consent SSD-5170 granted under the then Division 4.1 of Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). SSD-5170 (as modified) authorises the continuation of open cut coal mining and associated activities at Bengalla until 28 February 2039.

BMC is seeking a modification to SSD-5170 to facilitate the following activities:

- Operation of a mobile rock crushing plant and ancillary equipment, and the use of that crushed rock at Bengalla;
- Geotechnical investigations in connection with any activities approved under SSD-5170 from time to time;
- Prospecting operations (including exploration drilling) in accordance with BMC's mining leases issued under the *Mining Act 1992*;
- Realignment of the Western Diversion Levee within the Disturbance Boundary;
- Enlargement of the ROM coal stockpile located adjacent to the ROM dump hopper from 40 kt to 150 kt approximate maximum capacity;
- Upgrade/widening of an existing haul road (Southern Endwall Road) adjacent to the southern visual bund, which may require removal of part of the visual bund (to be replaced by an equivalent measure);
- Disposal of tyres in-pit; and
- Minor administrative changes to conditions of SSD-5170.

The proposed rock crushing facility will enable BMC to produce its own supply of crushed rock in addition to imported crushed rock. BMC currently imports crushed rock for a variety of on-site purposes including blast stemming and civil works. The Modification will reduce BMC's reliance on external suppliers for crushed rock and therefore heavy vehicle movements on public roads. The crushed rock may be used to line haul roads, which would have various benefits including improved safety and may reduce dust generation.

The proposed upgrade of the Southern Endwall Road will improve safety for vehicles travelling on the road. The proposed enlargement of the ROM coal stockpile will provide further flexibilities around coal storage and haulage.

Prospecting operations and geotechnical investigations will enable BMC to gather information on the coal reserves and ground conditions at Bengalla to inform future mining activities and infrastructure development at the site.

The Western Diversion Levee is a water diversion structure established to divert clean water around disturbed areas at Bengalla. The Western Diversion Levee (or parts of it) will need to be realigned from time to time to accommodate the westward progression of mining.

Environmental Impacts

The key environmental aspects of the Modification are the potential dust and noise emissions associated with the mobile crushing facility, enlargement of the ROM coal stockpile and upgrade of the Southern Haul Road. Suitably qualified experts have been engaged to assess these potential impacts.

The Modification has the potential to generate dust through the following processes:

- Vehicle movements;
- Exhaust emissions;
- Handling of earthen materials (including earthworks); and

- Windblown dust from exposed areas.

The air quality expert (Todoroski Air Sciences) estimated that the Modification may generate up to 47,726 kg/year of total suspended particulate (TSP) emissions. This value represents less than 0.6% of the TSP emissions associated with the approved operations. This minor increase is unlikely to be discernible beyond the existing dust levels at private receptors in the vicinity of Bengalla.

The Modification may generate noise through the use of mobile equipment for construction and operational activities. The acoustics expert (Bridges Acoustics) estimated that the earthmoving equipment required for the proposed construction works may produce a combined sound power level of approximately 117 LAeq,15min. In comparison, each of the haul trucks used at Bengalla produces a SPL of approximately 115 LAeq,15min. The existing mining operations utilise several haul trucks as well as other heavy equipment including excavators and dozers. Given that the SPL of the earthmoving fleet is similar to that of a single haul truck, the construction activities associated with the Modification will not significantly increase noise levels surrounding Bengalla.

The acoustics expert estimated that the mobile crushing plant and its associated equipment may produce a combined sound power level of up to 121 dBA. In comparison, the combined SPL of the approved mining fleet has been assessed at 133-134 dBA. Monthly noise monitoring has confirmed that Bengalla generally complies with the noise criteria at private receptors. Given that the combined SPL of the mobile crushing facility is more than 10 dBA lower than that of the approved mining fleet, the operational noise generated by the Modification is expected to be at least 10 dBA below the noise criteria.

The relevant controls described in the approved Air Quality and Noise Management Plans would be implemented (as required) for the carrying out of activities the subject of the Modification.

Views of the proposed infrastructure (mobile crushing facility and ROM coal stockpile) will be limited by topography, vegetation and existing screening measures. The proposed infrastructure may be visible from some locations surrounding Bengalla. However, the visual impact will be low due to the significant distance to these potential viewing locations.

The prospecting operations, geotechnical investigations, realignment of water diversion structures, in-pit disposal of tyres and administrative changes proposed by the Modification will not result in any significant environmental impacts.

Justification

The potential environmental impacts of the Modification are minor compared to the existing operations. The benefits of the proposed rock crusher include increased reliability of supply, fewer deliveries to site and potential improvements to safety and dust generation on haul roads. The proposed upgrade of the Southern Endwall Road will result in improved safety and the expansion of the coal stockpile will provide greater operational flexibilities without causing any material additional environmental impacts. The other aspects of the Modification are largely administrative, relate to activities that have minimal environmental impact and/or are ancillary to and a necessary part of the broader mining operations assessed and approved under SSD-5170.

Given that the Modification will not materially exacerbate impacts on the surrounding environment (including local residents), the environmental costs of the Modification are outweighed by its benefits.

CONTENTS

EXECUTIVE SUMMARY	III
1. INTRODUCTION	1
1.1 Background – Approved Project.....	1
1.2 Overview of the Modification	2
1.3 Reasons for the Modification	2
1.3.1 Mobile Crushing Facility.....	2
1.3.2 Southern Endwall Road and ROM Coal Stockpile	5
1.3.3 Prospecting Operations and Geotechnical Investigations	5
1.3.4 Re-alignment of Western Diversion Levee	5
1.4 Alternatives	5
1.5 Document Purpose	5
1.6 Applicant	5
2. STRATEGIC CONTEXT	7
2.1 Surrounding Environment.....	7
2.1.1 Catchments	7
2.1.2 Protected Areas	7
2.1.3 Land Ownership	7
2.1.4 Land Use	7
2.2 Planning Constraints.....	9
2.2.1 Flood Prone Land.....	9
2.2.2 Bushfire Prone Land	9
2.2.3 Mine Subsidence Districts.....	9
2.2.4 Other Matters.....	11
2.3 Key Strategic Issues	11
2.3.1 Government Policies and Plans.....	11
2.3.2 Cumulative Impacts	13
2.3.3 Planning Agreements	13
2.3.4 Strategic Context.....	13
3. MODIFICATION DESCRIPTION	14
3.1 Mobile Crushing Plant.....	14
3.1.1 Establishment.....	14
3.1.2 Operation	14
3.2 Geotechnical Investigations	14
3.3 Prospecting Operations	16
3.4 Western Diversion Levee	16
3.5 ROM Coal Stockpile and Haul Road	17
3.6 Administrative Amendments	17
3.6.1 Property Investigations.....	17
3.6.2 Tree Plantings Along Public Roads.....	18
3.6.3 In-Pit Disposal of Tyres	18
3.6.4 Historic Heritage.....	18
3.7 Comparison with Approved Development	20
4. STATUTORY CONTEXT	21
4.1 Overview	21
4.2 Key Legal Matters	23

4.2.1	Power to Modify	23
4.2.2	Permissibility	23
4.2.3	Environment Protection and Biodiversity Conservation Act	23
5.	STAKEHOLDER ENGAGEMENT	24
5.1	Community Engagement	24
5.2	Regulatory Consultation	24
6.	IMPACTS, MANAGEMENT AND MITIGATION.....	25
6.1	Air Quality	25
6.1.1	Background	25
6.1.2	Assessment of Impacts	25
6.1.3	Mitigation	26
6.2	Noise	27
6.2.1	Background	27
6.2.2	Assessment of Impacts	27
6.2.3	Mitigation	28
6.3	Visual.....	28
6.3.1	Background	28
6.3.2	Assessment of Impacts	29
6.3.3	Mitigation	29
7.	JUSTIFICATION AND EVALUATION	31
7.1	Ecologically Sustainable Development	31
7.2	Merit Evaluation	32
	REFERENCES	33
	ABBREVIATIONS.....	34

TABLES

Table 2-1	Muswellbrook Coal Mining Land Use Strategy	11
Table 2-2	Voluntary Planning Agreement with MSC.....	13
Table 3-1	Comparison of the Modification to the Approved Development	20
Table 4-1	Relevant Legislation Provisions.....	21
Table 5-1	Community Engagement.....	24
Table 5-2	Regulatory Engagement	24

FIGURES

Figure 1	Regional Locality	3
Figure 2	Approved Development Layout	4
Figure 3	Land Ownership.....	8
Figure 4	Planning Constraints.....	10
Figure 5	Conceptual Rock Crushing Facility	15
Figure 6	Historic Heritage Sites	19
Figure 7	Visual Long Sections	30

PLATES

Plate 1	Indicative Modification of the Existing Visual Bund	17
---------	---	----

APPENDICES

Appendix A	Air Quality Assessment
Appendix B	Noise Assessment

1. INTRODUCTION

This section introduces the Modification, the proponent and the development sought to be modified.

1.1 Background – Approved Project

Bengalla Mining Company Pty Limited (BMC) operates the Bengalla Mine (Bengalla) in the Upper Hunter Valley of NSW. Bengalla is situated approximately 130 km north-west of Newcastle and 4 km west of Muswellbrook (see **Figure 1**).

Bengalla is approved by State Significant Development Consent SSD-5170 granted under the then Division 4.1 of Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). SSD-5170 (as modified) authorises the continuation of open cut coal mining and associated activities at Bengalla until 28 February 2039. The approved activities at Bengalla include:

- Continuation of activities approved under the previous development consent including use of existing mining infrastructure;
- Open cut mining towards the west at a maximum extraction rate of 15 million tonnes per annum (Mtpa) of run of mine (ROM) coal;
- The use of a dragline, excavators and loaders, a truck fleet and other ancillary equipment for the purpose of uncovering and extracting the coal resource;
- An out-of-pit Overburden Emplacement Area (OEA) to the west of Dry Creek which may be utilised for excess spoil material until it is intercepted by mining;
- Processing, handling and transportation of coal via a Coal Handling and Preparation Plant (CHPP) and rail loop for domestic and export sale;
- Rejects and tailings co-disposal in the Main OEA and temporary in-pit reject emplacement;
- Relocation of a 6 km section of Bengalla Link Road at approximately Year 15 near the existing mine access road to facilitate coal extraction;
- The diversion of Dry Creek via dams and pipe work with a later permanent alignment of Dry Creek through rehabilitation areas when emplacement areas are suitably advanced;
- Relocation of water storage infrastructure as mining progresses through existing dams (including the Staged Discharge Dam and Hunter River Raw water dam); and
- A workforce of approximately 900 full time equivalent personnel (plus contractors) at peak production.

SSD-5170 has been modified on four occasions. The conditions of SSD-5170 require the development to be carried out generally in accordance with:

- '*Continuation of Bengalla Mine Environmental Impact Statement*' (Hansen Bailey, 2013) as modified by the '*Continuation of Bengalla Mine Response to Submissions*' (Hansen Bailey, 2014) (collectively referred to as the Bengalla EIS);
- '*Bengalla Mine Development Consent Modification Statement of Environmental Effects*' (Hansen Bailey, 2015a) and Response to Submissions (Hansen Bailey, 2015b) (MOD1 SEE);
- '*Bengalla Mine Development Consent Modification Statement of Environmental Effects*' (Hansen Bailey, 2016a) and Response to Submissions (Hansen Bailey, 2016b) (MOD2 SEE);
- '*Bengalla Mine Development Consent Modification 3 Statement of Environmental Effects*' (Hansen Bailey, 2016c) and Response to Submissions (Hansen Bailey, 2016d) (MOD3 SEE); and

- 'Bengalla Mine Development Consent SSD-5170 Modification 4 Statement of Environmental Effects' (Hansen Bailey, 2017), Response to Submissions (Hansen Bailey, 2018) and additional information dated July 2018 and November 2018 (MOD4 SEE).

Figure 2 shows the conceptual development layout approved by SSD-5170 (as modified).

The activities approved by SSD-5170 (as modified) comprise the Bengalla Continuation of Mining Project (the Project).

1.2 Overview of the Modification

BMC is seeking a modification to SSD-5170 under Section 4.55(2) of the EP&A Act to facilitate the following activities:

- Operation of a mobile rock crushing facility and ancillary equipment, and the use of that crushed rock at Bengalla;
- Geotechnical investigations in connection with any activities approved under SSD-5170 from time to time;
- Prospecting operations (including exploration drilling) in accordance with BMC's mining leases issued under the *Mining Act 1992* (Mining Act);
- Realignment of the Western Diversion Levee within the Disturbance Boundary;
- Enlargement of the ROM coal stockpile located adjacent to the ROM dump hopper from 40 kt to 150 kt approximate maximum capacity;
- Upgrade/widening of an existing haul road (Southern Endwall Road) adjacent to the southern visual bund, which may require removal of part of the visual bund (to be replaced by an equivalent measure);
- Disposal of tyres in-pit; and
- Minor administrative changes to conditions of SSD-5170.

The Modification is described in greater detail in **Section 3**.

1.3 Reasons for the Modification

1.3.1 Mobile Crushing Facility

BMC currently imports crushed rock for a variety of on-site activities including blasting, civil works and rock-lining of drains in rehabilitation and other operational purposes. The Modification will enable BMC to produce its own supply of crushed rock to assist with meeting operational requirements.

The crushed rock may be used for ongoing approved civil works (e.g. dragline maintenance pad, heavy mining equipment shutdown pad surfaces, light vehicle roads, workshop yard surface), blasting, rock lining of drains in rehabilitation and other operational purposes.

BMC may also use crushed rock for the additional purpose of lining haul roads. The use of crushed rock as road base may yield various benefits including improved safety (particularly during wet conditions), reduced dust generation, increased productivity and reduced maintenance costs.

By allowing Bengalla to produce crushed rock on-site, the Modification will reduce heavy traffic on the public road network to and from the site and reduce the risk of materials shortage due to competition with other stemming/gravel users.

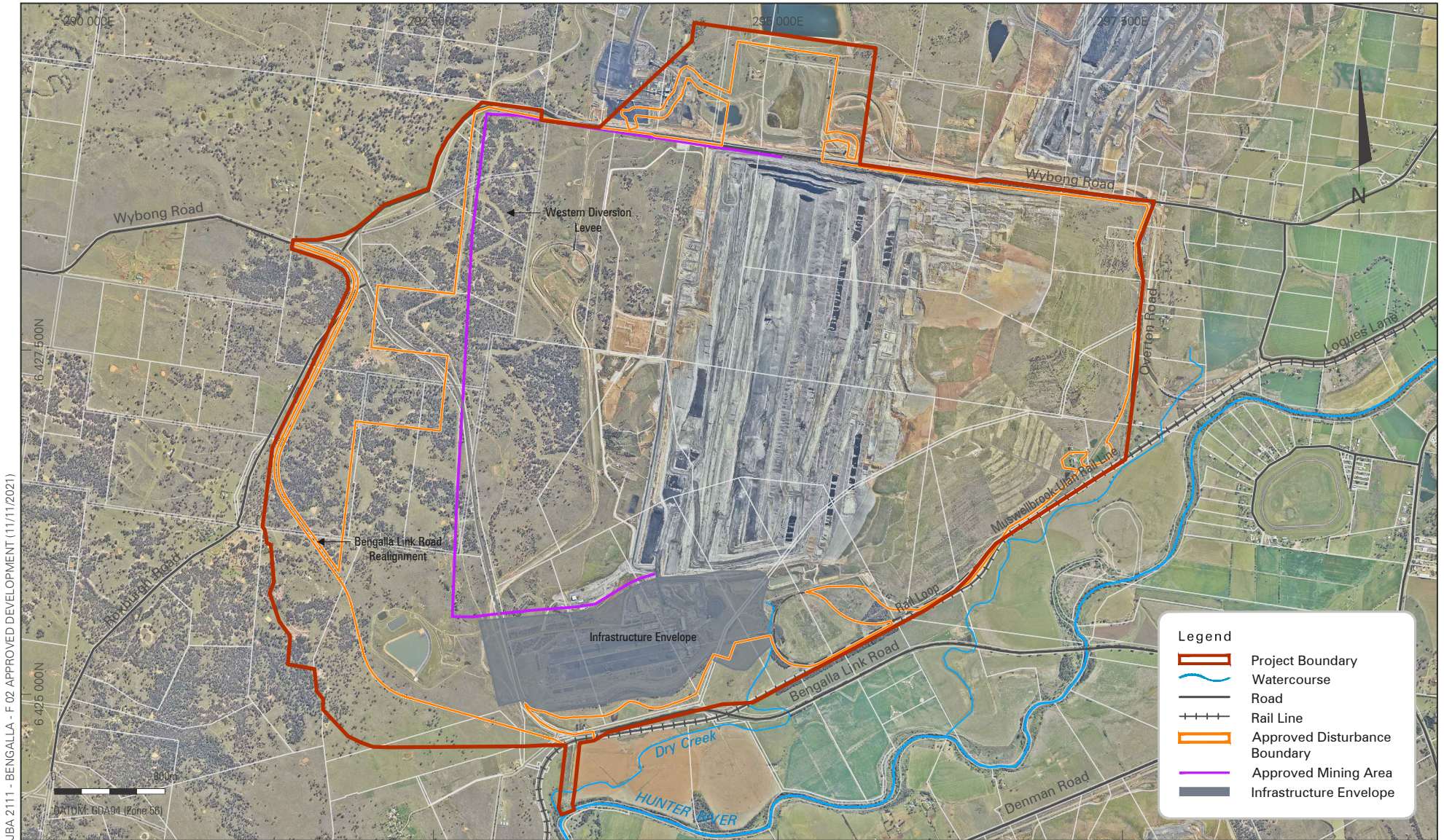


BENGALLA MINE

Regional Locality

FIGURE 1





JBA 2111 - BENGALLA - F 02 APPROVED DEVELOPMENT (11/11/2021)

Legend	
	Project Boundary
	Watercourse
	Road
	Rail Line
	Approved Disturbance Boundary
	Approved Mining Area
	Infrastructure Envelope

BENGALLA MINE

Approved Development Layout

FIGURE 2



1.3.2 Southern Endwall Road and ROM Coal Stockpile

The proposed upgrade of the Southern Endwall Road will improve safety for vehicles travelling on the road. The proposed enlargement of the ROM coal stockpile will provide further flexibilities around coal storage and haulage.

1.3.3 Prospecting Operations and Geotechnical Investigations

Prospecting operations and geotechnical investigations will enable BMC to gather information on the coal reserves and ground conditions within BMC's mining leases, to inform future mining activities and infrastructure development at Bengalla.

1.3.4 Re-alignment of Western Diversion Levee

The Western Diversion Levee is a water diversion structure established to divert clean water around disturbed areas at Bengalla. The Western Diversion Levee (or parts of it) will need to be realigned from time to time to accommodate the westward progression of mining.

1.4 Alternatives

The only alternative to the Modification is to continue the current practices at Bengalla (i.e. 'no modification').

If BMC does not produce its own supply of crushed rock, it would continue to source the required crushed rock materials from external suppliers. In the absence of the Modification, the benefits explained in **Section 1.3** would be foregone.

If the Modification is not undertaken, it is unlikely that the benefits associated with the crushed rock lining of haul roads (i.e. improved productivity (particularly in wet conditions), lower maintenance costs and a potential reduction in fine particulate generation on these trafficked surfaces) will be realised.

The proposed upgrades to the Southern Endwall Road and ROM coal stockpile will improve the efficiency and safety of the approved mining activities. The benefits of these upgrades would be foregone if the Modification does not proceed.

Prospecting operations and geotechnical investigations are essential to mine planning and infrastructure design. There are no alternatives to undertaking these activities.

1.5 Document Purpose

This Modification Report supports BMC's application to modify SSD-5170 under Section 4.55(2) of the EP&A Act. Clause 115AA of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) provides that a modification application for State Significant Development must (relevantly) include particulars of the nature of the proposed modification and be prepared having regard to the *State Significant Development Guidelines* (prepared by the Secretary as in force from time to time and available on the Department's website).

This Modification Report has been prepared in accordance with Clause 115AA of the EP&A Regulation and in consideration of the '*State significant development guidelines*' (DPIE, 2021a) including the associated Appendix E titled '*State significant development guidelines – preparing a modification report*' (DPIE, 2021b).

1.6 Applicant

The applicant is BMC which is owned by the Bengalla Joint Venture (BJV). The BJV consists of:

- New Hope Bengalla Pty Limited – 80%; and
- Taipower Bengalla Pty Limited (a wholly owned subsidiary of Taiwan Power Company) – 20%.

The contact details for BMC are:

Bengalla Mining Company Pty Limited

Locked Mail Bag 5

MUSWELLBROOK NSW 2333

Phone: 02 6542 9500

Fax: 02 6542 9599

Website: <https://newhopegroup.com.au/bengalla-mine/>

2. STRATEGIC CONTEXT

This section outlines the strategic context that is relevant to the Modification, including the relevant environmental and planning considerations.

2.1 Surrounding Environment

2.1.1 Catchments

The major watercourse in the vicinity of Bengalla is the Hunter River, which has a catchment of approximately 4,300 km² to Muswellbrook. The Hunter River is regulated by Glenbawn Dam. The main channel of the Hunter River meanders to the south of Bengalla and a small portion of its floodplain is located within the Project Boundary.

Dry Creek is a 3rd order stream that flowed in a southward direction through the centre of the Project Boundary. Dry Creek is an ephemeral tributary of the Hunter River and has a total catchment area of approximately 18 km². SSD-5170 authorises the temporary diversion of Dry Creek during mining operations. The temporary diversion has been completed and consists of a clean water dam (CW1) and pump and pipeline system to capture and circulate clean runoff around the mining area. Dry Creek will be re-instated within rehabilitated land following the completion of mining in this area.

2.1.2 Protected Areas

There are no national parks, state conservation areas or other protected areas located within 15 km of the Project Boundary. The nearest protected areas are Wollemi National Park to the south, Manobalai Nature Reserve to the west and Scone Mountain National Park to the north. The Modification will not impact upon any reserved areas under the *National Parks and Wildlife Act 1974* (NPW Act).

2.1.3 Land Ownership

Bengalla is adjoined to the north by the Mount Pleasant Mine (operated by MACH Energy Australia Pty Limited (MACH)). The Mt Arthur Coal Mine (operated by Hunter Valley Energy Coal Pty Ltd (HVEC)) is located to the south-east.

BJV/BMC owns all the freehold land within the Project Boundary except for some parcels north of Wybong Road which are owned by MACH. BMC holds Mining Lease (ML) 1711 in respect of its infrastructure in this area. MACH owns the land to the north of Bengalla and HVEC owns most of the land to the south. Several privately owned rural-residential properties are located immediately to the west of Bengalla.

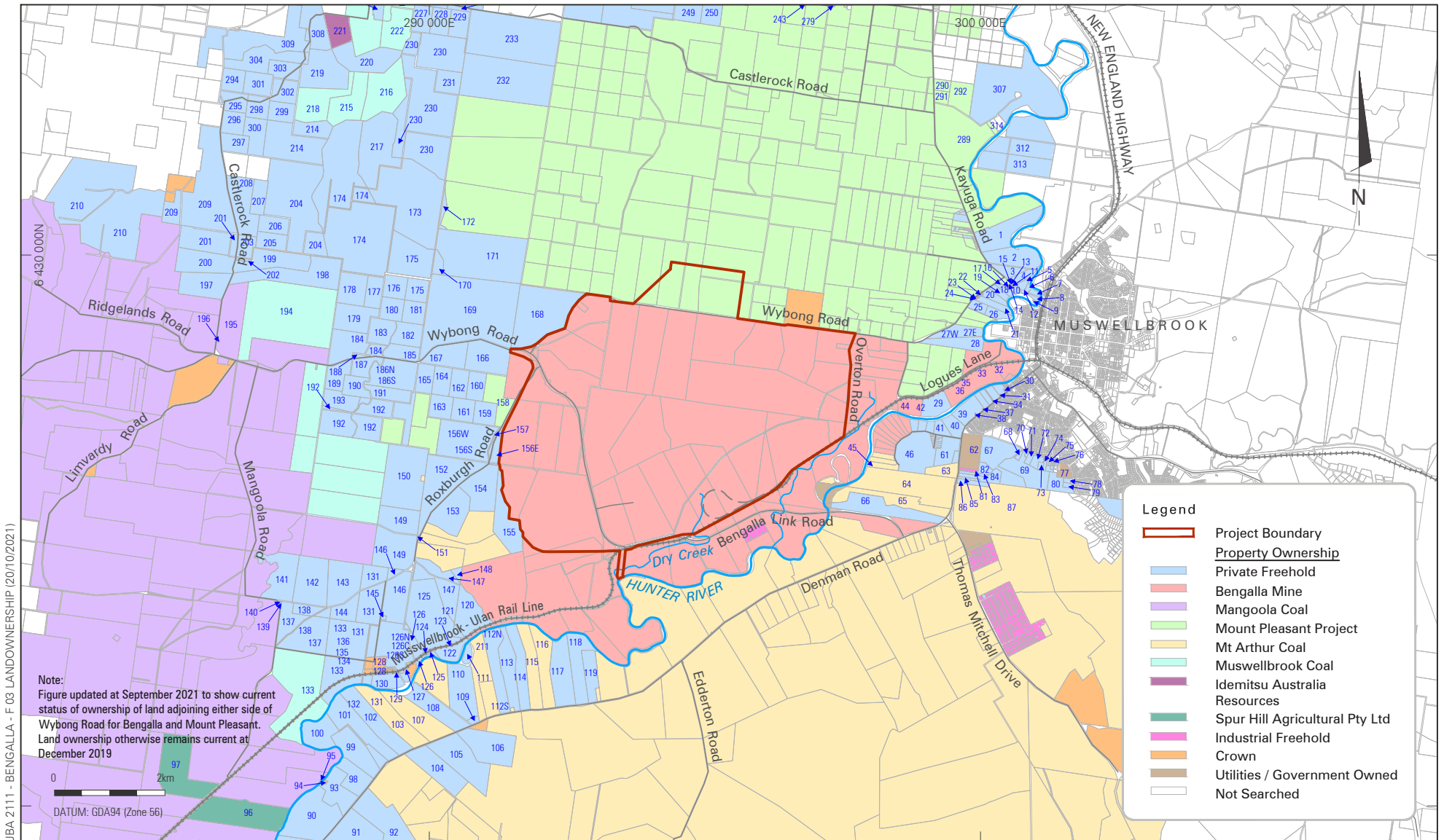
The major community in the locality is the township of Muswellbrook, located approximately 4 km east of Bengalla. The smaller community of Denman is located 15 km to the south-west.

The ownership of land in the vicinity of Bengalla is illustrated in **Figure 3**.

2.1.4 Land Use

Bengalla is located within the Muswellbrook Local Government Area (LGA), which has a mix of residential, agricultural and industrial land uses. Coal mining and associated power generation are prominent and long-standing land uses. The other coal mining and power generation operations in the LGA include Mount Pleasant Mine, Mt Arthur Coal Mine, Muswellbrook Coal Mine, Mangoola Mine and the Bayswater and Liddell Power Stations.

The township of Muswellbrook is located approximately 4km east of Bengalla. The Muswellbrook Industrial Estate is located on Thomas Mitchell Drive, approximately 4 km south of Bengalla. Muswellbrook Industrial Estate includes a variety of businesses that provide support services to the mining and power generation industries.



JBA 2111 - BENGALLA - F 03 LANDOWNERSHIP (20/10/2021)

BENGALLA MINE

Landownership

FIGURE 3



Agricultural activities (predominantly grazing) are undertaken on rural properties in the LGA.

The major transport corridors in the locality are the New England Highway and the Main Northern Rail Line.

2.2 Planning Constraints

2.2.1 Flood Prone Land

The southern extent of the Project Boundary is located within the floodplain of the Hunter River. The rail loop is within the flood extent for a 1% annual exceedance probability (AEP) storm event, as modelled in the '*Hunter River Flood Study (Muswellbrook to Denman)*' (Worley Parsons, 2014). The open cut mining area and mine infrastructure area (MIA) are located entirely outside of the modelled flood extent for all events up to and including the probable maximum flood (PMF). The activities proposed by the Modification will be located outside of the PMF extent for the Hunter River.

2.2.2 Bushfire Prone Land

Bengalla is located on mapped bushfire prone land. Bushfire prone land is categorised into three categories according to level of risk, namely:

- Vegetation Category 1 represents the highest bushfire risk and includes forests, woodlands, heaths and timber plantations;
- Vegetation Category 2 represents the lowest risk and includes rainforests, remnant vegetation and land that is actively managed; and
- Vegetation Category 3 is the most recently introduced category and falls between categories 1 and 2. Vegetation Category 3 includes grasslands and shrublands.

As shown in **Figure 4**, most of the land within the Project Boundary is mapped as Vegetation Category 3, although smaller areas of Vegetation Category 1 are present in the western extent of the site.

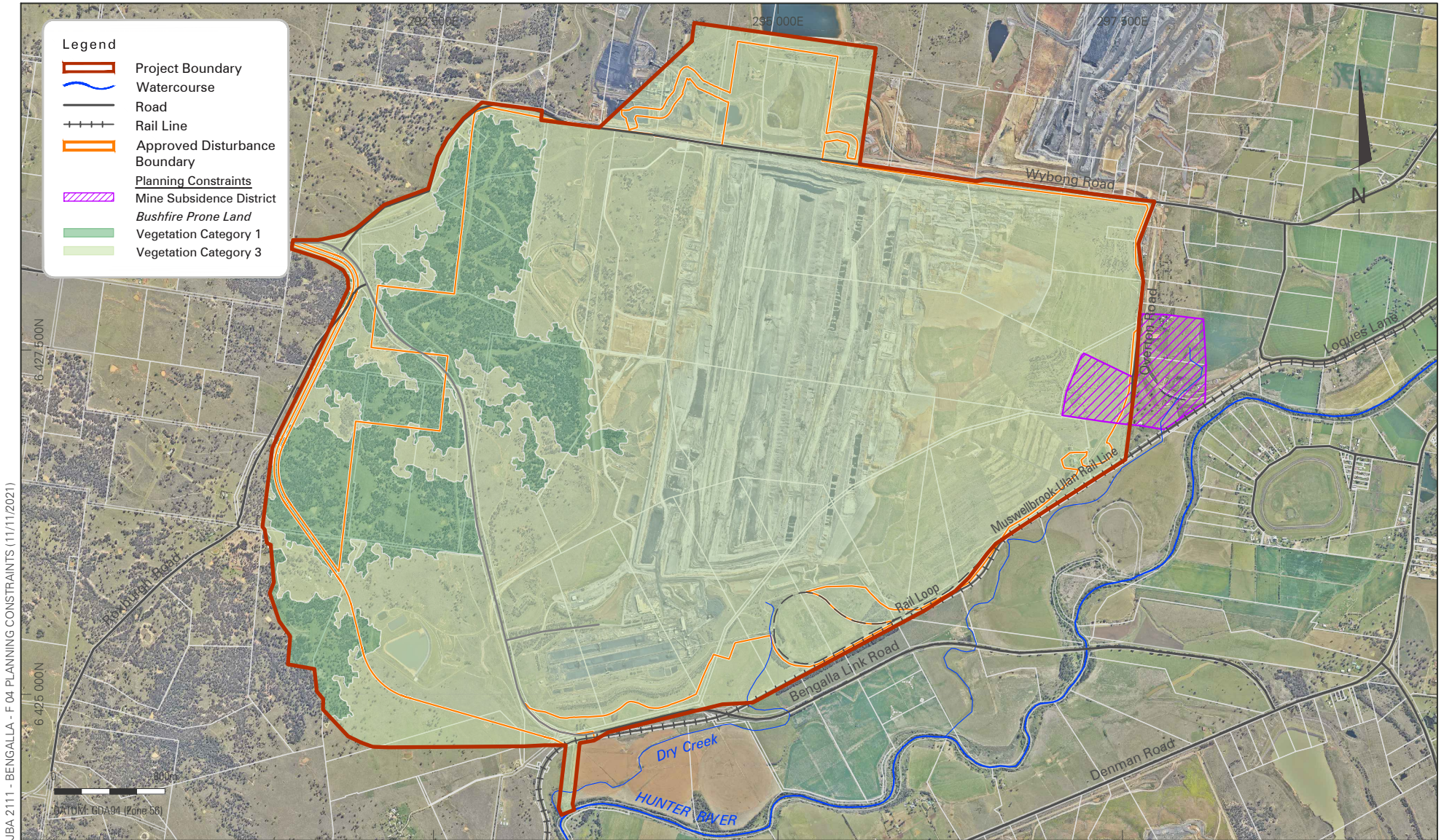
Chapter 8.3.6 of '*Planning for Bush Fire Protection*' (NSW Rural Fire Service, 2019) (PBFP) provides guidance regarding bushfire protection measures for mining development. PBFP recommends that an asset protection zone (APZ) of at least 10 m should be established around all infrastructure associated with mining. An APZ is a buffer zone with minimal fuel zones (i.e. vegetation).

The Modification is consistent with the recommendations of PBFP as follows:

- The ROM stockpile is located within an existing infrastructure area and as such, there is minimal vegetation surrounding the stockpile. The mobile crushing facility will progressively be re-located as mining advances. Whenever the facility is relocated, an APZ of at least 10 m will be established in accordance with PBFP.
- Both the ROM stockpile and mobile crushing facility will be equipped with water sprays, which can be used for fire management (if required). Bengalla is also equipped with first-response firefighting equipment. BMC has developed an emergency response protocol which addresses notification of emergency services.

2.2.3 Mine Subsidence Districts

The eastern portion of the Project Boundary is located within the Muswellbrook Mine Subsidence District (MSD). As shown in **Figure 4**, this MSD applies to part of the rehabilitated OEA. No aspects of the Modification will be undertaken within this MSD.



BENGALLA MINE

Planning Constraints

FIGURE 4

2.2.4 Other Matters

The Environmental Protection Authority (EPA) maintains a register of contaminated land in NSW. The Modification is not located on or near a notified contaminated site.

The Modification is not located on or near any land mapped as a landslide risk area.

2.3 Key Strategic Issues

2.3.1 Government Policies and Plans

The existing development (with the Modification) is permissible by virtue of the *Muswellbrook Local Environmental Plan 2009* (Muswellbrook LEP) and *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP) as described in **Section 4.2.2**.

The gateway provisions in the EP&A Regulation arising from the NSW Government's '*Strategic Regional Land Use Policy*' (2012) do not apply to the Modification as described in **Section 4.1**.

The following government plans and strategies are also relevant to the Modification.

Hunter Regional Plan 2036

The '*Hunter Regional Plan 2036*' (NSW Government, 2016) (HRP) outlines the state government's land use planning priorities for the Hunter Region. The HRP defines four broad goals, each comprised of more specific directions. Goal 1 of the HRP is to maintain the Hunter region as the leading regional economy in Australia. The HRP forecasts growth and diversification of the energy sector. The HRP relevantly states (at p. 24):

The Upper Hunter is recognised as a major supplier of coal, energy, wine and thoroughbred horses to national and global markets. These industries have driven investment in transport and energy infrastructure, and will continue to underpin the growth and diversification of the Hunter's economy and employment base.

In the coming decades, the growth and diversification of the Hunter's mining and energy industries will be influenced by global and national energy demands and policies. Identifying land and infrastructure requirements that can support the future development of the region's coal and alternative energy resources will enable the Upper Hunter to respond to new and emerging opportunities.

Whilst the HRP forecasts the emergence of alternative energy sources, it recognises the continuing need for development of the region's coal resources during the term of the plan (i.e. up to 2036). The Modification is consistent with Goal 1 of the HRP. The other goals of the HRP are not relevant to the Modification.

Land Use Development Strategy

Muswellbrook Shire Council (MSC) has prepared a '*Land Use Development Strategy*' (MSC, 2015) (LUDS) which outlines its vision for land use and development within the Muswellbrook LGA over the next 20 years. The LUDS includes a coal mining land use strategy that aims to balance the expected increase in coal demand with environmental and community interests. **Table 2-1** outlines the application of the coal mining land use strategy to the Modification.

Table 2-1 Muswellbrook Coal Mining Land Use Strategy

Strategic Issue	Applicability to the Modification
Intensification of existing and approved mining activities are favoured over an increase in the footprint of mining activities	The Modification does not involve intensification or expansion of mining activities, as the production rate and disturbance footprint will remain consistent with the approved Bengalla.
Land use conflict needs to be managed between mining activities and adjoining uses, particularly in	The Modification will not expand the mining footprint or materially increase environmental

Strategic Issue	Applicability to the Modification
regard to the development and growth of Muswellbrook township.	impacts and therefore will not result in any additional land use conflict.
Impacts of mining activities on the health and well-being of residents in settlements and townships require investigation and monitoring throughout the lifetime of the mine.	As discussed in Sections 6.1 and 6.2 , the Modification will not materially increase the dust or noise emissions generated by the approved mine. Air quality and noise monitoring will continue to be undertaken in accordance with the approved environmental management plans.
Recognition needs to be given to the central location of Muswellbrook in regard to the movement of coal resource through the Upper and Mid Hunter Valley.	There will be no change to the approved production rate. As such, the Modification will not result in any additional transportation of coal.
There is a need for a whole of life consideration for mining activities, including quality rehabilitation and restoration of mined land.	All disturbed land at Bengalla will be rehabilitated in accordance with the rehabilitation objectives in SSD-5170. The Modification does not seek any change to the rehabilitation conditions of SSD-5170.
Mining activities as far as possible should complement rather than dominate landscapes, particularly as seen from the road.	As described in Section 6.3 , the additional infrastructure proposed by the Modification will not materially increase the visual impacts of Bengalla when viewed from public roads or private receptors.
Provision needs to be made for the diversification of land uses within the Shire, particularly ensuring that once mining has ceased compatible land use activities can re-establish and add to the Shire's diversity and economic base.	All disturbed land at Bengalla will be rehabilitated in accordance with the rehabilitation objectives in SSD-5170. Suitable post-mining land uses may include grazing land. This will not change as a result of the Modification.
Rehabilitation of land post mining should set the platform for future land use, recreation opportunities, and provide for opportunities to strengthen the districts biodiversity resource.	All disturbed land at Bengalla will be rehabilitated in accordance with the rehabilitation objectives in SSD-5170. The post-mining landform will be a mixture of high-density woody vegetation and grazing land. This will not change as a result of the Modification.
Best practice activities employed in the mining industry should be employed in mining activities throughout the Shire.	Dust and noise controls will continue to be implemented for the construction and operational activities proposed by the Modification in accordance with the approved Air Quality Management Plan and Noise Management Plan.
Recognition that mining activity is a positive contributor to the Shire's economy and that the mining industry continues to work in partnership with Council	Bengalla continues to provide economic benefits to the local community through employment and procurement of goods and services, as well as to MSC via the Voluntary Planning Agreement (VPA). The general contribution under the VPA (see Section 2.3.3) is proportional to coal production. Consequently, any productivity gains due to the Modification may result in greater contributions under the VPA.

As demonstrated in **Table 2-1**, the Modification is consistent with the principles of the LUDS.

2.3.2 Cumulative Impacts

Assessments of cumulative air quality and noise impacts were conducted for the Bengalla EIS and its subsequent modifications. The following developments were considered in the cumulative impact assessments:

- Mount Pleasant Mine;
- Mt Arthur Coal Mine;
- Mangoola Mine;
- Muswellbrook Coal Mine; and
- Dartbrook Mine.

The most recent modification (MOD4) to SSD-5170 was approved on 19 December 2018. Since that time the following planning approvals have been issued for mining operations in the locality:

- Approval of the Mangoola Coal Continued Operations Project (SSD-8642); and
- Approval of the Maxwell Underground Coal Mine Project (SSD-9526).

A development application for the Mount Pleasant Optimisation Project (SSD-10418) has been lodged but not yet determined.

As described in **Sections 6.1** and **6.2**, the potential air quality and noise emissions generated by the Modification are negligible in the context of the overall development and surrounding developments in the vicinity of Bengalla. The Modification will not result in any material additional contribution to the cumulative impacts of those developments.

2.3.3 Planning Agreements

In accordance with Schedule 2, Condition 16 of SSD-5170, BMC has entered into a Voluntary Planning Agreement (VPA) with MSC. The VPA facilitates the community benefits listed in **Table 2-2**.

Table 2-2 Voluntary Planning Agreement with MSC

Component	BMC Commitment
General contribution	\$0.065 cents per tonne of product coal produced in excess of 8.5 Mt of product coal from the mine in any calendar year.
Bengalla Coal Community Fund	\$400,000 per annum
Road maintenance requirements within the Muswellbrook LGA	\$125,000 per annum
MSC Environmental Officer position	\$20,000 per annum
A commitment to training of local apprentices	Four apprentices per annum sourced from the local area

2.3.4 Strategic Context

The strategic context relevant to Bengalla has not materially changed since SSD-5170 was approved in 2015. Some additional government plans/policies have been published; however the Modification is consistent with the relevant aspects of these plans/policies (as described at **Section 2.3.1**). There have been some changes to the planning approvals for other mining operations in the locality, but these do not materially affect the environmental assessment relevant to this Modification.

3. MODIFICATION DESCRIPTION

The key elements of the Modification are listed in **Section 1.2**. This section provides a detailed description of the activities for which approval is sought.

3.1 Mobile Crushing Plant

3.1.1 Establishment

The mobile crushing facility is comprised of moveable infrastructure components including a hopper, crusher, feeder, screens, conveyors, stockpile and access road. An indicative layout of the crushing facility is shown in **Figure 5**.

It is anticipated that the mobile crushing facility will be relocated from time to time to accommodate the progression of mining towards the west. The mobile crushing facility will generally be sited within or near the active mining area. The mobile crushing facility will always be located within the approved Disturbance Boundary and therefore will not result in any additional disturbance.

3.1.2 Operation

The mobile crushing facility will be used to produce crushed rock for on-site activities including blast stemming, road base and rock-lining of drains. The facility will have the capacity to crush and separate up to 3,000 tonnes per day (up to an annual limit of 500,000 tonnes per annum) of excavated rock materials. The raw rock material will be sourced from the approved mining area under SSD-5170 (as modified).

Crushed material will be placed in short-term stockpiles adjacent to the crusher unit. Crushed material that is not needed immediately may be relocated to other stockpiles located within the Disturbance Boundary for later use. Crushed material that cannot be reused will be emplaced within the approved OEA. No crushed rock will be transported off-site.

The equipment fleet required for operation of the mobile crushing facility indicatively includes one loader (with a 12m³ bucket), one 50t excavator, three 40t trucks and a service cart. Bengalla's existing fleet of trucks and water carts will also support the operation of the mobile crushing facility.

Appropriate dust management measures will be implemented at the mobile crushing facility. The crushing facility is equipped with water sprays. The existing water cart fleet will be used for water application to unsealed roads and temporary stockpiles.

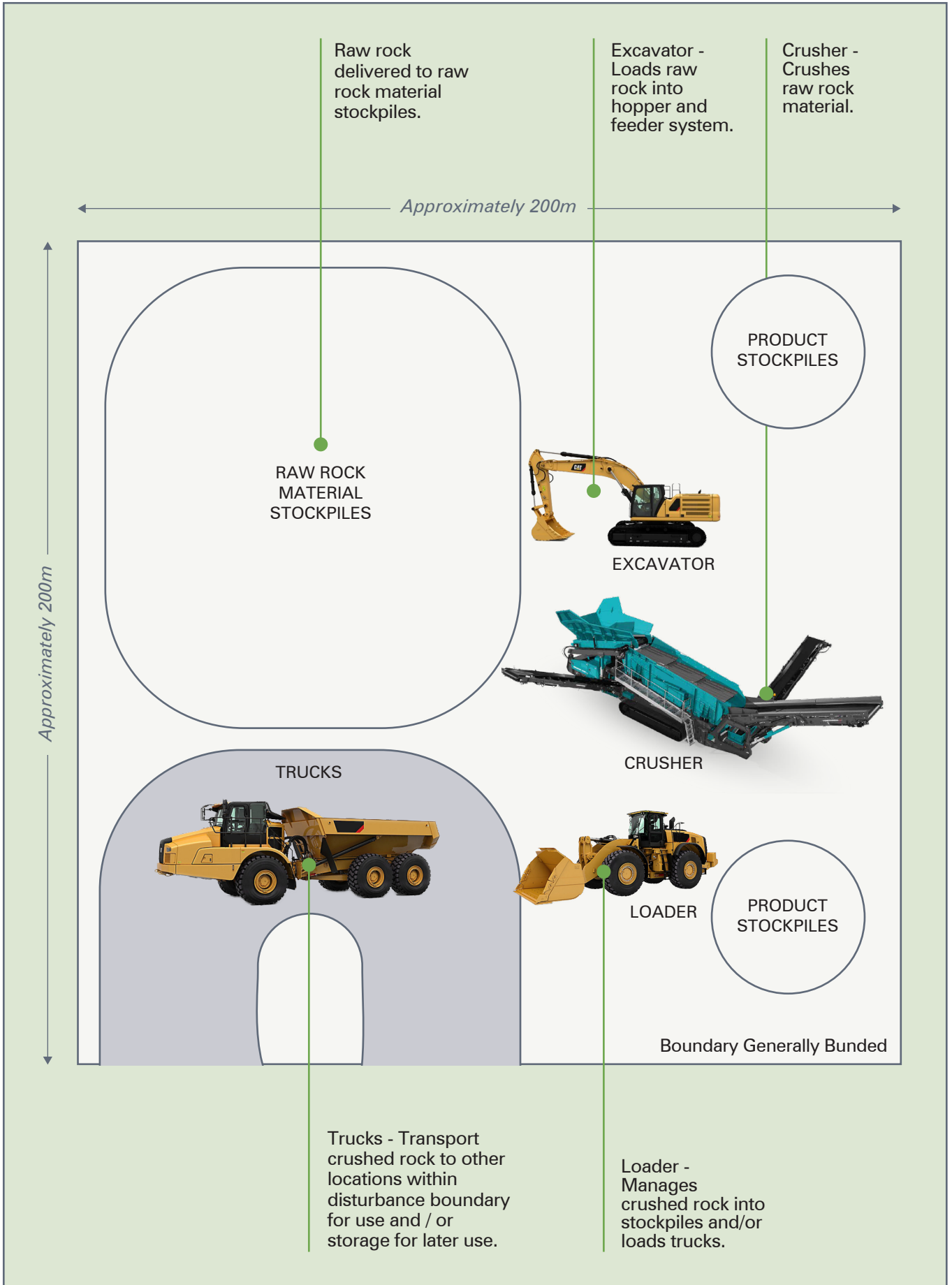
Operation of the mobile crushing facility will be limited to 7 am to 6 pm from Monday to Saturday (day shift only). The Modification will not affect the operating hours of any other activities at Bengalla.

Up to five personnel will be required to operate the mobile crushing plant. Notwithstanding, the number of personnel employed at Bengalla will remain within the approved maximum workforce.

3.2 Geotechnical Investigations

Geotechnical investigations at Bengalla are ancillary to and a necessary pre-requisite for the construction of approved infrastructure and carrying out of some approved activities. Although the activities that are facilitated by geotechnical investigations have previously been assessed and approved under SSD-5170, geotechnical investigations are included in this Modification for completeness.

Geotechnical investigations (such as geotechnical drilling, test pits and surveys) will be undertaken from time to time within the Disturbance Boundary to inform the future detailed design and construction of infrastructure and activities approved under SSD-5170.



3.3 Prospecting Operations

As described at **Section 4.2.2**, Clause 6 of the Mining SEPP provides that development for the purposes of mineral exploration (i.e. prospecting operations) may be carried out without development consent. However, environmental assessment may still be required. Prospecting operations at Bengalla are ancillary to and a necessary pre-requisite for the mining activities that have been environmentally assessed and approved under SSD-5170. Nevertheless, prospecting operations are included in this Modification for completeness.

Prospecting operations (including exploration drilling) will be conducted generally in advance of mining to further define the coal deposit. All prospecting operations will be located within the Project Boundary and relevant mining leases (MLs) for coal held by BMC from time to time (currently being ML1397, ML1450, ML1469, ML1729 and ML1796).

Prospecting operations will be undertaken in accordance with the Mining Act and relevant ML conditions. The approved Mining Operations Plan (MOP) for Bengalla includes prospecting operations within BMC's mining leases.

3.4 Western Diversion Levee

SSD-5170 and its supporting documents provide approval for BMC to establish water diversion structures within the Disturbance Boundary. Section 4.6.5 of the Bengalla EIS relevantly states (emphasis added):

"Minor additional disturbance associated with ancillary works including Dry Creek pipeline, Mount Pleasant Discharge Dam pipeline and associated power supplies, fencing, firebreaks, water diversion structures, minor contour banks, tracks along pipelines, powerlines, temporary service areas, core shed and portable buildings, temporary construction, heavy vehicle park up areas and sediment control structures may be required. These will generally be located within the Disturbance Boundary."

The Western Diversion Levee is a water diversion structure established to divert clean water around disturbed areas at Bengalla. Indicative alignments of the Western Diversion Levee at specific project years were shown in the following documents:

- Figures 4 & 5 and Appendix D of the MOD₁ SEE;
- Figures 4 & 5 of the MOD₂ SEE;
- Figures 2, 3 & 4 of the MOD₃ SEE; and
- Figure 2 and Appendix B of the MOD₄ SEE.

These indicative alignments were assumed for assessment purposes. This Modification confirms that:

- Actual alignments of the Western Diversion Levee may vary from these assumptions but will remain within the Disturbance Boundary; and
- Between the specific project years shown in the environmental assessment documents, the Western Diversion Levee may be moved from time to time (including in parts) as mining progresses to the west.

The land to the west of the Western Diversion Levee is a clean water catchment. Runoff from this catchment is diverted around the disturbed areas at Bengalla (i.e. it is not taken by the mine). The proposed re-alignment of the Western Diversion Levee and/or additional diversion structures will continue to divert clean water away from disturbed areas at Bengalla, consistent with best practice mine site water management.

The land between the Western Diversion Levee and the mining area is part of Bengalla's dirty water catchment. Runoff from this catchment is approved to be managed within the mine water management system. Any realignments of the Western Diversion Levee within the Disturbance Boundary will not materially alter the water balance for Bengalla. The Water Management Plan will be updated as required to reflect incremental realignments of the Western Diversion Levee as mining progresses to the west.

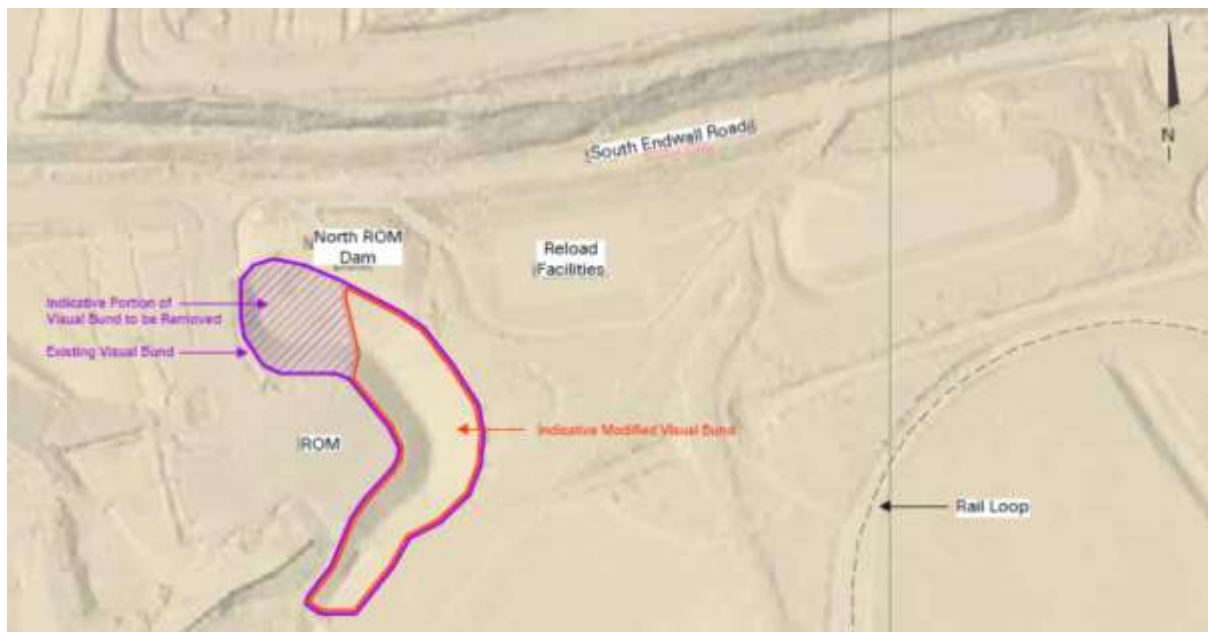
3.5 ROM Coal Stockpile and Haul Road

ROM coal from the mining area is currently transported to a ROM coal stockpile within the MIA or unloaded to the ROM bin. Access to the coal stockpile area may occur via the Southern Endwall Road, which is a haul road adjacent to the southern boundary of the mining area. The Modification proposes to upgrade and widen the Southern Endwall Road to improve its safety and utility. Where appropriate, substitute screening measures will be implemented to compensate for modification of the existing visual bund.

The Modification also proposes enlargement of the ROM coal stockpile to increase its nominal maximum capacity from 40 kt to 150 kt. The location of the ROM coal stockpile is illustrated in **Plate 1**. The height of the stockpile will increase to approximately 10 m. The proposed enlargement of the ROM coal stockpile will involve modifying a small part of the western side of the existing visual bund adjacent to the ROM coal stockpile (as indicatively illustrated in **Plate 1**).

The upgrade of the Southern Endwall Road and enlargement of the ROM coal stockpile will occur within the approved Disturbance Boundary.

Plate 1 Indicative Modification of the Existing Visual Bund



3.6 Administrative Amendments

The Modification proposes some administrative amendments to the conditions of SSD-5170 (as modified). These amendments are administrative because they do not result in any additional environmental impacts.

3.6.1 Property Investigations

To avoid erroneous claims of property damage and to contemporise SSD-5170 to be consistent with more recent State Significant Development consents for mining projects, BMC requests the following amendments (strikethroughs and red coloured text) to Condition 12 of Schedule 3 of SSD-5170.

12. ~~If the owner of any privately owned land claims~~ *the Applicant receives a written request from the owner of any privately-owned land within 3 kilometres of the approved open cut mining area for a property investigation on the basis that buildings and or structures on his/her land have been damaged as a result of blasting on the site (the Claim), then within 2 months of receiving the Claim the Applicant must:*

(a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to investigate the Claim; and

(b) give the landowner a copy of the property investigation report.

If this independent property investigation confirms the ~~landowners~~ Claim, and both parties agree with these findings, then the Applicant must repair the damage to the satisfaction of the Secretary.

If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Applicant or the landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Secretary for resolution.

3.6.2 Tree Plantings Along Public Roads

Due to physical constraints within the relevant public road reserves, BMC is seeking the following amendments (red coloured text) to Conditions 40 & 41 of Schedule 3 of SSD-5170 to provide additional flexibility in relation to the required visual screens:

40. Within 2 years of the commencement of development under this consent, unless the Secretary agrees otherwise, the Applicant must *(where reasonable and feasible)* plant tree screening *or provide some other visual screening measure (e.g. visual bunding)* along those sections of Denman Road, Roxburgh Road and Wybong Road that will have direct views of mining operations on site. This screening must be planted, in consultation with Council (and where relevant the RMS), and *be* maintained to the satisfaction of the Secretary.
41. At least five years prior to construction of the Bengalla Link Road realignment, or as otherwise agreed by the Secretary, the Applicant must *(where reasonable and feasible)* plant tree screening *or provide some other visual screening measure* along the proposed Bengalla Link Road realignment. This screening must be planted in consultation with Council and maintained to the satisfaction of the Secretary.

Note: The planting of tree screening in areas of constructed fill embankments associated with the road realignment shall be undertaken as soon as practicable after completion of the constructed landform".

The proposed amendments to Conditions 40 and 41 of Schedule 3 recognise the practical difficulty of implementing visual screening adjacent to lineal infrastructure and will provide the required flexibility regarding the implementation of such screening measures.

3.6.3 In-Pit Disposal of Tyres

Having regard for changes in the administration of in-pit tyre disposal under the *Protection of the Environment Operations Act 1997* (POEO Act), BMC is seeking approval to dispose of tyres (generated by on-site activities) within the overburden emplacement area (OEA). BMC proposes a minor change to Schedule 3, Condition 43(b) of SSD-5170 as shown in red coloured text below:

43. The Applicant must:

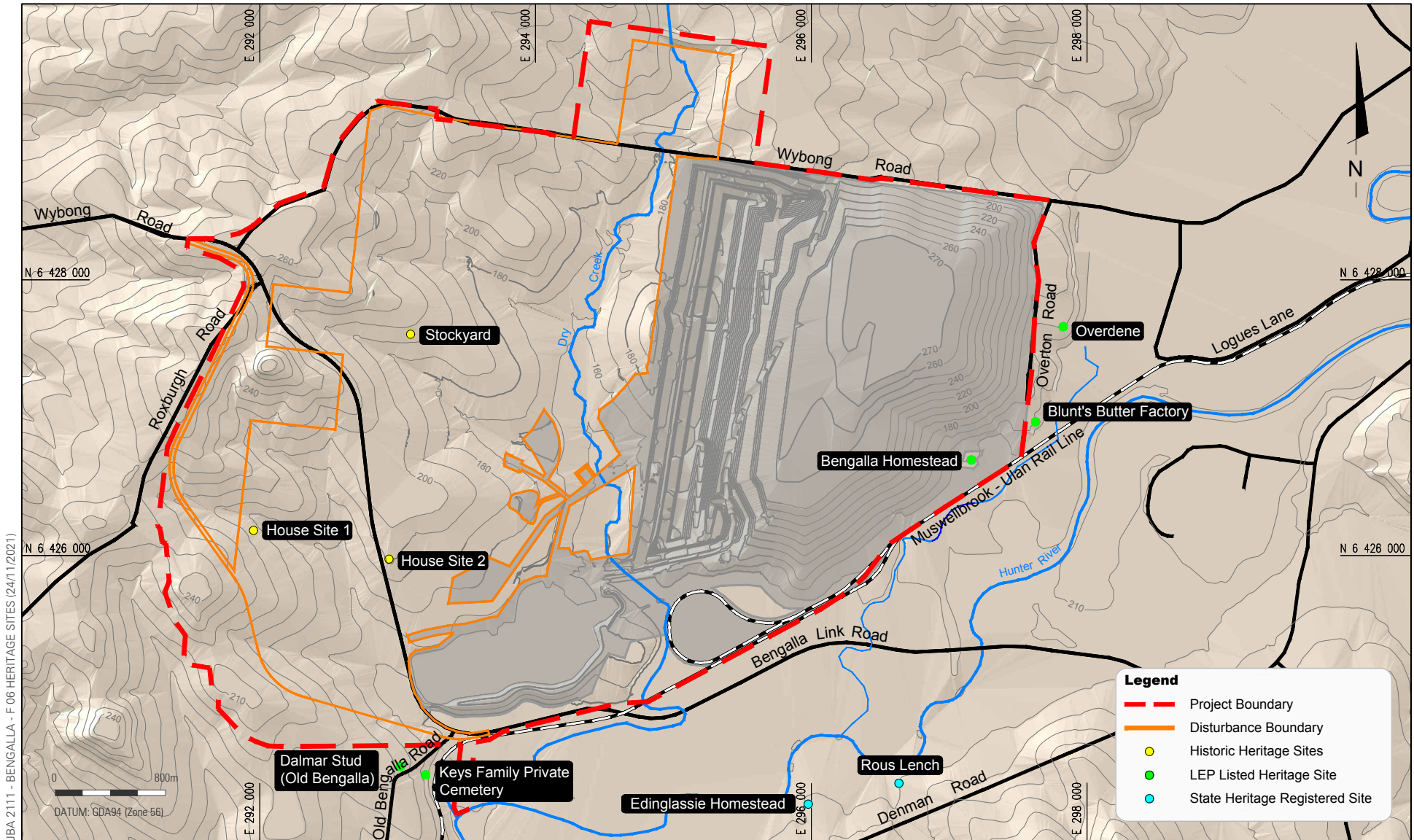
...

(b) ensure that the waste generated by the development is appropriately stored, handled and disposed of *(including the in pit disposal of tyres);*

As described in **Section 4.1**, BMC will also seek a variation to EPL 6538 to authorise the disposal of waste tyres within the OEA.

3.6.4 Historic Heritage

Appendix 6 of SSD-5170 identifies the historic heritage sites within and surrounding the Project Boundary. BMC proposes to update Appendix 6 to remove any historic heritage sites which have been salvaged in accordance with the approved Historic Heritage Management Plan. **Figure 6** shows the historic heritage sites within and surrounding the Project Boundary that remain extant.



BENGALLA MINE

Historic Heritage Sites



FIGURE 6

3.7 Comparison with Approved Development

Table 3-1 compares the activities proposed by the Modification with the equivalent aspects of the approved development. The Modification involves relatively minor additions or upgrades to the approved surface infrastructure at Bengalla. The proposed additional infrastructure is similar in nature to the existing mine infrastructure (i.e. industrial). Accordingly, the Modification does not alter the character or scale of the approved development.

Section 4.2.1 discusses how the modified development would be substantially the same development as that for which consent was originally granted.

Table 3-1 Comparison of the Modification to the Approved Development

Aspect	Approved Development*	The Modification
Land use	Coal mining and ancillary activities	No change
Duration	Mining operations until 28 February 2039	No change
Mining method	Open cut mining using a dragline, excavators, truck fleet and ancillary equipment	No change
Production rate	Maximum production rate of 15 Mtpa of ROM coal	No change
Surface infrastructure	CHPP, rail loadout facility, offices, bathhouse, workshop, fuel storages, vehicle wash bays, powerlines, access roads and water management infrastructure.	<ul style="list-style-type: none"> • Addition of a mobile crushing facility • Enlargement of the ROM coal stockpile from 40 kt to 150 kt • Upgrade of the haul road from the mining area to the ROM coal stockpile
Water management	<ul style="list-style-type: none"> • Diversion of clean water around disturbed areas, primarily using the Western Diversion Levee. • Capture and containment of mine-affected water in mine water dams. Mine water is reused for operational purposes (e.g. dust suppression, coal washing) wherever possible. If required, surplus mine water can be discharged in accordance with the Hunter River Salinity Trading Scheme. • Capture and treatment of sediment-laden water in sediment dams. 	<ul style="list-style-type: none"> • Realignment of sections of the Western Diversion Levee and additional diversion drains within the Disturbance Boundary. Clean water will continue to be diverted around disturbed areas. • No change • No change
Final landform	Conceptual final landform is shown in Appendix 9 of SSD-5170.	No change
Operating hours	24 hours per day, 7 days per week	No change
Workforce	Maximum of 900 FTE personnel	No change

* Details in the 'Approved Development' column are the same for both the originally approved development (before modification) and the currently approved development (as modified up to and including MOD 4).

4. STATUTORY CONTEXT

This section provides a summary of the legislative provisions that are relevant to the Modification.

4.1 Overview

Table 4-1 summarises the regulatory framework that is relevant to the Modification. The aspects of the regulatory framework that warrant greater analysis are discussed further in **Section 4.2**.

Table 4-1 Relevant Legislation Provisions

Aspect	Relevant Provisions	Applicability to Modification
Power to modify approval	Section 4.55(2) of the EP&A Act	If the Modification is granted, the modified development would be 'substantially the same development' as the development for which consent was originally granted (as explained in Section 4.2.1).
Permissibility	<i>Muswellbrook Local Environment Plan 2009</i> (Muswellbrook LEP) Clause 7 of <i>State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007</i> (Mining SEPP)	The land within the Project Boundary is zoned as either RU1 Primary Production or E3 Environmental Management under the Muswellbrook LEP. Open cut mining is permissible on this land pursuant to Clause 7 of the Mining SEPP. Further detail is provided in Section 4.2.2 .
Gateway process	Clause 119A of EP&A Regulation Clause 17A of the Mining SEPP	Clause 119A of the EP&A Regulation provides that a Gateway Certificate or Site Verification Certificate is required for applications to modify a development consent that relate to 'mining or petroleum development' on land shown on the Strategic Agricultural Land Map. The definition of 'mining or petroleum development' under Clause 17A of the Mining SEPP refers to certain mining developments that require the grant of a mining lease. No new mining leases are required for the activities proposed in this Modification. Accordingly, the Gateway process does not apply to the Modification.
Matters for consideration	Section 1.3 of the EP&A Act Section 4.55(3) of the EP&A Act	Section 1.3 of the EP&A Act sets out the objects of the Act. Section 4.55(3) of the EP&A Act requires the consent authority to consider the matters under Section 4.15(1) of the EP&A Act that are relevant to the Modification and the reasons given by the consent authority for the grant of the consent that is sought to be modified.

Aspect	Relevant Provisions	Applicability to Modification
		These matters are further discussed in Section 7 .
Other approvals	Sections 5 and 6 of the Mining Act	<p>Under Section 5 of the Mining Act, the proposed prospecting operations must be undertaken in accordance with an authorisation granted under the Mining Act. The prospecting will be undertaken within mining leases for coal held by BMC from time to time.</p> <p>Coal stockpiles and drains principally used for purposes connected with mining are 'designated ancillary mining activities' under Section 6 of the Mining Act. These activities must be the subject of a mining lease or an 'ancillary mining activities' condition attached to a nearby mining lease that regulates the carrying out of the activity.</p> <p>The 'designated ancillary mining activities' proposed as part of this Modification are located within BMC's existing mining leases (MLs). As such, no additional authorisations are required for the Modification.</p>
	Section 48 of the POEO Act	<p>BMC holds Environment Protection Licence (EPL) 6538 granted under the POEO Act.</p> <p>BMC will seek a variation to EPL 6538 to authorise the disposal of waste tyres within the OEA.</p> <p>BMC will also seek a variation to the EPL so that it clearly authorises the relevant "scheduled activity" relating to the proposed construction and operation of the rock crusher.</p> <p>No other changes to the EPL are required in connection with the Modification.</p>
	Section 68 of <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)	BMC holds approval EPBC 2012/6378 granted under the EPBC Act. No further approval under the EPBC Act is required for the Modification, as discussed in Section 4.2.3 .
	Section 138 of the <i>Roads Act 1993</i> (Roads Act)	Approval under Section 138 of the Roads Act will be obtained for any tree plantings conducted within road reserves. This requirement is not altered by the Modification.

4.2 Key Legal Matters

4.2.1 Power to Modify

Section 4.55(2) of the EP&A Act enables a consent authority to modify a development consent. This power to modify is governed by certain requirements including the need for the consent authority to be satisfied that the modified development is 'substantially the same development' as the original development (before any modifications) for which consent was granted.

The Modification proposes minor administrative changes to the conditions of SSD-5170, geotechnical investigations, prospecting operations, the realignment of water diversion structures, the enlargement of a ROM coal stockpile, the upgrade/widening of a haul road and the operation of a mobile crushing plant and associated equipment fleet. The following key aspects of the original development approved by SSD-5170 will remain unchanged:

- Mining methods;
- Maximum coal production rate;
- Duration of mining operations;
- Methods and rates of coal processing and transportation; and
- Hours of operation.

Due to these key aspects of Bengalla being unchanged, the modified development will be "substantially the same development" as the development for which consent was originally granted. This "sameness" is demonstrated by **Table 3-1** showing a comparison between the originally approved development and the modified development. Therefore, the consent authority may exercise its power under Section 4.55(2) to modify SSD-5170.

4.2.2 Permissibility

The land within the Project Boundary is zoned as either RU1 Primary Production or E3 Environmental Management. The land use table in the Muswellbrook LEP states that open cut mining is permissible with consent in zone RU1.

The Muswellbrook LEP does not list open cut mining as permissible development within zone E3. However, Clause 7 of the Mining SEPP states that mining can be carried out on any land where agriculture or industry is permissible (with or without consent). The Muswellbrook LEP permits 'extensive agriculture' within zone E3. Therefore, mining is also permissible within zone E3 by virtue of Clause 7 of the Mining SEPP.

Clause 6 of the Mining SEPP states that 'mineral exploration and fossicking' is permissible without consent. Notwithstanding, the proposed prospecting operations within BMC's authorisations have been described for completeness (see **Section 3.3**).

4.2.3 Environment Protection and Biodiversity Conservation Act

BMC was granted an approval (EPBC 2012/6378) under Part 9 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to undertake an action that would have a significant impact on matters of national environmental significance.

The activities associated with the Modification will be undertaken predominantly within the approved Disturbance Boundary for Bengalla. Activities within the approved Disturbance Boundary are consistent with the conditions of EPBC 2012/6378 and therefore do not require any additional approval. The Modification proposes prospecting operations and geotechnical investigations that involve minimal disturbance and as such, will not result in significant impacts to any matters of national environmental significance under the EPBC Act. Therefore, no further approval under the EPBC Act is required for the Modification.

5. STAKEHOLDER ENGAGEMENT

This section provides a summary of the stakeholder engagement undertaken for the Modification. The Modification does not propose any changes to any approved stakeholder engagement strategies or processes.

5.1 Community Engagement

Consultation with key community stakeholders was undertaken to inform them of the Modification. **Table 5-1** summarises the consultation undertaken, the issues raised and where those issues are addressed in this document.

Table 5-1 Community Engagement

Stakeholder	Method of Consultation	Issues Raised
MSC	Meeting at MSC offices on 1 July 2021	No issues raised that required further assessment or material changes to the Modification.
CCC	Meeting on 26 May 2021	No issues raised that required further assessment or material changes to the Modification.

5.2 Regulatory Consultation

In addition to community engagement, BMC has consulted with the relevant regulatory authorities to ascertain matters for consideration and/or assessment. **Table 5-2** summarises the consultation undertaken, the issues raised and where those issues are addressed in this document.

Table 5-2 Regulatory Engagement

Stakeholder	Method of Consultation	Issues Raised	Section where Addressed
DPIE	Meeting at DPIE offices on 1 June 2021	<ul style="list-style-type: none"> Disturbance required for mobile crushing facility 	Section 3.1.1
	Letter from DPIE dated 8 July 2021	<ul style="list-style-type: none"> Whether any crushed rock will be transported off-site 	Section 3.1.2
	Video conference with DPIE on 20 September 2021	<ul style="list-style-type: none"> Update of Water Management Plan to include changes to water diversion structures 	Section 3.4
		<ul style="list-style-type: none"> Assessment of surface water impacts 	Section 3.4
		<ul style="list-style-type: none"> Alternative visual mitigation measures 	Section 3.5
		<ul style="list-style-type: none"> Dust dispersion modelling 	Section 6.1.2
		<ul style="list-style-type: none"> Outcomes of community consultation 	Section 5.1
<ul style="list-style-type: none"> Whether approval under the EPBC Act is required 	Section 4.2.3		

6. IMPACTS, MANAGEMENT AND MITIGATION

This section outlines the potential environmental impacts of the Modification and describes the measures that will be implemented to mitigate these impacts.

6.1 Air Quality

6.1.1 Background

An air quality assessment for the Modification was undertaken by Todoroski Air Sciences (TAS). This assessment considered the construction and operational activities proposed by the Modification that have the potential to generate dust emissions. The impacts of the Modification are considered relative to those of the approved Bengalla Mine, which represents the baseline for this assessment. The air quality impacts of the approved mine were assessed in the Bengalla EIS, MOD₁ SEE, MOD₂ SEE and MOD₄ SEE.

The key components of the Modification from an air quality perspective are the mobile crushing facility (and its associated mobile equipment), upgrade of the haul road and enlargement of the ROM coal stockpile. The other components of the Modification are expected to generate minimal dust emissions. The air quality impact assessment is provided in **Appendix A**.

6.1.2 Assessment of Impacts

Construction Impacts

The following construction activities associated with the Modification have the potential to generate dust:

- Initial establishment (and subsequent relocations) of the mobile crushing facility;
- Enlargement of the ROM coal stockpile;
- Upgrade of the Southern Endwall Road; and
- Realignment of sections of the Western Diversion Levee.

Dust emissions would primarily be generated through vehicle movements, exhaust emissions, handling of material, and windblown dust from exposed areas. Some of the proposed activities are located within existing disturbed areas. Such activities will only require minor grading and will therefore generate lower emissions than if land clearing was required.

The dust controls that are currently implemented at Bengalla will be adopted for the proposed construction activities, where appropriate. The air quality expert (TAS) has determined that with the implementation of appropriate dust controls, the proposed construction activities are unlikely to generate significant dust emissions.

Operational Impacts

Operational dust emissions associated with the Modification will be generated primarily by the mobile crushing plant and ROM coal stockpile.

Operation of the crushing plant involves various dust generating processes including vehicle movements on unsealed roads, material handling, crushing, screening, diesel emissions and windblown dust from exposed areas and stockpiles. The estimated operational dust emissions are presented in **Table 6-1**. The total suspended particulate (TSP) emissions of the Modification are estimated at 47,726 kg/year. This represents less than 0.6% of the annual TSP emissions of the approved Bengalla Mine.

An air dispersion model was previously developed for the Bengalla EIS and updated for the MOD2 SEE and MOD4 SEE. The dust emissions presented in **Table 6-1** were added to the existing dispersion model to determine the impacts of the Modified Project. The modelled dust isopleths are presented in Appendix B of the air quality assessment (**Appendix A**). These isopleths show that the predicted impacts of the Modified Project are almost identical to those of the Approved Project.

The air quality expert concludes that the minor increase in dust due to the Modification is unlikely to be discernible beyond the existing dust levels at private receptors in the vicinity of Bengalla.

Table 6-1 Operational Dust Emissions Associated with the Modification

Activity	TSP emissions (kg/year)	PM ₁₀ emissions (kg/year)	PM _{2.5} emissions (kg/year)
Loading raw material onto haul truck	671	317	48
Hauling to crusher stockpile	8,657	1,981	198
Emplacing at stockpile	671	317	48
Loading raw material into crusher	671	317	48
Crushing material	300	135	25
Screening material	550	300	18
Unloading processed material to stockpile	671	317	48
Rehandle processed material at stockpile	671	317	48
Loading processed material onto haul truck	671	317	48
Hauling to emplacement	14,429	3,302	330
Emplacing at location	671	317	48
Rehandle processed material	671	317	48
Wind erosion of exposed areas / stockpiles	17,520	8,760	1,314
Diesel exhaust emissions	504	504	489
Wind erosion of ROM stockpile extension	401	200	30
Total emissions (kg/yr)	47,726	17,720	2,788

6.1.3 Mitigation

The conditions of SSD-5170 require BMC to implement an approved Air Quality Management Plan (AQMP). The following dust controls will be implemented to minimise the dust emissions associated with the Modification:

- Water application to trafficked surfaces associated with the mobile crushing facility; and
- Use of water sprays at the mobile crushing facility.

6.2 Noise

6.2.1 Background

An acoustic impact assessment for the Modification was undertaken by Bridges Acoustics. This assessment considered the potential noise impacts of the Modification, including both construction and operational noise.

The key components of the Modification from an acoustic perspective are the mobile crushing facility (and its associated mobile equipment), the Southern Endwall Road upgrade and enlargement of the ROM coal stockpile. Noise emissions from the other components of the Modification are expected to be negligible in the context of mining activities at Bengalla. The acoustic impact assessment is provided in **Appendix B**.

6.2.2 Assessment of Impacts

ROM Stockpile Enlargement and Haul Road Improvement

Construction and relocation of the proposed infrastructure will involve minor earthworks. The earthmoving fleet is assumed to include the following equipment:

- Two tracked excavators (approximately 20 t capacity);
- Two off-road trucks (approximately 50 t capacity);
- One loader;
- One grader;
- One roller;
- One water truck; and
- Other minor ancillary equipment.

The combined sound power level (SPL) of the indicative earthmoving fleet is estimated at 117 LAeq,15min. In comparison, each of the haul trucks used at Bengalla produces a SPL of approximately 115 LAeq,15min. The existing mining operations utilise several haul trucks as well as other heavy equipment including excavators and dozers. Given that the SPL of the earthmoving fleet is similar to that of a single haul truck, the construction activities associated with the Modification will not significantly increase noise levels surrounding Bengalla.

Construction works will be limited to the hours of 7am to 6pm. As such, no construction noise will occur during the sensitive evening and night periods.

Based on the combined SPL of construction equipment and timing of works, Bridges Acoustics concludes that the proposed construction activities will not result in significant noise at any sensitive receptors.

Mobile Crushing Facility and Mobile Plant

Operation of the mobile crushing plant and associated equipment may include the following noise generating processes:

- Hauling of raw material from the mining area to the crushing facility;
- Feeding the crusher using an excavator;
- Crushing;
- Screening;
- Loading of crushed rock onto trucks; and
- Hauling of crushed material to the end use location.

Indicative SPLs of the mobile crusher and screening plant are listed in **Table 6-2**. The SPL produced by the screening plant varies depending on hardness of the material being processed. The upper bound of 118 dBA has been assumed for assessment purposes. The crusher and screening plant will produce a combined SPL of 120 dBA when operating simultaneously.

Indicative SPLs of the mobile plant (excavator, loader and trucks) supporting the mobile crushing facility are listed in **Table 6-2**. When these mobile sources are added to the combined SPL of the crushing and screening plant (120 dBA), the combined SPL of the mobile crushing facility will be 121 dBA when all noise sources are operating simultaneously. In comparison, the combined SPL of the approved mining fleet has been assessed at 133-134 dBA. Monthly noise monitoring has confirmed that Bengalla generally complies with the noise criteria at private receptors. Given that the combined SPL of the mobile crushing facility is more than 10 dBA lower than that of the approved mining fleet, the operational noise generated by the Modification is expected to be at least 10 dBA below the noise criteria.

Table 6-2 Assumed Equipment Sound Power Levels

Equipment	Sound Power Level (dBA)
Excavator	103
Loader	114
Truck	110
Crusher	116
Screening Plant	111 – 118 (depending on material characteristics)

Rock crushing will be limited to the hours of 7am to 6pm on Mondays to Saturdays. This will avoid noise during the sensitive evening and night periods. However, loading of crushed rock onto trucks may be undertaken 24 hours per day, 7 days per week.

6.2.3 Mitigation

The conditions of SSD-5170 require BMC to implement an approved Noise Management Plan (NMP). The potential noise impacts of the Modification will be minimised through the following measures:

- Limiting construction work hours;
- Limiting use of the crushing facility to daytime hours; and
- Use of noise-attenuated equipment, wherever appropriate.

6.3 Visual

6.3.1 Background

The Modification includes the establishment of a mobile crushing facility and enlargement of the ROM coal stockpile to a height of approximately 10 m. Consideration of visual impact is warranted for these components of the Modification.

The areas to the north and south are occupied by Mount Pleasant Mine and Mt Arthur Mine, respectively. There are no private receptors located on land owned by MACH and HVEC. The nearest private receptors are located to the west and east of Bengalla (see **Figure 3**).

6.3.2 Assessment of Impacts

Bengalla is bounded to the north by Wybong Road. Views of Bengalla from Wybong Road are partly screened by a combination of tree screening, visual bunds, natural vegetation and topography. The mobile rock crushing facility will not materially alter the current visual impact of Bengalla.

The western extent of the Project Boundary is comprised of rolling hills and ridgelines. Roxburgh Road is located west of Bengalla. Roxburgh Road generally rises in elevation approaching its northern intersection with Wybong Road. Although screening is provided by vegetation, the larger structures at the MIA are discernible. The ROM coal stockpile is considerably lower than these discernible structures (such as the CHPP, workshop and train loadout facility). Due to the setback of Roxburgh Road from mining activities, the ROM coal stockpile and mobile crushing facility will occupy a negligible portion of the view. Consequently, the visual impacts of the Modification to the west will be minor.

The rehabilitated OEA (east of the active mining area) will provide visual screening to receptors located east of Bengalla. As such, the proposed infrastructure is unlikely to be visible from Muswellbrook.

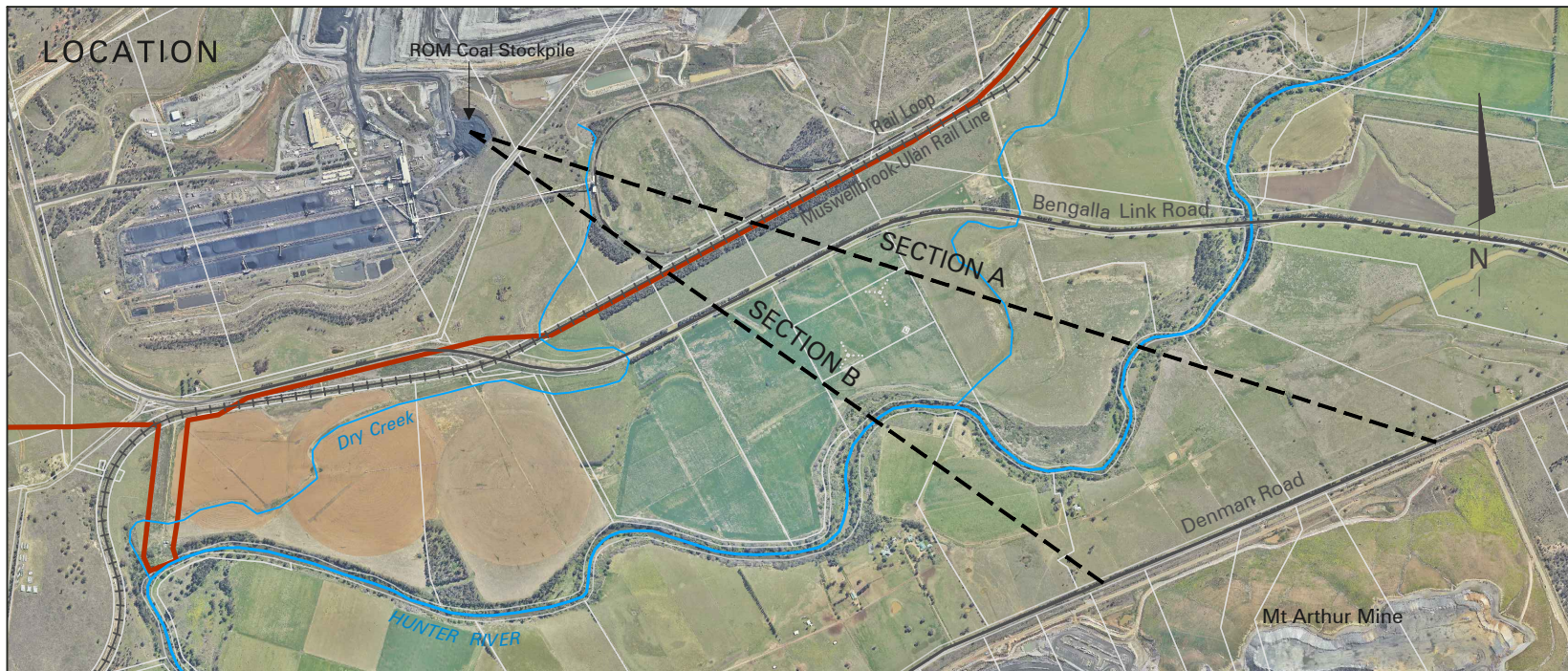
Long sections have been developed (see **Figure 7**) to assess the visibility of the ROM coal stockpile from Bengalla Link Road and Denman Road to the south of Bengalla. Existing visual bunds and tree screens are located to the south of the MIA.

As shown in **Figure 7**, the existing visual treatments will adequately screen views of the ROM coal stockpile from Bengalla Link Road. Although Denman Road is located further from the MIA than Bengalla Link Road, there are sections of Denman Road that are topographically higher. As such, potential views from Denman Road have also been assessed. The elevated sections of Denman Road occur adjacent to Mt Arthur Mine. There is roadside vegetation along this section of road. Where present, roadside vegetation will shield motorists from views of Bengalla. The two long sections in **Figure 7** represent the views from the limited spans of Denman Road that are not shielded by roadside vegetation. The long sections demonstrate that the existing visual bund will remain adequate for screening views to the ROM coal stockpile.

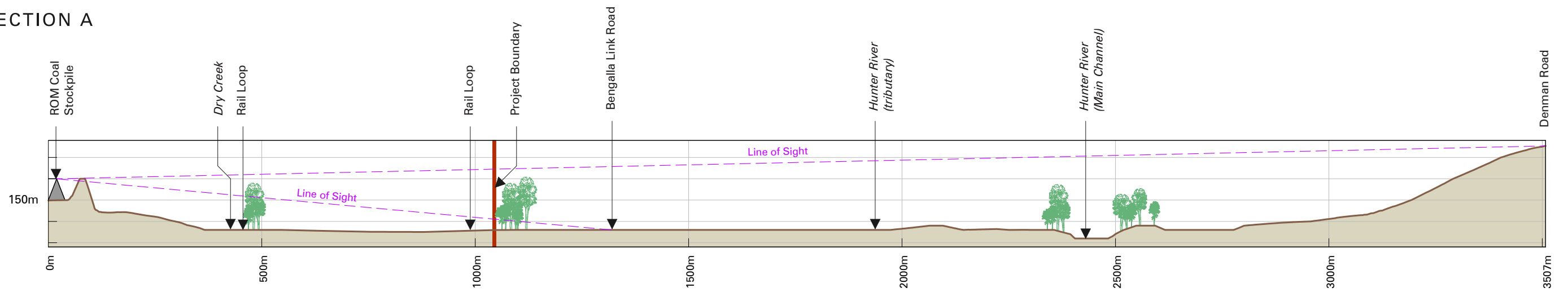
The mobile crushing facility will be located north of the MIA. Given that the ROM coal stockpile will be shielded from motorists on Bengalla Link Road and Denman Road, the mobile crushing facility will also be shielded in part by those existing visual treatments, topography and roadside vegetation.

6.3.3 Mitigation

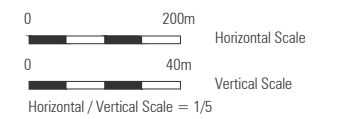
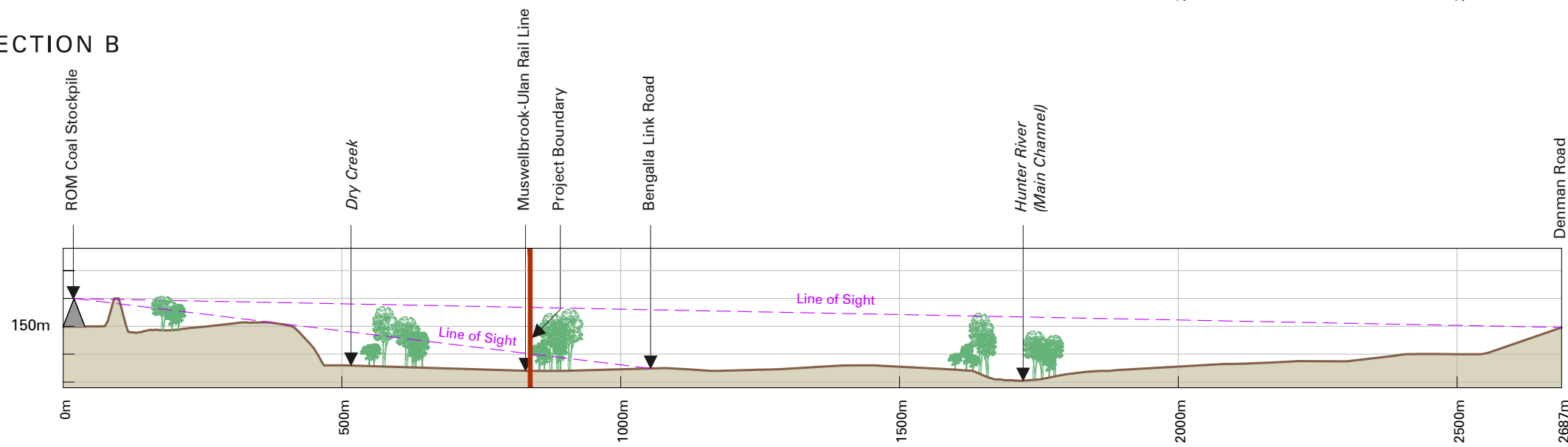
Given that the existing visual bunds and tree screens are adequate at screening views of the rock crushing facility and the ROM stockpile from Bengalla Link Road, no additional mitigation measures are proposed.



SECTION A



SECTION B



JBA 2111 - BENGALLA - F 07 VISUAL LONGSECTIONS (11/11/2021)



BENGALLA MINE

Visual Long Sections

FIGURE 7

7. JUSTIFICATION AND EVALUATION

7.1 Ecologically Sustainable Development

The objects of the EP&A Act include “to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment” (Section 1.3(b)). “Ecologically sustainable development” (ESD) has the same meaning as in Section 6(2) of the *Protection of the Environment Administration Act 1991*. **Table 7-1** lists the four principles of ESD and explains how the Modification satisfies these principles.

Table 7-1 Principles of Ecologically Sustainable Development

Principle	Application to the Modification
The precautionary principle—namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.	The potential environmental impacts of the Modification have been assessed using the best scientific methods available at the time. As such, the precautionary principle does not apply as this is not a case where there is lack of scientific certainty. In any event, appropriate controls have been adopted to minimise environmental impacts.
Inter-generational equity—namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.	Upon completion of mining, disturbed areas will be rehabilitated to enable future generations to use the land, potentially for alternative energy sources. This will not change as a result of the Modification.
Conservation of biological diversity and ecological integrity—namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration.	Disturbed areas at Bengalla will be rehabilitated to a mixture of woodland and pasture. In addition, BMC has established biodiversity offset areas in accordance with Schedule 3, Condition 26 of SSD-5170. This will not change as a result of the Modification.
Improved valuation, pricing and incentive mechanisms—namely, that environmental factors should be included in the valuation of assets and services	The Modification is consistent with the ‘polluter pays’ principle for the following reasons: <ul style="list-style-type: none"> • BMC bears the cost of all environmental management measures including dust and noise controls; • BMC compensates for its social impacts through its VPA (see Section 2.3.3); and • BMC holds the required licences, including an EPL, and any variations required as a result of this Modification will be sought.

For the reasons described above, the Modification is consistent with the object of the EP&A Act relating to ESD. The Modification would also promote other objects of the EP&A Act including “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” and “to promote the orderly and economic use and development of land”.

7.2 Merit Evaluation

Bengalla is approved by SSD-5170, which was granted by the Secretary of the then Department of Planning and Environment (DP&E) following a review by the NSW Planning Assessment Commission. In its determination of the Project, DP&E (2015) concluded that:

"The Department has carefully weighed the impacts of the project against the significance of the resource and the social and economic benefits. On balance, the Department believes that the project's benefits outweigh its residual costs, and that it is in the public interest and should be approved, subject to stringent conditions".

Section 6 assesses the potential environmental impacts of the Modification, which include dust and noise emissions, visual impacts and minor changes in water management. The dust and noise emissions generated by the Modification will not materially increase the impacts of the Project. The infrastructure proposed by the Modification will not result in significant visual impacts from public locations, provided that alternative screening is implemented to compensate for alteration of an existing visual bund adjacent the Southern Endwall Road. The Modification may result in small changes to the water catchment of the mining area, but these changes will not materially alter the approved water balance for Bengalla.

Given that the Modification will not materially increase the environmental impacts of the Project, the benefit of the Project (as described the Bengalla EIS and other previous assessments) will continue to outweigh its social and environmental costs.

There are various benefits to the Modification, as described in **Section 1.3**. For the proposed rock crushing facility, potential benefits includes an alternate supply of crushed rock, reducing heavy vehicle traffic on public roads to and from the site, and potential improvements to safety and dust generation on haul roads. The proposed upgrade of the Southern Endwall Road will result in improved safety and the expansion of the coal stockpile will provide greater operational flexibilities without causing any material additional environmental impacts. The other aspects of the Modification are largely administrative, relate to activities that have minimal environmental impact and/or are ancillary to and a necessary part of the broader mining operations assessed and approved under SSD-5170.

As explained in **Section 2.3.1**, the Modification is consistent with the relevant environmental planning instruments and government plans/policies. A key theme of the relevant government plans/policies is to minimise land use conflict. The Modification will occur primarily within the approved disturbance boundary and will not materially increase the environmental impacts of the approved development. Accordingly, the Modification will not result in any additional land use conflict.

For these reasons, the Modification remains in the public interest, as it will not significantly alter the merits of the currently approved development.

REFERENCES

- Department of Planning, Infrastructure and Environment (2021a), *State significant development guide – preparing a modification report*.
- Department of Planning, Infrastructure and Environment (2021b), *State significant development guide – preparing an environmental impact statement*.
- Hansen Bailey (2013), *Continuation of Bengalla Mine Environmental Impact Statement*.
- Hansen Bailey (2014), *Continuation of Bengalla Mine Response to Submissions'*.
- Hansen Bailey (2015a), *Bengalla Mine Development Consent Modification Statement of Environmental Effects*.
- Hansen Bailey (2015b), *Bengalla Mine Development Consent Modification Response to Submissions*.
- Hansen Bailey (2016a), *Bengalla Mine Development Consent Modification Statement of Environmental Effects*.
- Hansen Bailey (2016b), *Bengalla Mine Development Consent Modification 2 Response to Submissions*.
- Hansen Bailey (2016c), *Bengalla Mine Development Consent Modification 3 Statement of Environmental Effects*.
- Hansen Bailey (2016d), *Bengalla Mine Development Consent Modification 3 Response to Submissions*.
- Hansen Bailey (2017), *Bengalla Mine Development Consent SSD-5170 Modification 4 Statement of Environmental Effects*.
- Hansen Bailey (2018), *Bengalla Mine Development Consent Modification 4 Response to Submissions*.
- Muswellbrook Shire Council (2015), *Land Use Development Strategy*.
- NSW Government (2016), *Hunter Regional Plan 2036*.
- Rural Fire Service (2019), *Planning for Bush Fire Protection*.
- Worley Parsons (2014), *Hunter River Flood Study (Muswellbrook to Denman)*.

ABBREVIATIONS

Abbreviation	Meaning
AEP	Average Exceedance Probability
APZ	Asset protection zone
AQMP	Air Quality Management Plan
Bengalla EIS	Environmental impact statement titled ' <i>Continuation of Bengalla Mine, Environmental Impact Statement</i> ' (6 volumes), dated September 2013, as modified by the <i>Response to Submissions</i> dated March 2014
BJV	Bengalla Joint Venture
BMC	Bengalla Mining Company Pty Limited
CCC	Community Consultative Committee
CHPP	Coal Handling and Preparation Plant
DP&E	Department of Planning and Environment
EP&A Act	<i>Environmental Planning & Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000</i>
EPA	Environmental Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPL	Environment Protection Licence
ESD	Ecologically sustainable development
FTE	Full-time equivalent
HRP	<i>Hunter Regional Plan 2036</i> (NSW Government, 2016)
HVEC	Hunter Valley Energy Coal Pty Ltd
LGA	Local Government Area
LUDS	<i>Land Use Development Strategy</i> (Muswellbrook Shire Council, 2015)
MACH	MACH Energy Australia Pty Limited
MIA	Mine infrastructure area
Mining Act	<i>Mining Act 1992</i>
MOP	Mining Operations Plan
Mining SEPP	<i>State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007</i>
ML	Mining Lease
MOD ₁ SEE	Statement of Environmental Effects titled ' <i>Bengalla Mine Development Consent Modification Statement of Environmental Effects</i> ' dated August 2015 and prepared by Hansen Bailey, including the <i>Response to Submissions</i> document dated October 2015
MOD ₂ SEE	Statement of Environmental Effects titled ' <i>Bengalla Mine Development Consent Modification Statement of Environmental Effects</i> ' dated April 2016 and prepared by Hansen Bailey, including the <i>Response to Submissions</i> document dated June 2016
MOD ₃ SEE	Statement of Environmental Effects titled ' <i>Bengalla Mine Development Consent Modification 3 Statement of Environmental Effects</i> ' dated September 2016 and prepared by Hansen Bailey, including the <i>Response to Submissions</i> document dated November 2016

Abbreviation	Meaning
MOD ₄ SEE	Statement of Environmental Effects titled ' <i>Bengalla Mine Development Consent Modification 4 Statement of Environmental Effects</i> ' dated December 2017 and prepared by Hansen Bailey, including the Response to Submissions document dated May 2018 and additional information dated July 2018 and November 2018
MSC	Muswellbrook Shire Council
MSD	Mine subsidence district
Mt	Million tonnes
Mtpa	Million tonnes per annum
Muswellbrook LEP	<i>Muswellbrook Local Environmental Plan 2009</i>
NMP	Noise Management Plan
NPW Act	<i>National Parks and Wildlife Act 1974</i>
OEA	Overburden emplacement area
PBFP	<i>Planning for Bush Fire Protection</i> (NSW Rural Fire Service, 2019)
PMF	Probable Maximum Flood
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
Roads Act	<i>Roads Act 1993</i>
ROM	Run of Mine
SPL	Sound Power Level
The Project	Bengalla Continuation of Mining Project
TSP	Total Suspended Particulate
VPA	Voluntary Planning Agreement
WM Act	<i>Water Management Act 2000</i>

APPENDIX A
AIR QUALITY ASSESSMENT



Suite 2B, 14 Glen Street Eastwood,
NSW 2122
Phone: O2 9874 2123
Fax: O2 9874 2125
Email: info@airsciences.com.au
Web: www.airsciences.com.au
ACN: 151 202 765 | ABN: 74 955 076 914

20 October 2021

James Bailey
James Bailey & Associates
Via email: jbailey@baileyassociates.com.au

RE: Air Quality Assessment – Bengalla Mine Development Consent Modification 5

Dear James,

Todoroski Air Sciences has assessed the potential for air quality impacts to arise due to the proposed modifications at the Bengalla Mine (Bengalla), hereafter referred to as the Modification. This report investigates the likely change in dust emissions associated with the Modification relative to the approved Bengalla. The report has been prepared with consideration of the New South Wales (NSW) Environment Protection Authority (EPA) *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (NSW EPA, 2017).

Overview

Bengalla is an open cut coal mine located approximately 4 kilometres (km) west of Muswellbrook in the Upper Hunter Valley of NSW. Bengalla Mining Company Pty Limited (BMC) was granted approval on 3 March 2015 for the continuation of mining under State Significant Development Consent SSD-5170. SSD-5170 has been successfully modified on four separate occasions.

BMC is seeking approval for a modification to SSD-5170. The elements of the Modification relevant to this air quality assessment are:

- ✦ the construction and operation of a mobile crushing facility and associated activities on-site to produce crushed rock for use as part of approved mining operations; and,
- ✦ an extension of the existing Run-Of-Mine (ROM) coal stockpile area located adjacent to the ROM dump hopper.

These elements of the Modification are hereafter referred to as the Operations. The Operations are within the existing approved project boundary and disturbance boundary.

A quantitative assessment has been conducted to determine the potential dust emissions and associated air quality impacts with the Operations relative to the approved Bengalla.

Modification description

The proposed operation of the mobile crusher and screen and associated activities would occur within the approved disturbance boundary generally to the west of mining operations and would move periodically as the mine progresses. The raw material processed in the mobile crusher and screen would be suitable rock won within the mining area. The raw material would be processed and stockpiled as needed and delivered to various locations on-site depending on the use. The maximum production rate is 3,000 tonnes per day (t/day) with an estimated maximum annual production rate of 500,000 tonnes per year (t/year).

The mobile crusher will have the ability to produce a variety of materials. This may include:

- ✦ Road base material nominally 45-30mm in size;
- ✦ Stemming material nominally 30-14mm in size; and
- ✦ Geofluff rock up to 500mm.

The various materials produced will be used across the mine site in association with approved activities such as mine haul road construction and the mine rehabilitation process.

The proposed hours of operation for the mobile crusher and screen are 7:00am to 6:00pm from Monday to Saturday. The hours of operation for the associated rock crusher activities would be 24 hours per day, 7 days per week.

The proposed extension of the existing ROM stockpile area will allow for an increase in the capacity from 40,000 tonnes (t) to 150,000t which is achieved through an extension of the stockpile footprint of approximately 0.8 hectares (ha). There would be no additional rehandle of ROM associated with the proposed stockpile extension as the ROM would have otherwise been emplaced and rehandled at the alternative in-pit ROM stockpile.

Assessment of potential air quality impacts

To investigate the potential effect the Operations may have on dust emissions, an analysis was undertaken for the proposed change in dust levels associated with the Operations relative to the dust levels associated with the approved Bengalla Continuation Project (AQIA) (**Todoroski Air Sciences, 2013**) and subsequent Modification 2 (**Todoroski Air Sciences, 2016**) and Modification 4 (**Todoroski Air Sciences, 2017**).

Construction dust emissions and other Modification elements

Any construction required for the Operations have the potential to generate some dust emissions however those emissions are expected to be minimal. The construction activities which are required to support the Operations involve establishing a suitable space to enable safe operation, which is likely to require minimal work to prepare (e.g. clearing and levelling the ground). Generally, no significant buildings or infrastructure is required for the Operations. The proposed extension of the existing ROM stockpile area occurs within an already disturbed area near the CHPP and would require minimal work to prepare the space.

The potential construction dust emissions for the Operations would be primarily generated from the handling of material, vehicle movements, exhaust emissions from vehicles and plant and windblown dust generated from exposed areas. The total amount of dust generated from the construction activities is unlikely to be significant given that the nature of the activities would occur within the mining area and minimal work is required for the site establishment.

Nevertheless, appropriate operational and physical mitigation measures would be implemented (such as maintaining sufficient levels of moisture on the surface of trafficked surfaces) to ensure any dust generated from this activity is minimised where possible.

The other Modification elements are expected to generate minimal dust emissions.

Potential operational dust emissions

The Operations have the potential to generate dust which can affect the quantum of dust emissions generated at Bengalla. To consider the potential effect of dust emissions associated with the Operations, the estimated dust emissions are compared with the levels of dust for the approved Bengalla operations which include the handling of processed material, crushing and screening the material, vehicle movements and windblown dust generated from stockpiles.

A summary of the estimated total dust emissions from the Operations presented in **Table 1**. A detailed dust emissions inventory for the Operations is presented in **Appendix A**.

Table 1: Summary of estimated dust emission rate for operational activities associated with the Operations

Activity	TSP emission	PM ₁₀ emission	PM _{2.5} emission
Loading raw material to haul truck	671	317	48
Hauling to crusher stockpile	8,657	1,981	198
Emplacing at stockpile	671	317	48
Loading raw material to crusher	671	317	48
Crushing material	300	135	25
Screening material	550	300	18
Unloading processed material to stockpile	671	317	48
Rehandle processed material at stockpile	671	317	48
Loading processed material to haul truck	671	317	48
Hauling to emplacement	14,429	3,302	330
Emplacing at location	671	317	48
Rehandle processed material	671	317	48
Wind erosion of exposed areas/ stockpiles	17,520	8,760	1,314
Diesel exhaust emissions	504	504	489
Wind erosion of ROM stockpile extension	401	200	30
Total emissions (kg/yr.)	47,726	17,720	2,788

A comparison of the estimated total annual dust emissions for Year 8, Year 15 and Year 24 of the approved mining operation and the proposed Operations is presented in **Table 2**.

The estimated total annual dust emissions for Year 8 (**Todoroski Air Sciences, 2016**), Year 15 (**Todoroski Air Sciences, 2013**) and Year 24 (**Todoroski Air Sciences, 2017**) are compared with the total annual dust emissions for the Operations.

Table 2: Comparison of estimated TSP emission rate for the Operations

Scenario	TSP emissions (kg/year)	Operations (kg/year)	Percent of approved total dust emissions
Year 8	8,007,483	47,726	0.6%
Year 15	8,729,823	47,726	0.5%
Year 24	9,766,705	47,726	0.5%

It is calculated that the net total annual dust emissions associated with the Operations would increase dust emissions by approximately 0.5-0.6% relative to the approved Bengalla Continuation Project.

The small increase in total annual dust emissions due to the Operations primarily arises from the hauling of material and from wind erosion at the stockpiles. The haulage distance for transporting raw material would only be a small increase relative to the distance required to transport the material to the overburden emplacement areas (as would otherwise occur). The stockpiles of material would be located within the approved disturbance area which would otherwise be an exposed area subject to wind erosion regardless of the Modification. The estimated additional dust emissions generated for the Operations are likely to be conservative and most of which would otherwise already be accounted for in the approved operations.

To further investigate the extent of the effects on air quality due to the Operations, air dispersion modelling was performed using the detailed air dispersion model previously developed for the Continuation of Bengalla Mine Environmental Impact Statement (EIS) (**Hansen Bailey, 2013**). The model was updated to reflect the proposed Operations.

The air dispersion model was setup identically (apart from adding in the Operations) to allow for a direct comparison with the previous assessment. Full details regarding the air dispersion model setup can be found in the Air Quality Impact Assessment (AQIA) (**Todoroski Air Sciences, 2013**).

The average and peak scenarios for the operation of the crusher have been considered. The average scenario is based on the proposed annual tonnage of 500,000tpa of material processed and used to assess annual average dust impacts. The peak scenario is based on the maximum daily capacity of 3,000tpd of material processed and used to assess 24-hour average dust impacts.

Dispersion modelling predictions

The predicted air quality levels due to the Operations are overlaid with the predictions for the indicative:

- ✦ Year 8 of the MOD2 AQIA (**Todoroski Air Sciences, 2016**);
- ✦ Year 15 of the AQIA (**Todoroski Air Sciences, 2013**); and,
- ✦ Year 24 of the MOD4 AQIA (**Todoroski Air Sciences, 2017**).

Overlaying these contours allows for a direct comparison of the potential change associated with the proposed Operations.

Overall, the modelling indicates the estimated increase in dust emissions due to the Operations is minor and would be unlikely to be discernible beyond the existing approved levels of dust in the area surrounding Bengalla.

The comparison of the results for all assessed dust metrics in all years (see dust isopleths in **Appendix B**) show that the proposed Operations has a negligible effect at the privately-owned receptor locations and no additional privately-owned receptor locations are predicted to exceed the applicable air quality impact criteria.

A similar negligible change to cumulative impacts would also be anticipated and would not result in any significant additional impacts at the surrounding receptor locations.

Summary and Conclusions

The Modification (including Operations, construction activities relevant to Operations and other modification elements) are predicted to generate less than one per cent more dust relative to the approved Bengalla. This

change is within the modelling accuracy and the normal variation which naturally occurs in background dust levels daily or between years.

It is concluded the proposed Modification will not result in any discernible additional impact above that presented in the **Todoroski Air Sciences (2013)**, **Todoroski Air Sciences (2016)** and **(Todoroski Air Sciences, 2017)** assessment at any receptor locations.

Please feel free to contact us if you would like to clarify any aspect of this report.

Yours faithfully,
Todoroski Air Sciences



Philip Henschke

References

Hansen Bailey (2013)

"Continuation of Bengalla Mine Environmental Impact Statement", prepared by Hansen Bailey, September 2013.

NSW Environment Protection Authority (2017)

"Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales", January 2017.

Todoroski Air Sciences (2013)

"Air Quality and Greenhouse Gas Impact Assessment Continuation of Bengalla Mine", prepared for Hansen Bailey by Todoroski Air Sciences, July 2013.

Todoroski Air Sciences (2016)

"Air Quality Assessment – Bengalla Mine Development Consent Modification 2", prepared for Hansen Bailey by Todoroski Air Sciences, April 2016.

Todoroski Air Sciences (2017)

"Air Quality Assessment – Bengalla Mine Development Consent Modification 4", prepared for Hansen Bailey by Todoroski Air Sciences, December 2017.



Appendix A – Emission Calculations

Activity	TSP emission	PM10 emission	PM2.5 emission	Intensity	Units	EF - TSP	EF - PM10	EF - PM25	Units	Var. 1	Units	Var. 2	Units	Var. 3	Units	Var. 4 - TSP / PM10/ PM2.5	Units	Var. 5	Units	Var. 6	Units	
Loading raw material to haul truck	671	317	48	500,000	t/y	0.0013	0.0006	0.0001	kg/t	1.133	Ave(WS/2.2) ^{1.3} [m/s]	2	M.C. %									
Hauling to crusher stockpile	8,657	1,981	198	500,000	t/y	0.1154	0.0264	0.0026	kg/t	209	tonnes/load	281	Vehicle gross (t)	6.0	km	4.0/ 0.9/ 0.1	kg/VKT	2.8	S.C. %	85	% Control	
Emplacing at stockpile	671	317	48	500,000	t/y	0.0013	0.0006	0.0001	kg/t	1.133	Ave(WS/2.2) ^{1.3} [m/s]	2	M.C. %									
Loading raw material to crusher	671	317	48	500,000	t/y	0.0013	0.0006	0.0001	kg/t	1.133	Ave(WS/2.2) ^{1.3} [m/s]	2	M.C. %									
Crushing material	300	135	25	500,000	t/y	0.0006	0.0003	0.0001	kg/t													
Screening material	550	300	18	500,000	t/y	0.0011	0.0006	0.0000	kg/t													
Unloading processed material to stockpile	671	317	48	500,000	t/y	0.0013	0.0006	0.0001	kg/t	1.133	Ave(WS/2.2) ^{1.3} [m/s]	2	M.C. %									
Rehandle processed material at stockpile	671	317	48	500,000	t/y	0.0013	0.0006	0.0001	kg/t	1.133	Ave(WS/2.2) ^{1.3} [m/s]	2	M.C. %									
Loading processed material to haul truck	671	317	48	500,000	t/y	0.0013	0.0006	0.0001	kg/t	1.133	Ave(WS/2.2) ^{1.3} [m/s]	2	M.C. %									
Hauling to emplacement	14,429	3,302	330	500,000	t/y	0.1924	0.0440	0.0044	kg/t	209	tonnes/load	281	Vehicle gross (t)	10.0	km	4.0/ 0.9/ 0.1	kg/VKT	2.8	S.C. %	85	% Control	
Emplacing at location	671	317	48	500,000	t/y	0.0013	0.0006	0.0001	kg/t	1.133	Ave(WS/2.2) ^{1.3} [m/s]	2	M.C. %									
Rehandle processed material	671	317	48	500,000	t/y	0.0013	0.0006	0.0001	kg/t	1.133	Ave(WS/2.2) ^{1.3} [m/s]	2	M.C. %									
Wind erosion of exposed areas/ stockpiles	17,520	8,760	1,314	10	ha	3,504	1,752	263	kg/ha/yr	8,760	hours									50	% Control	
Diesel exhaust emissions	504	504	489																			
Total emissions (kg/yr)	47,726	17,720	2,788																			

Appendix B – Isopleth Diagrams

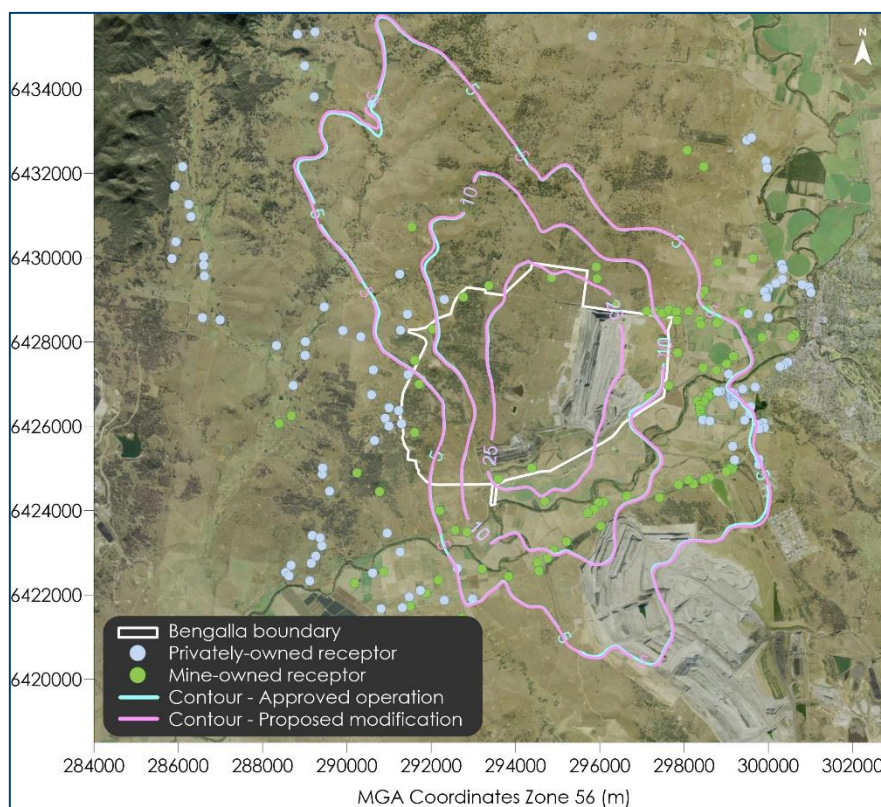


Figure 1: Comparison of predicted maximum incremental 24-hour average $PM_{2.5}$ concentrations - Year 8 ($\mu g/m^3$)

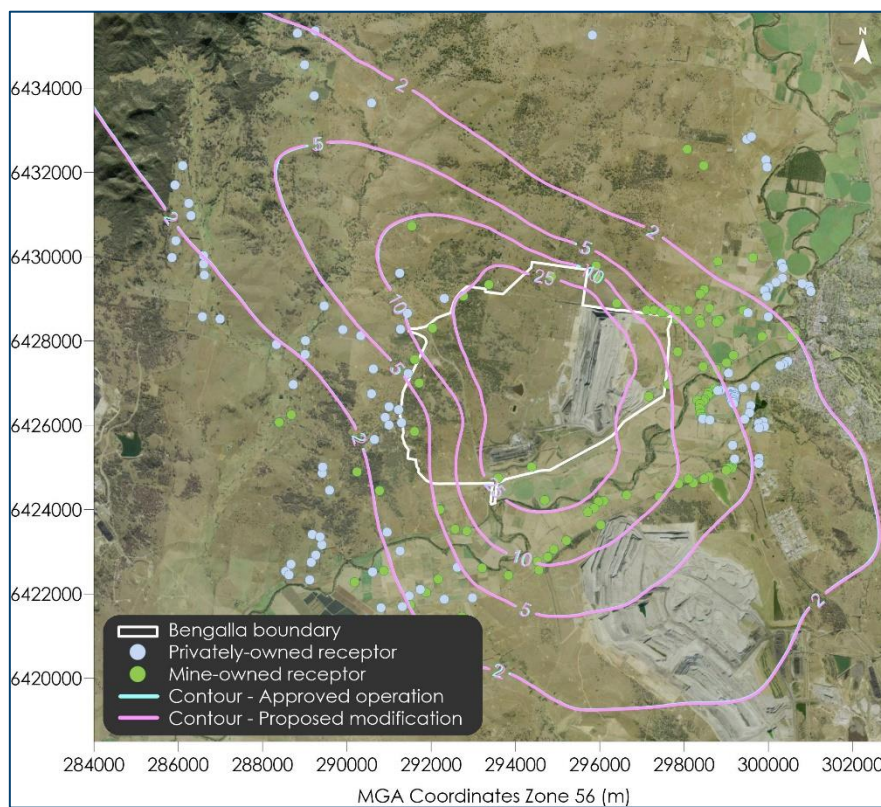


Figure 2: Comparison of predicted incremental annual average $PM_{2.5}$ concentrations - Year 8 ($\mu g/m^3$)

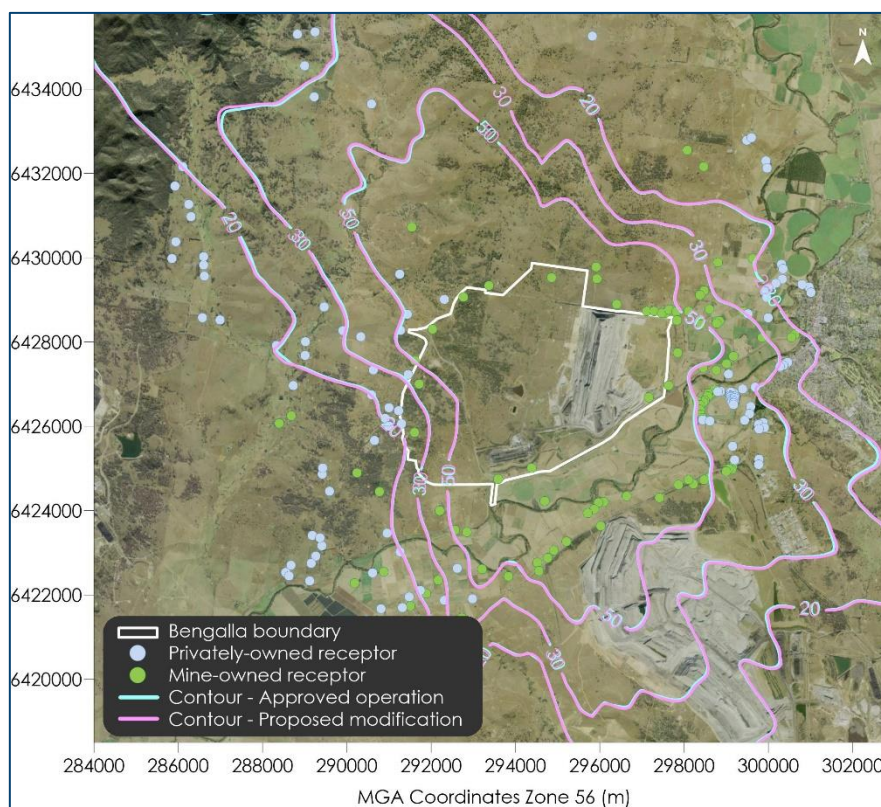


Figure 3: Comparison of predicted maximum incremental 24-hour average PM_{10} concentrations - Year 8 ($\mu g/m^3$)

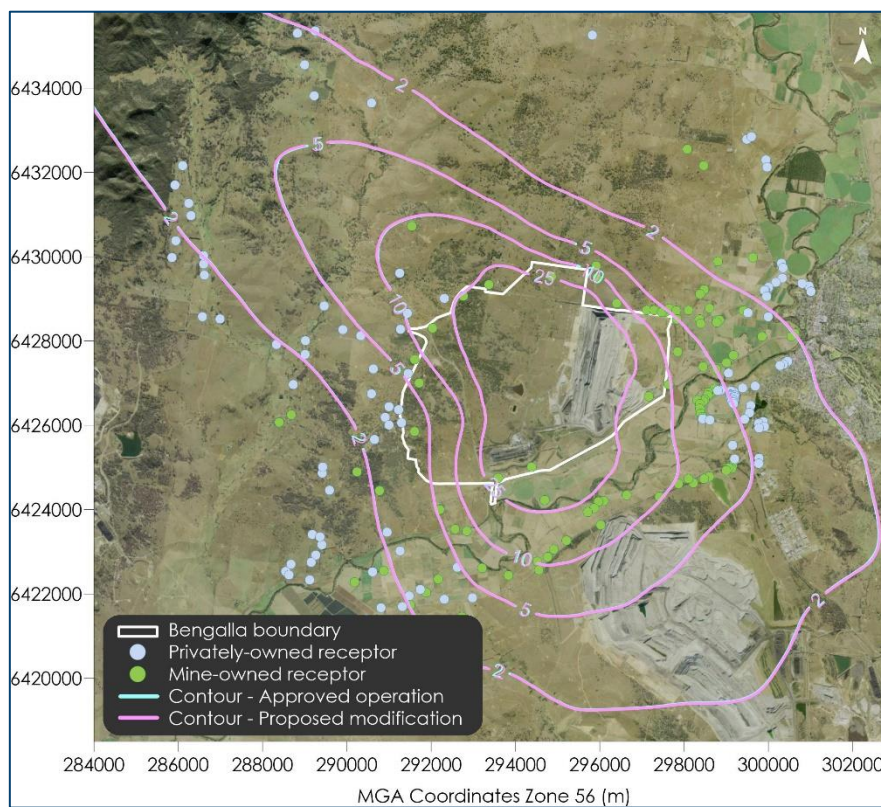


Figure 4: Comparison of predicted incremental annual average PM_{10} concentrations - Year 8 ($\mu g/m^3$)

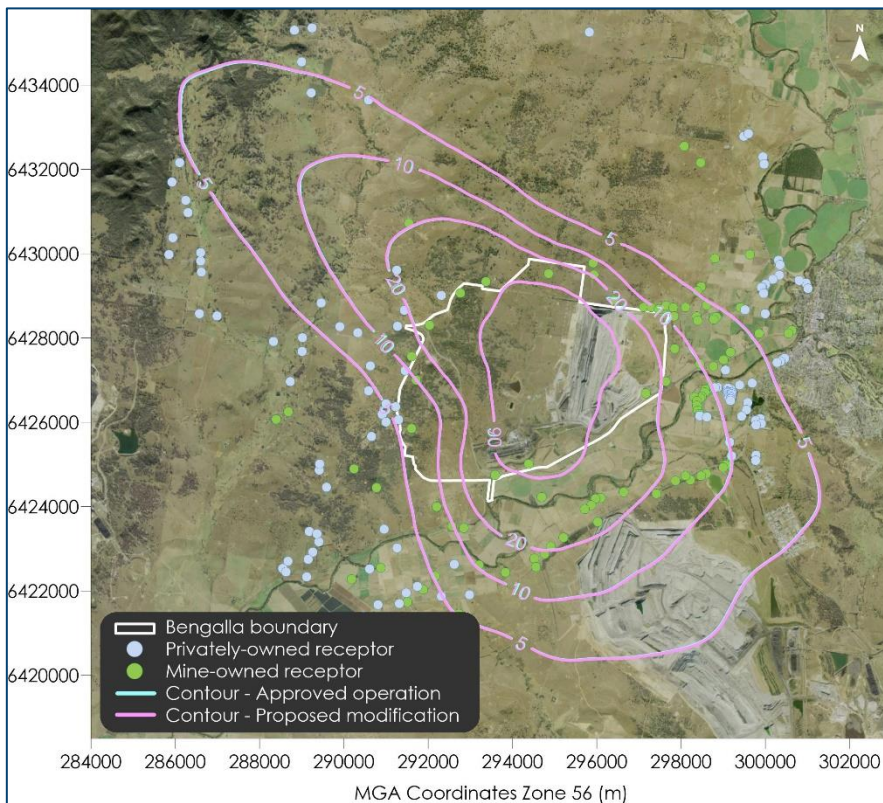


Figure 5: Comparison of predicted incremental annual average TSP concentrations - Year 8 ($\mu\text{g}/\text{m}^3$)

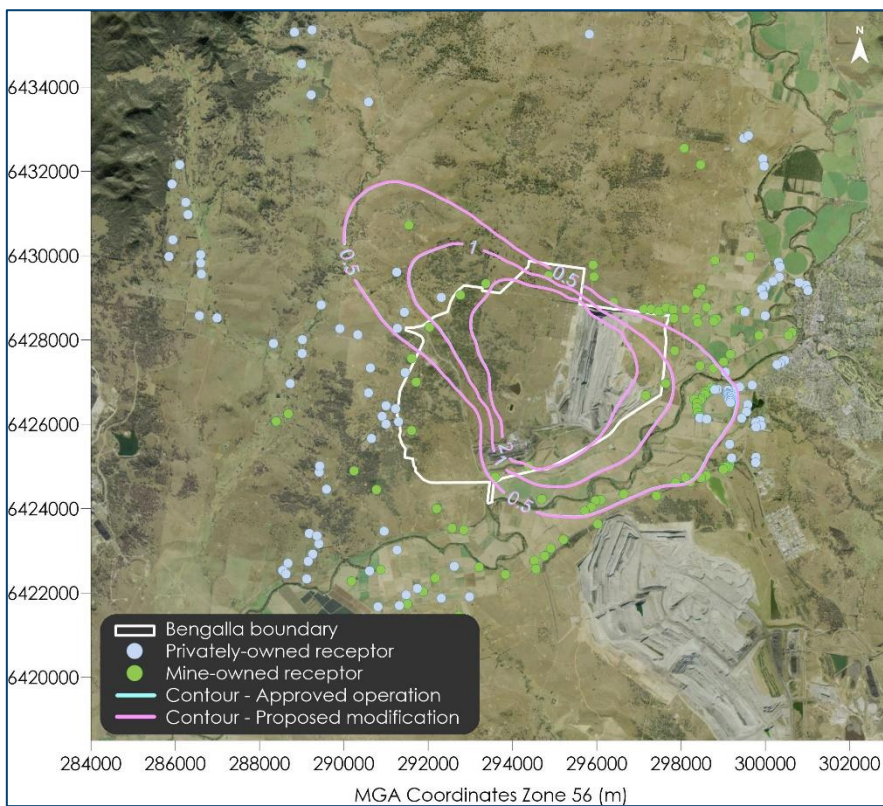


Figure 6: Comparison of predicted incremental annual average dust deposition levels - Year 8 ($\text{g}/\text{m}^2/\text{month}$)

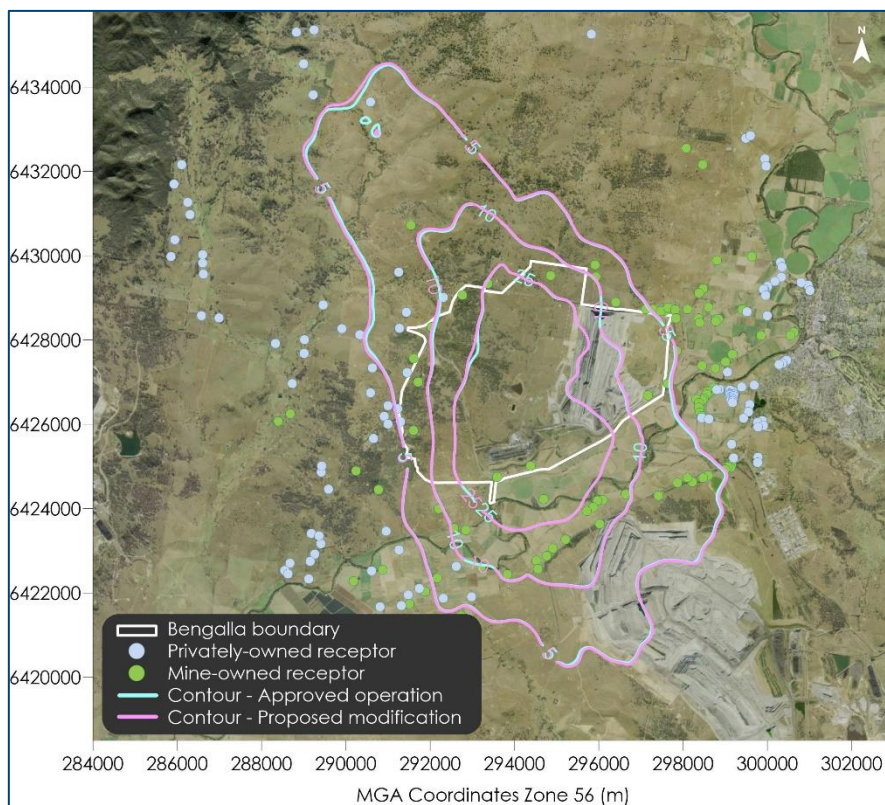


Figure 7: Comparison of predicted maximum incremental 24-hour average PM_{2.5} concentrations - Year 15 ($\mu\text{g}/\text{m}^3$)

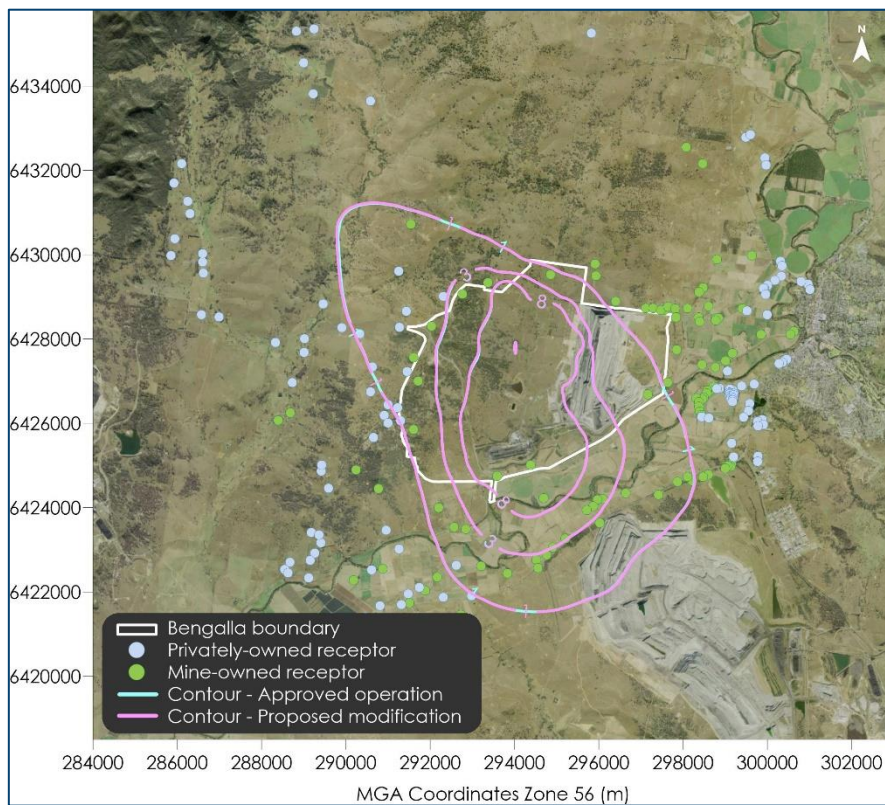


Figure 8: Comparison of predicted incremental annual average PM_{2.5} concentrations - Year 15 ($\mu\text{g}/\text{m}^3$)

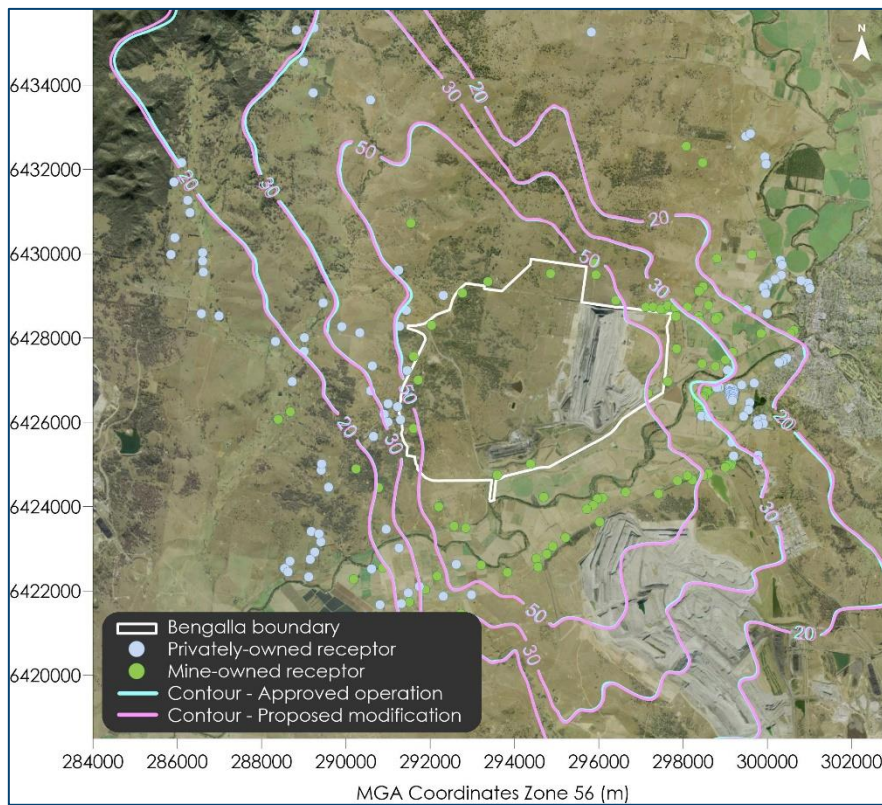


Figure 9: Comparison of predicted maximum incremental 24-hour average PM₁₀ concentrations - Year 15 (µg/m³)

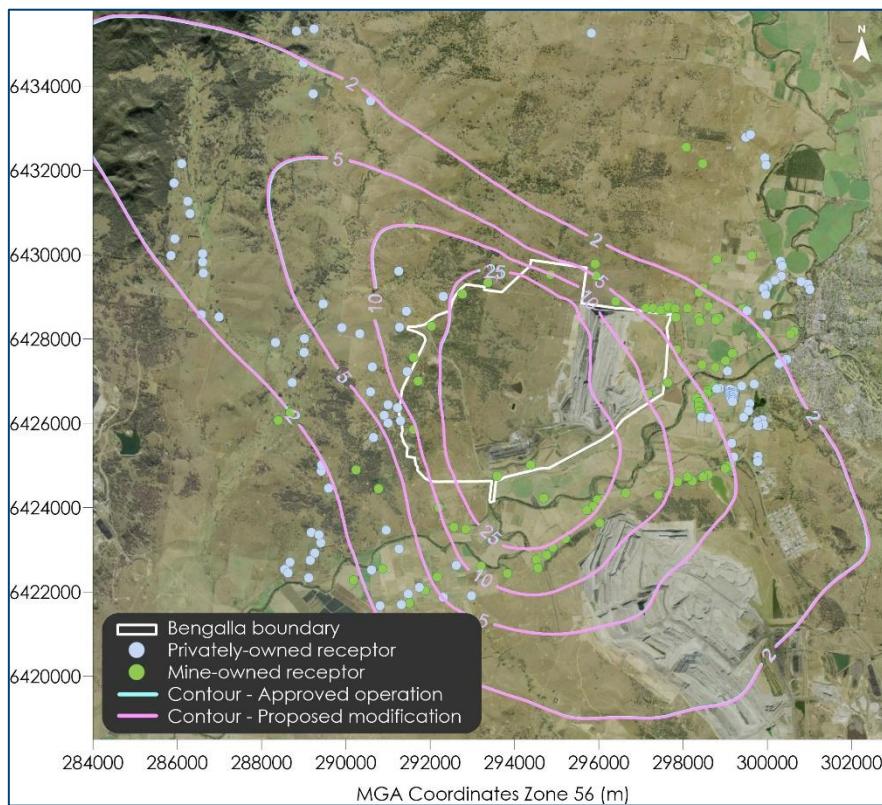


Figure 10: Comparison of predicted incremental annual average PM₁₀ concentrations - Year 15 (µg/m³)

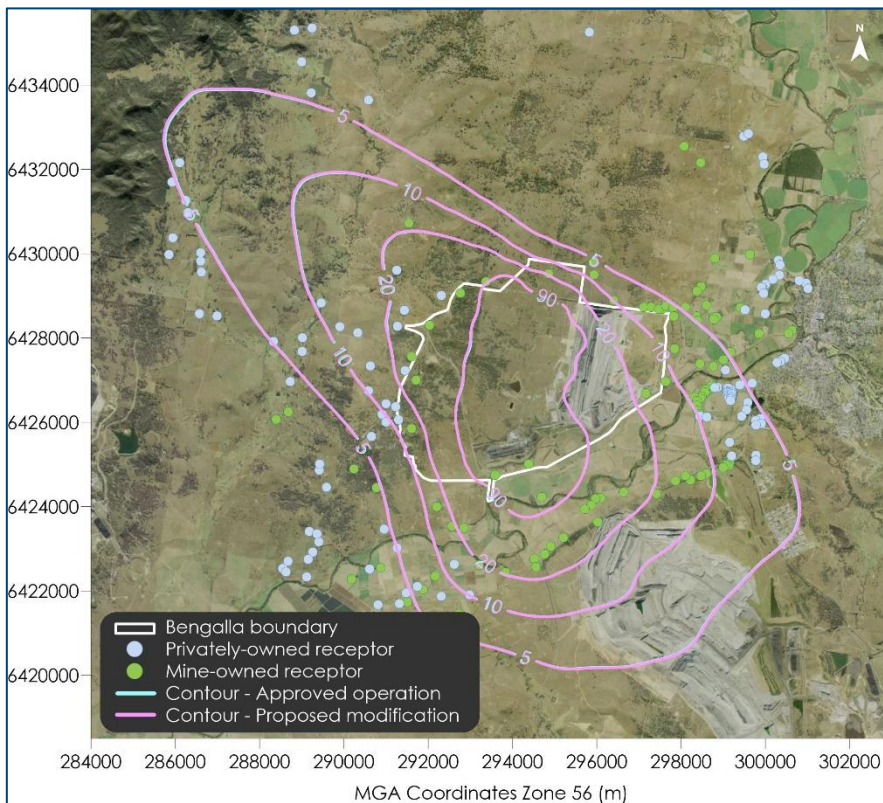


Figure 11: Comparison of predicted incremental annual average TSP concentrations - Year 15 ($\mu\text{g}/\text{m}^3$)

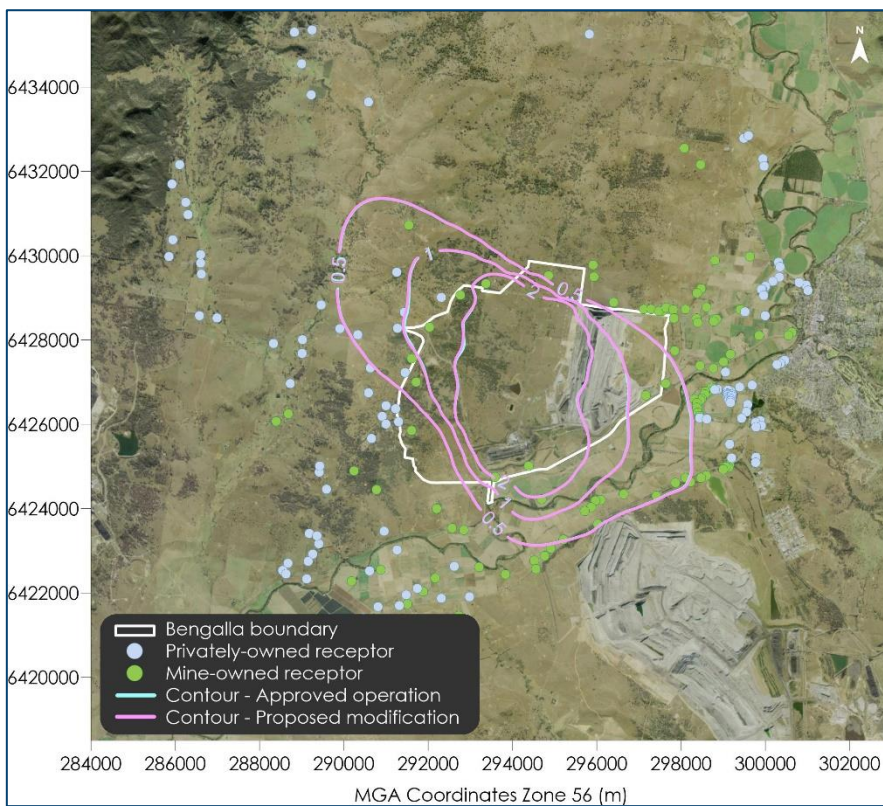


Figure 12: Comparison of predicted incremental annual average dust deposition levels - Year 15 ($\text{g}/\text{m}^2/\text{month}$)

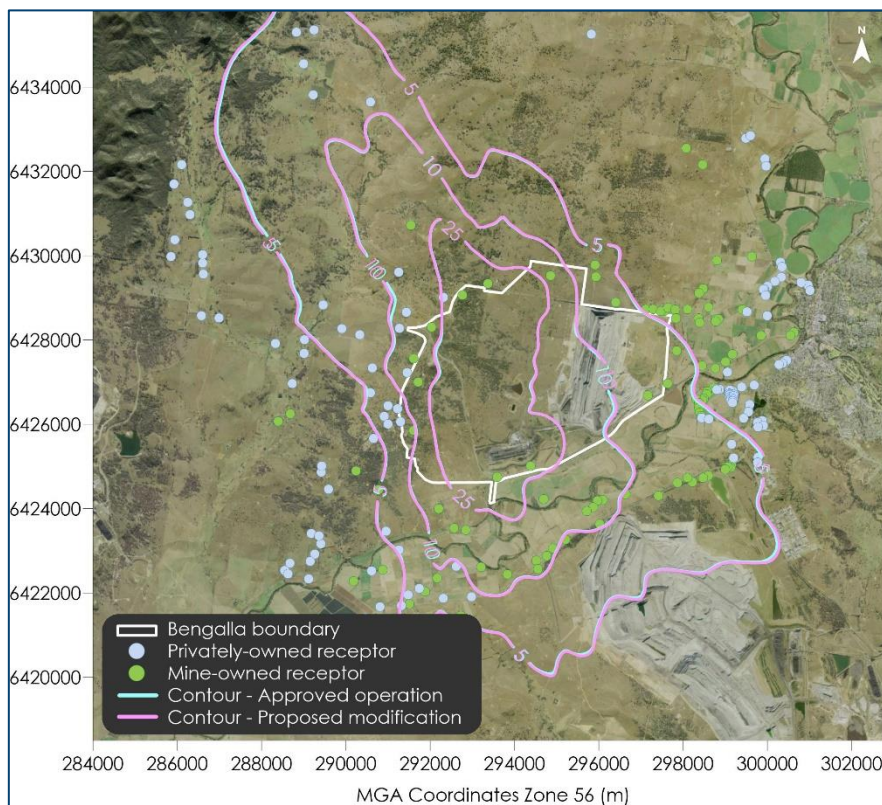


Figure 13: Comparison of predicted maximum incremental 24-hour average PM_{2.5} concentrations - Year 24 ($\mu\text{g}/\text{m}^3$)

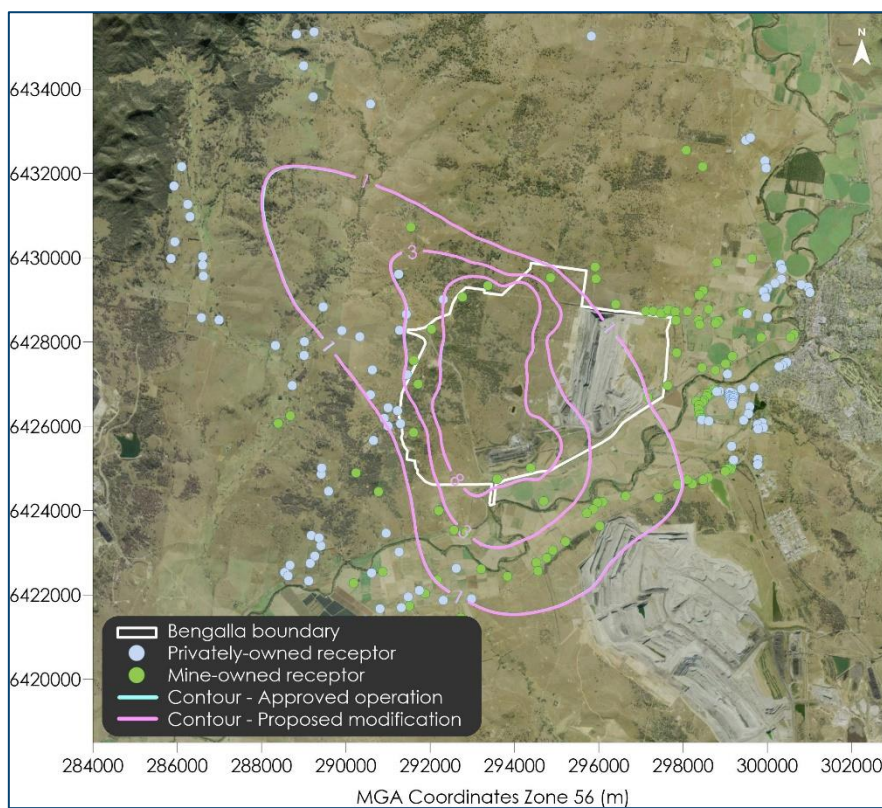


Figure 14: Comparison of predicted incremental annual average PM_{2.5} concentrations - Year 24 ($\mu\text{g}/\text{m}^3$)

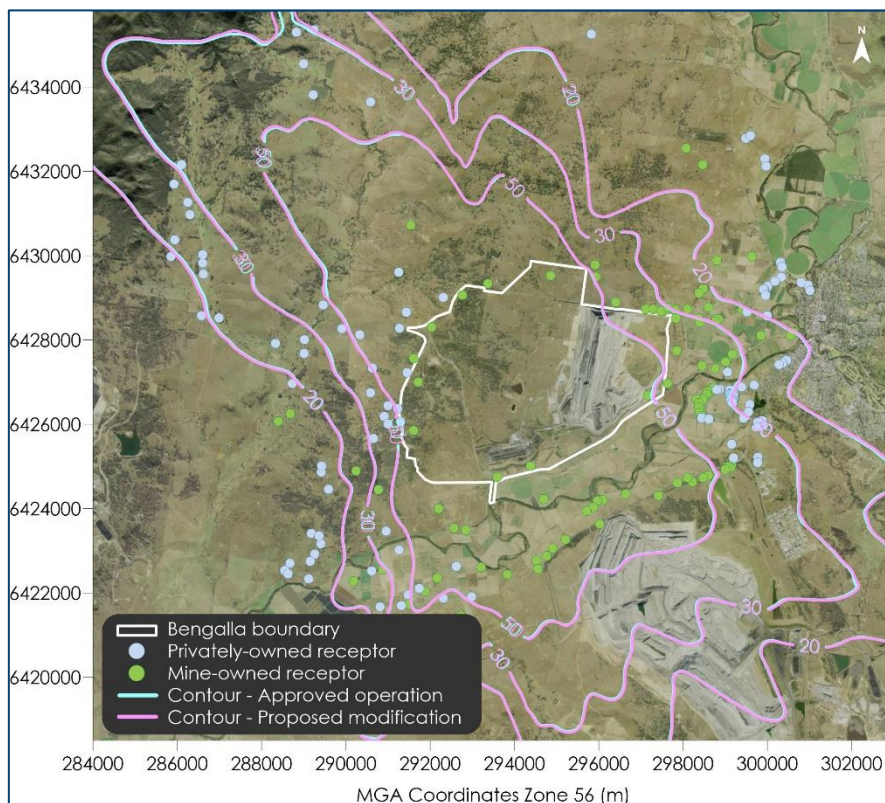


Figure 15: Comparison of predicted maximum incremental 24-hour average PM₁₀ concentrations - Year 24 ($\mu\text{g}/\text{m}^3$)

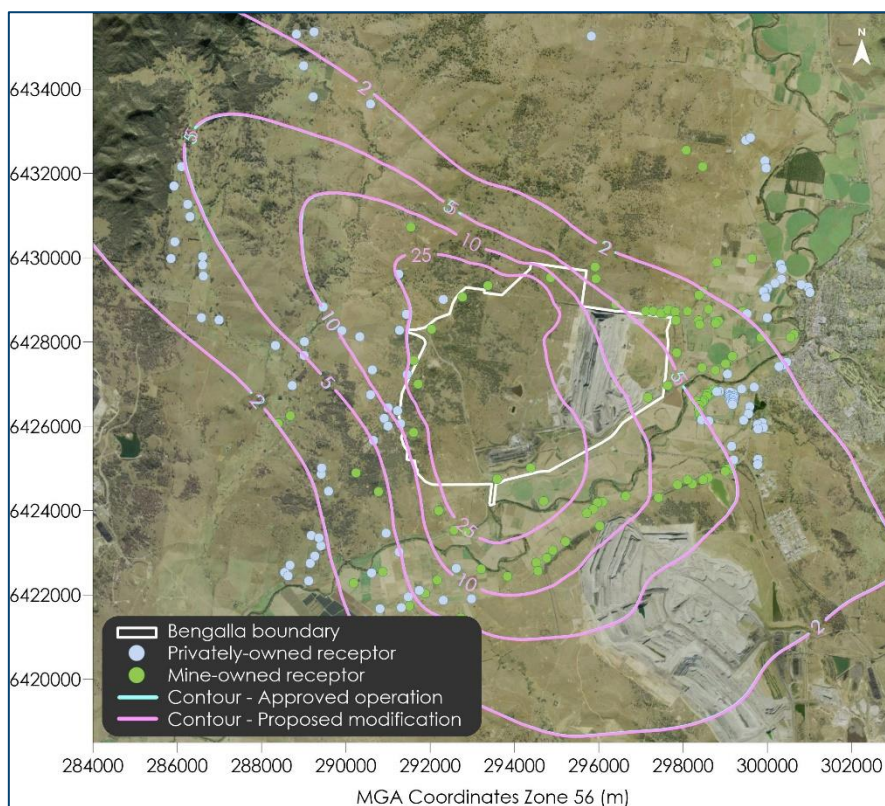


Figure 16: Comparison of predicted incremental annual average PM₁₀ concentrations - Year 24 ($\mu\text{g}/\text{m}^3$)

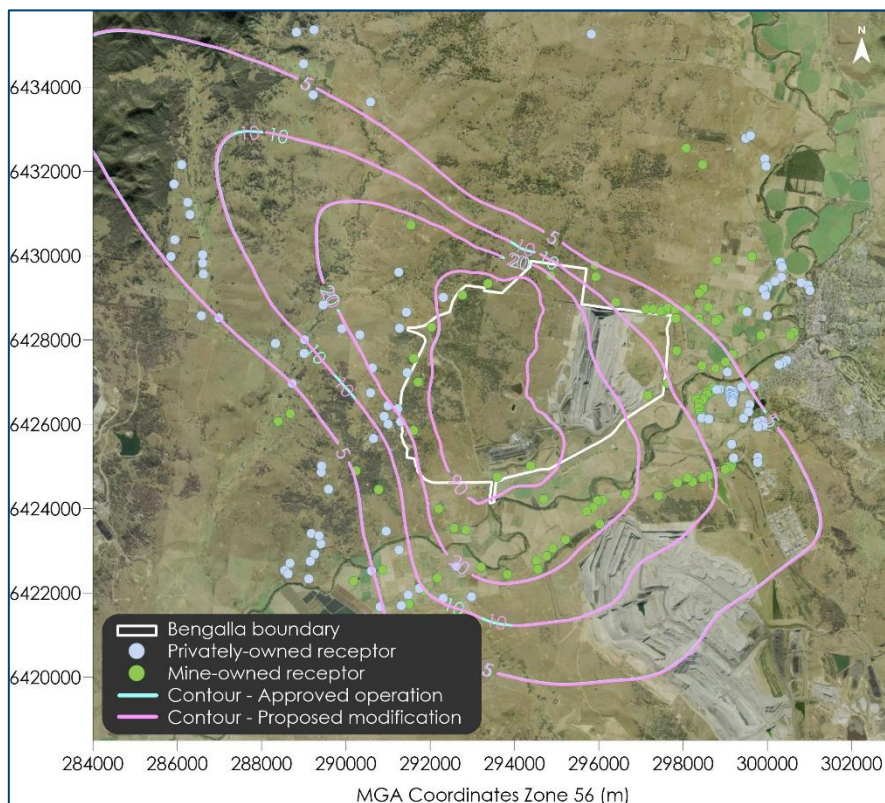


Figure 17: Comparison of predicted incremental annual average TSP concentrations - Year 24 ($\mu\text{g}/\text{m}^3$)

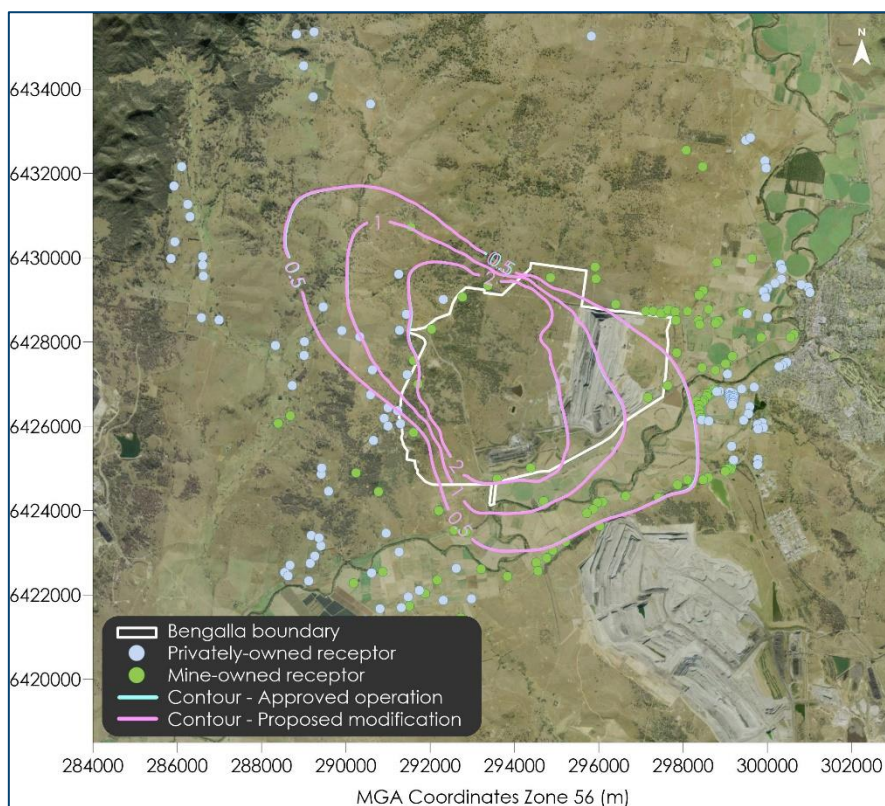


Figure 18: Comparison of predicted incremental annual average dust deposition levels - Year 24 ($\text{g}/\text{m}^2/\text{month}$)

APPENDIX B
NOISE ASSESSMENT

21 October 2021
Ref: J0254-02-L1

James Bailey & Associates Pty Ltd
6/127 John Street
SINGLETON NSW 2330

Attn: Mr Andrew Wu

Dear Andrew,

RE: BENGALLA COAL MINE - MODIFICATION 5 ACOUSTIC ASSESSMENT

This report has been commissioned by James Bailey & Associates (JBA) to determine likely acoustic impacts associated with a proposed Modification to Bengalla Mine (Bengalla) operations by Bengalla Mining Company Pty Ltd (BMC). Bengalla currently operates under development consent SSD-5170, last modified in December 2018, and includes an open cut coal mine and associated infrastructure to produce up to 15 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal until February 2039.

The Modification includes the following components that have been acoustically assessed:

- Operation of a mobile crushing and screening plant and associated diesel powered mobile plant such as an excavator, loader and trucks to produce sized rock material for use within Bengalla for haul road construction, blasthole stemming, geofluid and other similar uses. The crushing and screening plant would be located near or within the active mining area. A maximum production rate of 3,000 tonnes per day and no more than 500,000 tonnes per annum is proposed;
- Enlargement of the ROM coal stockpile area from 40,000 tonnes to a maximum of 150,000 tonnes; and
- Improvements to the southern coal haul road including widening the road and reconstructing earth berms, visual screens or similar as required on the southern side of the southern haul road to maintain safe operation and reduce noise and visual impacts.

MODIFICATION DETAILS

Crushing and Screening Plant Noise Levels

The proposed crushing and screening plant and associated equipment includes mobile units able to be readily transported to the site. The plant will be periodically relocated as the pit progresses to the west. The plant is anticipated to include the following components:

- A Powerscreen Maxtrak 1300 cone crusher. This unit is expected to produce a sound power level of 116 dBA based on supplied noise measurement data on three sides and at 3 distances from the machine;
- A Powerscreen Warrior 2400AF three-way screening plant. No noise data have been supplied for this unit, however previous noise measurements around similar plant have returned a sound power level in the range 111 dBA (for screening relatively soft crushed sandstone) to 118 dBA (for screening hard rock). A conservatively assumed sound power level of 118 dBA has been adopted for this unit.

A combined sound power level of 120 dBA is expected from both machines operating simultaneously. Plant are assumed to operate during the day only (7 am to 6 pm) Monday to Saturday, although maintenance may occur on Sundays. Other materials handling activities may occur 24 hours per day seven days per week.

Mobile Plant Noise Levels

The crushing and screening plant would require the mine's existing haul trucks to intermittently deliver raw overburden material, which would not appreciably affect existing mine noise levels given the relatively small percentage of overburden truck movements that would visit the crusher site.

Rock will be loaded into the crusher using an excavator.

Crushed rock is stockpiled within the disturbance boundary or transported as required to the designated area using a mine haul truck (or other equipment such as 40 tonne trucks) which would otherwise be used within the mine and would therefore not increase total noise levels. Crushed rock required for blasthole stemming would be delivered to the blastholes using the existing stemming truck which would not change existing noise levels.

Potentially significant additional mobile plant include:

- An excavator to feed the crusher, producing a sound power level of 103 dBA according to supplied noise measurement data;
- A loader to load crushed rock into trucks, producing a sound power level of 114 dBA; and
- Three 40 tonne trucks to transport crushed rock to a stockpile area or for use at Bengalla, producing a sound power level of up to 110 dBA each.

Blasthole drilling and haul road construction currently occurs 24 hours per day. The excavator, loader and 40 tonne trucks are therefore assumed to operate at any time of the day, evening or night.

Crushing and Screening Plant Locations

The crushing and screening plant and associated stockpiles would require periodic relocation to avoid interference with mining operations. The exact location of the plant would therefore vary from time to time and would typically be near or adjacent to the western edge of the pit or adjacent to infrastructure west of the pit. In later years, to avoid locating the plant outside the approved disturbance area, the plant may be relocated to the eastern side of the pit within the overburden emplacement area.

ROM Stockpile Enlargement and Haul Road Improvement

The existing ROM stockpile, located generally near and north east of the ROM hopper, currently has a capacity of approximately 40,000 tonnes of ROM coal. Enlargement of the stockpile is proposed in the same general area which would require enlargement of the relatively flat area on which the stockpile would be placed by removing part of the northern section of the earth bund adjacent to the current stockpile area.

Construction work may utilise the approved mining fleet or may require a small earthmoving fleet, assumed to consist of:

- One tracked excavator up to approximately 50 tonne capacity;
- Up to three off-road trucks of approximately 40 tonne capacity;
- One loader;
- One grader;
- One roller;

- One water truck; and
- Other ancillary equipment as required.

A combined sound power level of approximately 117 LAeq,15min is expected from the earthmoving fleet. Removal and construction work for part of the earth bund adjacent to the ROM stockpile and road widening of the southern haul road can occur at any time. Removal and construction work for part of the visual bund south of the southern haul road is assumed to occur from 7.00am - 6.00pm daily.

ASSESSMENT

Noise levels associated with the Modification are initially considered to have a low risk of significant noise impact to any sensitive receptor, therefore a qualitative assessment has been completed. Recent mine noise assessments, including detailed noise modelling of the entire mining fleet, have indicated a total sound power level of approximately 133 to 134 dBA during a reasonable worst case situation with almost all mobile mining machines operating simultaneously. This sound power is produced by several sources distributed within the mining area with approximately 50% on the upper benches and on the haul road to the ROM stockpile, 20% on the lower benches and the remaining 30% on the overburden emplacement area.

Bengalla has complied with relevant noise criteria at all receptors except under unusually strong temperature inversion conditions, based on monthly noise surveys at representative receptors over the last five years.

The proposed crushing and screening plant, associated excavator, loader, and trucks have an estimated combined sound power level of 121 dBA, are proposed to operate near the pit or infrastructure forward of the mine. Proposed plant would produce a sound power level at least 10 dBA lower than current and future mining equipment sound power levels and would therefore produce a noise level at least 10 dBA below relevant noise criteria at all receptors.

Based on this analysis, noise levels from proposed plant are unlikely to be audible at any receptor, particularly considering the crusher and screening plant are not proposed to operate during the most sensitive night period.

A similar analysis can be completed for the assumed earthmoving fleet required to enlarge the ROM stockpile area and improve the South Endwall Road and adjacent southern earth bund. Coal haul trucks producing a sound power level of 115 dBA currently use the South Endwall Road and nearby roads, plus various other mining machines including excavators and dozers operate in adjacent areas of the mine and overburden emplacement area.

The assumed construction fleet, which would produce a combined noise level similar to one mine haul truck and would not operate on exposed bunds during the evening and night, would therefore produce insignificant noise to any sensitive receptor.

The proposed improved South Endwall Road would include a bund or visual screen of up to approximately 4m to 5m high for most of its length which would reduce noise levels to receptors located generally south of the haul road. These closest receptors are owned by BMC and other mining companies.

Nearest privately owned receptors, located approximately 5.8 km to the south-west or 3.7 km to the east, would not receive a significant noise reduction from the bund but are nevertheless not likely to be affected by haul truck noise from the improved road compared to existing noise levels from trucks currently operating on the road.

CONCLUSION

A qualitative assessment of the Modification activities described above, including a comparison between existing noise levels produced by Bengalla's mining fleet and noise levels produced by additional equipment required by the Modification, indicate construction and operation of the Modification would produce no significant or perceptible noise level increase at all sensitive receptors. As Bengalla currently meets relevant noise criteria at all receptors based on regular monthly noise monitoring, compliance with the criteria is predicted to continue if the Modification is approved.

We trust this assessment provides sufficient information regarding acoustic issues associated with the Modification. Please contact the undersigned for any further information or discussion.

BRIDGES ACOUSTICS



MARK BRIDGES BE (Mech) (Hons) MAAS
Principal Consultant