BHP

MT ARTHUR COAL MINE
MODIFICATION 2

Modification Report

Appendix C
Social Impact Assessment

Resource Strategies

SOCIAL IMPACT ASSESSMENT

For the Mt Arthur Coal Mine Modification 2030 Project

Provided for

BHP

Lead Author

DANIEL HOLM

SQUARE PEG
SOCIAL PERFORMANCE

EXECUTIVE SUMMARY

Hunter Valley Energy Coal, a wholly owned subsidiary of BHP, is seeking to modify the approval for its Mt Arthur Coal Mine (MAC), located near Muswellbrook in the Upper Hunter Valley. MAC is an open cut coal mine approved to produce up to 32 million tonnes per annum of run-of-mine coal until 30 of June 2026. Approximately 2,200 people are employed at MAC. In June 2022, BHP announced its intention to cease mining at MAC, and as part of a pathway to closure, seek approval for a modification which would entail a four-year extension to mining, as well as reductions in the approved mining rates, train movements and the overall approved disturbance area (the Modification). The Modification would also include a minor new disturbance area, an overall reduction in the height of overburden emplacement areas and final landform as well as a revised final landform and final void configuration.

This document is the Social Impact Assessment for the Modification, and has been developed in accordance with the NSW Department of Planning and Environment's Social Impact Assessment Guideline (2023). Based on substantial qualitative community research in the Upper Hunter Valley, and secondary social, economic and demographic information, this document describes the social impacts associated with the Modification, evaluates their significance and proposes mitigation, enhancement and monitoring measures. A total of 50 community stakeholders provided valuable input to this report.

The overwhelming response from nearly all community members who contributed to this report was that the Modification will provide the community with time to plan (four more years) and prepare for the eventual closure of MAC. This was considered a positive impact by most stakeholders during the consultation process, and consequently, the Modification is seen as a positive by most. Further, many community members who had negative personal experiences of coal mining – including experiencing direct amenity or cultural impacts from MAC – expressed limited or no concerns about the Modification.

As such, the main social impact of the Modification is the opportunity to plan and prepare for the future closure of MAC. Taking into account enhancement measures, this positive impact was considered to be of a very high significance. Most other social impacts represent continuations of current experiences – both positive and negative – for an additional four years, and include:

- the potential impact to Aboriginal heritage sites within the Modification New Disturbance Area;
- continuation of current noise, lighting and dust impacts at similar levels;
- potential impact to water quality and quantity;
- improved visual impact of reduced overburden emplacement heights;
- continuation of current socio-economic benefits; and
- continuation of current negative social and economic impacts, including rental shortages, economic divide and transient workers, at current levels.

All of these are of less concern to most stakeholders and have been assessed low or medium. In light of the overall low significance of these social impacts and the fact that these are predominantly continuations of current experiences, it is reasonable that the mitigation measures which are currently being deployed by BHP are extended in time to also address these.

By contrast, should the Modification not proceed, the impacts that are continuations in time would naturally not occur. Whilst this may be experienced positively by some stakeholders, the relatively low level of concern associated with the Modification suggests this benefit is negligible. Should the Modification not proceed, the opportunity for an orderly and inclusive closure planning process would be greatly reduced, leading to exacerbated negative impacts of the eventual cessation of mining, including cessation of current socio-economic benefits for the community. This would be a significant and negative consequence for the community.

Social impacts associated with closure of MAC per se – as opposed to extending its life by four years – was outside of scope for this Social Impact Assessment. Nevertheless, many stakeholders who contributed to this assessment talked predominantly about this eventual closure, and hence a qualitative discussion about these is provided in the report. It also provides recommendations for how these impacts can be addressed, drawing on extant literature on mine closure and socio-economic transitions.

In summary, should the Modification proceed, negative social impacts are mostly of low or medium significance and can likely be adequately addressed with existing mitigation measures. The additional time the Modification would provide the community, governments and BHP to prepare for closure is a significant and positive impact. The proponent is recommended to invest time and resources to – together with other stakeholders – ensure this benefit is realised to the greatest extent feasible.

Finally, considering impact significance, stakeholder feedback and existing BHP social and environmental mitigation measures, a framework for addressing and monitoring significant social impacts was considered. Importantly, as the Modification largely represents a continuation of current operations beyond 2026 for an additional four years, proposed mitigation and enhancement measures also largely build on already existing programs. Separate to the mitigation measures proposed for the Modification, measures to be incorporated in closure planning were also proposed.

GLOSSARY AND ABBREVIATIONS

Term	Meaning
ABS	Australian Bureau of Statistics
ACHA	Aboriginal Cultural Heritage Assessment
AHD	Australian Height Datum
CCC	Community Consultative Committee
CCL	Consolidated Coal Lease
CHPP	Coal Handling and Preparation Plant
CL	Coal Lease
DPE	Department of Planning and Environment
Engagement Guidelines	Engagement Guidelines for State Significant Projects
ERP	Estimated Resident Population
Ha	Hectares
HVEC	Hunter Valley Energy Coal
IAIA	International Association of Impact Assessment
ICMM	International Council of Mining and Metals
Km	Kilometres
LGA	Local Government Area
LMI	Labour Market Insights
M	Metres
MAC	Mt Arthur Coal Mine
MACCP	Mt Arthur Coal Continuation Project
MPL	Mining Purpose Lease
MSC	Muswellbrook Shire Council
MTPA	Million tonnes per annum
MW	Megawatt
NSC	National Skills Commission
NSW	New South Wales
PHIDU	Public Health Information Development Unit
RAP	Registered Aboriginal Parties
ROM	Run of Mine
SEIFA	Socio-Economic Indexes for Areas
SIA	Social Impact Assessment
SIA Guideline	Social Impact Assessment Guideline for State Significant Projects
Technical Supplement	Technical Supplement - Social Impact Assessment Guideline for State Significant Projects
The Modification	Mt Arthur Coal Mine Modification 2
SA4	Statistical Area Level 4

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1. INTRODUCTION

1.1 Background and Purpose

The Mt Arthur Coal Mine (MAC) is an open cut coal mine situated approximately 5 kilometres (km) south-west of the town of Muswellbrook in the Upper Hunter region of New South Wales (NSW). MAC is owned and operated by Hunter Valley Energy Coal (HVEC), a wholly owned subsidiary of BHP. MAC is currently approved to operate until 30 June 2026, in accordance with NSW Project Approval MP 09_0062.

In June 2022, HVEC announced its decision to cease mining at MAC in 2030 and accordingly seek a modification to the current approval for a four-year extension of MAC operations (the Modification). The four-year extension is part of a responsible plan to provide a pathway to closure of the operation.

The Modification would be sought under section 4.55(2) of the *Environmental Planning & Assessment Act 1979*. A scoping letter commencing the Modification process was lodged with the NSW Department of Planning and Environment (DPE) in October 2022.

Square Peg Social Performance Pty Ltd has been engaged by BHP to undertake and prepare a Social Impact Assessment (SIA) to support the Modification. This document is the SIA report for the Modification. It has been prepared to meet the requirements of the *Social Impact Assessment Guideline for State Significant Projects* (referred to here as the SIA Guideline) (Department of Planning and Environment, 2023a), its supporting *Technical Supplement - Social Impact Assessment Guideline for State Significant Projects* (referred to as the Technical Supplement) (Department of Planning and Environment, 2023b), and *Undertaking Engagement Guidelines for State Significant Projects* (referred to as the Engagement Guideline) (Department of Planning and Environment, 2022b). In addition, where relevant the *Community Consultative Committee Guideline – State Significant Projects* and the *Practice Note – Engaging with Aboriginal Communities* (Department of Planning and Environment, 2019, 2022a) have informed engagement with MAC Community Consultative Committee (CCC) representatives and Aboriginal stakeholders.

This SIA has been prepared as part of the Modification, where a separate SIA Scoping Report is not required, and consequently reports on both the first and second phase of the SIA process. Specifically, the SIA Guideline (Department of Planning and Environment, 2023a, p. 14) suggests that an SIA report typically should:

- predict and analyse the extent and nature of likely social impacts against baseline conditions using accepted social science methods;
- evaluate, draw attention to and prioritise the social impacts that are important to people;
- develop appropriate and justified responses (e.g. avoidance, mitigation and enhancement measures) to social impacts, and identify and explain residual social impacts; and
- propose arrangements to monitor and manage residual social impacts, including unanticipated impacts, over the life of the Modification (including post-closure phases for extractive industry projects).

1.2 Existing Mt Arthur Coal Mine and the Modification

1.2.1 Mt Arthur Coal Mine

BHP has operated MAC since 2002. It is a large open cut coal mine approved to produce up to 32 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal, and provides employment for approximately 2,200 people, many of whom are residents in the Muswellbrook Local Government Area (LGA). It is a 24 hour, seven days per week operation. Coal is extracted by excavators and transported via rear dump trucks to an onsite Coal Handling and Preparation Plant (CHPP) where it is processed. Product coal is transported via rail to the Port of Newcastle for export.

MAC is an integral part of the Muswellbrook community through its employment and procurement practices, as well as its community engagement and social investment programs. Ongoing community engagement includes:

- MAC representative attendance at Muswellbrook Chamber of Commerce & Industry and Business Singleton (formerly known as Singleton Business Chamber) events.
- Participation in the Upper Hunter Mining Dialogue.
- Participation in community events, including via financial support.
- Telephone, face-to-face and written engagement with neighbouring landholders and stakeholders.
- Quarterly community newsletter, distributed to key community stakeholders (including surrounding landholders).
- 24-hour BHP Mt Arthur Coal Community Response Line: 1800 882 044.

Additionally, MAC operates a CCC chaired by an independent chairperson and with members from the local community and the Muswellbrook Shire Council (MSC). The CCC meets quarterly.

Through its Local Buying Program, delivered in partnership with cost-neutral entity C-Res, BHP provides opportunities for locally based small and medium enterprises to supply to MAC. In the financial year 2021-2022, the Local Buying Program had 132 approved suppliers and an actual spend of $16.6 million in NSW. In addition, the Local Buying Program channels a percentage of spend generated through the Program to the Local Buying Foundation, which supports capacity building projects for the local business community.

Further, BHP invests in the sustainability of the community through its social investment program which is aligned with the United Nations Sustainable Development Goals, and focusses on three themes:

- Future of communities – to contribute to the understanding, development and sustainable use of resources to support communities to be more adaptive and resilient and enable them to address the challenges of the future and thrive.
- Future of work – to enhance human capability and social inclusion through increasing access to relevant education and vocational training, skills development, and enhanced livelihood opportunities linked to the future of work.
- Future of environment – to contribute to enduring environmental and social benefits through biodiversity conservation and ecosystem restoration, water stewardship and climate change mitigation and adaptation.

BHP also operates a matched giving program, providing two dollars for every one dollar employees donate to approved organisations (BHP, n.d.-c).

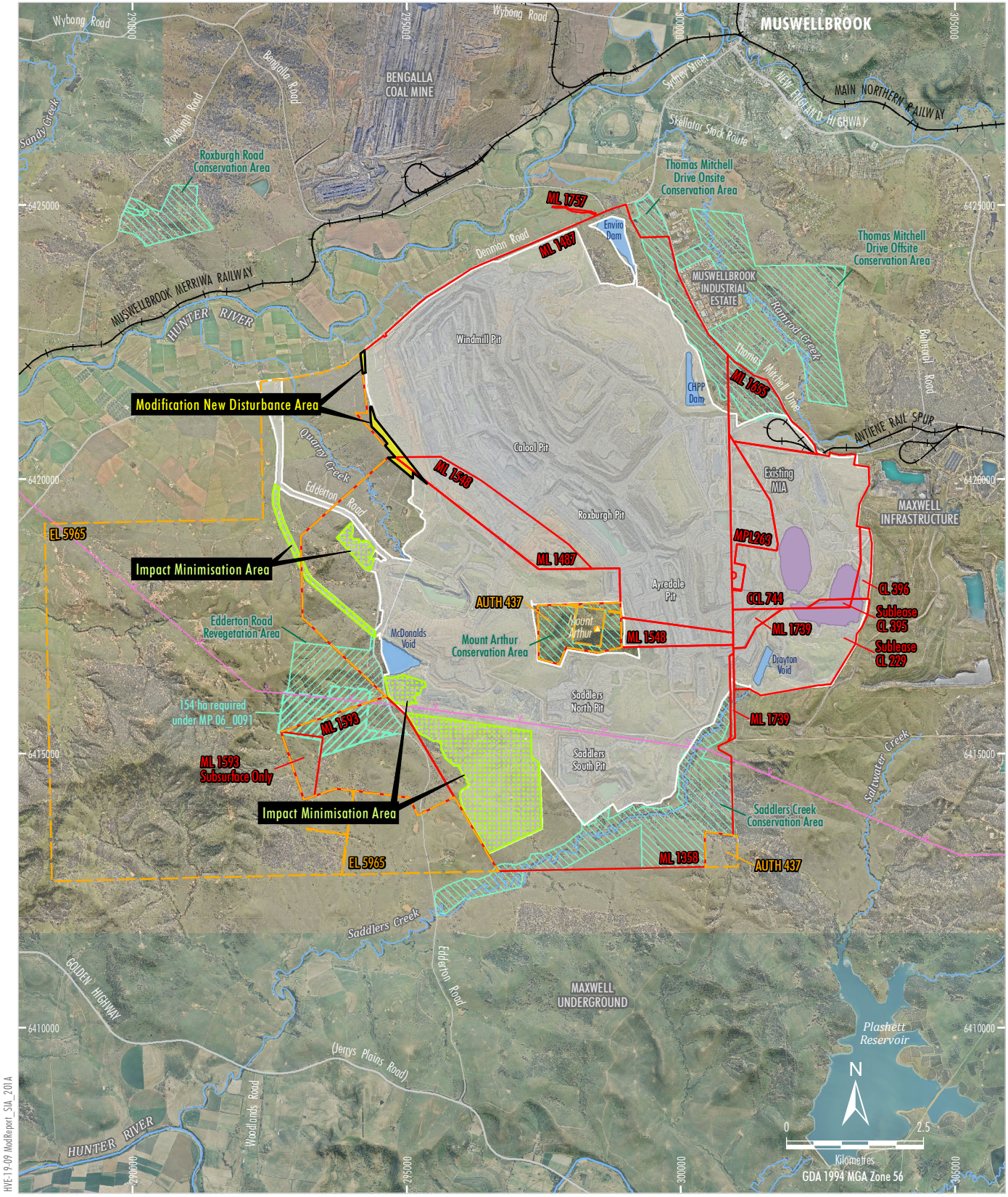
BHP is a member of the International Council of Mining and Metals (ICMM) which aims to strengthen the environmental and social performance of the mining industry. The company has developed a structured approach and requirements for engaging with and managing impacts on local communities, aligned with the ICMM standards, the United Nations Global Compact, the United Nations Guiding Principles on Business and Human Rights, and the social and environmental performance standards of the International Finance Corporation (BHP, n.d.-b). BHP's approach to engaging with Aboriginal stakeholders is embedded in its Indigenous Peoples Policy Statement, and implemented in Australia through the Elevate Reconciliation Action Plan (BHP, n.d.-a).

1.2.2 The Modification

In June 2022, BHP announced that it would cease mining at MAC in 2030. As part of that process, BHP consequently announced it would seek a four-year extension to the life of MAC, which is the proposed Modification. The Modification involves the following activities:

- four-year extension of mining activities to 30 June 2030;
- reduction in the approved open cut mining rate from 32 Mtpa of ROM coal to a maximum of 25 Mtpa of ROM coal (similar to current actual ROM coal production);
- reduction in the cumulative open cut and underground ROM coal handling rate from 36 Mtpa to 29 Mtpa;
- reduction in maximum total (open cut and underground) coal rail transportation from 27 Mtpa of product coal to 20 Mtpa, and a reduction in train movements from 30 to 20 movements per day;
- minor extension of the approved disturbance area in the north-west corner of the operation predominantly to allow for access and ancillary infrastructure (refer to Modification New Disturbance Area within Figure 1);
- an overall reduction (387 ha) in approved disturbance, as some previously approved disturbance areas are no longer intended to be disturbed (refer to Impact Minimisation Area within Figure 1);
- revised final landform and final void configuration, including an overall reduction in the approved height of the northern overburden emplacement areas and the final landform (to reflect the current actual height).

Figure 1 overleaf shows the general arrangement of the Modification.



HVE-19-09 ModReport_SIA_201A

Source: BHP (2023); NSW Spatial Services (2023)
Orthophoto Mosaic: BHP (2022-2020)

LEGEND

- Exploration Licence Boundary (EL, AUTH)
- Mining and Coal Lease Boundary (ML, MPL, CL, CCL)
- Existing 500kV Electricity Transmission Line
- Existing Conservation/Offset Area
- Edderton Road Revegetation Area
- Approximate Extent of Existing/Approved Surface Development
- Existing/Approved Tailings Storage Facility
- Water Storage
- Modification New Disturbance Area
- Impact Minimisation Area

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MT ARTHUR COAL MINE MODIFICATION 2

Modification General Arrangement

Figure 1

The Modification would involve no change to:

- existing mining tenements;
- existing coarse rejects and tailings management;
- existing workforce;
- the existing explosives facility;
- existing site accesses;
- existing electricity supply and distribution;
- existing offset and rehabilitation objectives;
- existing services, plant and equipment;
- the existing hours of operation and associated activities (undertaken 24 hours per day, seven days a week).

1.2.3 Comparison Between the Modification and the Approved Mt Arthur Coal Mine

Table 1 provides a comparison of the approved MAC and the Modification.

TABLE 1 SUMMARY COMPARISON OF THE APPROVED MINE AND THE MODIFICATION

Component	Approved Mt Arthur Mine (PA 09_0062)	The Modification
Life-of-Mine	Approval for open cut mining to 30 June 2026.	Open cut mining for an additional four years until 30 June 2030.
Site Entrance	Various site accesses off Thomas Mitchell Drive and Edderton Road.	Unchanged.
Mining Method and Resource	Continuation of conventional truck and shovel open cut strip and terrace mining in the Windmill, Calool, Roxburgh, Ayredale and Saddlers (north and south) Pits.	Unchanged.
Annual ROM Coal Production Rate	Up to 32 Mtpa of ROM coal from the open cut mining operations.	Reduction in approved extraction, handling and processing of ROM coal from the open cut mining operations to 25 Mtpa (i.e. from 32 Mtpa).
Coal Processing Rate	Coal Handling and Preparation Plant (CHPP) processing of up to 36 Mtpa (including underground coal).	Continued use of the CHPP to facilitate the processing of up to 29 Mtpa of ROM coal from the total complex (i.e. reduction from 36 Mtpa to 29 Mtpa).
Mining Areas	Open cut mining including the Northern Open Cut Pits (Windmill, Calool, Roxburgh and Ayredale) and Southern Open Cut Pits (Saddlers).	Minor extension of the Windmill Pit, predominantly for access and ancillary infrastructure.

Component	Approved Mt Arthur Mine (PA 09_0062)	The Modification
Overburden Emplacement	Development of northern overburden emplacement height to an average of 360 metres (m) Australian Height Datum (AHD) (maximum height of 375 m AHD). Development of Bayswater No 3 (Saddlers Pit) overburden emplacement height up to 250 m AHD. Development of Sublease Coal Leases (CL) 229 and Sublease CL 395 emplacement area up to 360 m AHD. Development of an out-of-pit overburden emplacement area up to 360 m AHD.	No requirement to develop the southern section of the out-of-pit emplacement. Reduction in height of the northern emplacement (from an average of approximately 360 AHD an average to an average of approximately 340 m AHD).
Disturbance Areas	Total MAC disturbance area of approximately 6,710 hectares (ha).	Modification New Disturbance Area of 25 ha. Decrease in net total disturbance of approximately 387 ha (via the Impact Minimisation Area). The revised total disturbance for the Mt Arthur Coal Mine would be approximately 6,323 ha.
Mining Tenements	Mining Leases 1548, 1487, 1358, 1655, 1739, 1757, and 1593, Mining Purpose Lease (MPL) 263, Sublease CL 229 and 395, CL 396 and Consolidated Coal Lease (CCL) 744.	Unchanged.
Coarse Rejects and Tailings Management	Deposition of tailings in the tailings emplacement area at Bayswater No 2. Approval to dispose tailings in the void within Sublease CL 229. The tailings emplacement area up to 280 m AHD. Disposal of coarse reject within overburden emplacement areas.	Unchanged.
Product Coal Transport	Transport of up to 27 Mtpa product coal via rail. Maximum of 30 rail movements per day (i.e. 15 laden train departures).	Reduced transport of product coal to 20 Mtpa from the Mt Arthur Coal Mine. Maximum of 20 rail movements (or 10 laden train departures per day.
Employment	Total workforce of approximately 2,600 full-time equivalents employees during peak production. A workforce of approximately 240 full-time equivalent employees during peak construction phases.	Continuation of a total workforce of approximately 2,200 full-time equivalent positions.

Component	Approved Mt Arthur Mine (PA 09_0062)	The Modification
Hours of Operation	All coal operations and associated activities undertaken 24-hours per day, seven days a week. Construction on-site may be on a 24-hour, seven day roster consistent with operational requirements.	Unchanged.
Explosives Facilities	Fully bunded on-site explosives magazine for the storage of detonators and other materials.	Unchanged.
Progressive Rehabilitation	Progressive rehabilitation of areas consistent with the approved Rehabilitation Management Plan (BHP, 2021) and Rehabilitation Strategy (BHP, 2023).	Unchanged.
Final Landform	**Voids**: Approval for three final voids (i.e. Northern Open Cut Void, Belmont Void and McDonalds Void).	**Voids**: Retention of final voids. Reduction in number of final voids from three to two, comprising the Northern Open Cut Void and McDonalds Void. Change in location and shape of the Northern Open Cut Void due to proposed continuation of mining to 30 June 2030. The currently approved Belmont Void would be backfilled.
	Emplacements: Final landform associated with out-of-pit and in-pit waste rock emplacements. Requirement to rehabilitate waste rock emplacements consistent with the approved RMP and Rehabilitation Strategy.	**Emplacements:** No change to the requirement to rehabilitate waste rock emplacement areas. No requirement to develop or rehabilitate the southern out-of-pit emplacement area (Impact Minimisation Area). Reduction in final height of northern emplacement by approximately 20 m AHD.
	Tailings: Tailings dam dewatering and capping undertaken consistent with the RMP, Rehabilitation Strategy and Tailings Management Strategy approved at the time of closure.	**Tailings:** No change to tailings decommissioning and capping strategy.
	Infrastructure: All surface infrastructure decommissioned and removed unless a post-mining land use has been established and approved by the Resources Regulator in consultation with surrounding landholders (condition 41A of Schedule 3 of MP 09_0062).	**Infrastructure:** Unchanged. Surface infrastructure would be decommissioned and removed unless agreed upon by the Resources Regulator. This includes any additional infrastructure within the Modification New Disturbance Area.

Component	Approved Mt Arthur Mine (PA 09_0062)	The Modification
Final Land Use	Supporting native ecosystem (woodland) and agriculture (pasture) meeting existing offset requirements.	No change to land uses comprising woodland corridors and pasture areas. Revised location of land use areas developed to meet existing offset and rehabilitation requirements.

1.3 Document Structure

This report proceeds as follows:

- Section 2 describes the SIA methodology.
- Section 3 describes the social locality for the SIA.
- Section 4 provides a description of the stakeholder engagement undertaken for the SIA.
- Section 5 provides the social baseline.
- Section 6 provides the identification and assessment of the social impacts associated with the Modification.
- Section 7 provides the recommended monitoring and management framework to be adopted for the Modification.
- Section 8 concludes.

2. METHODOLOGY

2.1 What are Social Impacts?

The methodology for this SIA has been developed following the process set out in the SIA Guideline as well as taking into account good practice SIA literature, in particular the guideline by Vanclay and colleagues issued by the International Association of Impact Assessment (IAIA) (Vanclay et al., 2015).

The SIA Guideline states that social impacts generally mean "the consequences that people experience when a new project brings change" (Department of Planning and Environment, 2023a, p. 7). Similarly, the IAIA considers social impacts to be "all the issues associated with a planned intervention (i.e. a project) that affect or concern people, whether directly or indirectly. Specifically, a social impact is considered to be something that is experienced or felt in either a perceptual (cognitive) or a corporeal (bodily, physical) sense, at any level" (Vanclay et al., 2015, p. 2).

Importantly, this definition suggests that a SIA should consider three interrelated aspects: the *change* brought about by a project or other planned intervention, *people* and their *experience* of the change. SIA practice thus places people at the centre of the assessment.

Various categorisations of social impacts exist, and for the purposes of this report those in the SIA Guideline have been adopted, shown in Table 2 below.

TABLE 2 SOCIAL IMPACT CATEGORIES

Impact Category	Description
Way of life	Including how people live, how they get around, how they work, how they play, and how they interact each day.
Community	Including composition, cohesion, character, how the community functions, resilience, and people's sense of place.
Accessibility	Including how people access and use infrastructure, services and facilities, whether provided by a public, private, or not for profit organisation.
Culture	Both Aboriginal and non-Aboriginal, including shared beliefs, customs, practices, obligations, values and stories, and connections to Country, land, waterways, places and buildings.
Health and wellbeing	Including physical and mental health especially for people vulnerable to social exclusion or substantial change, psychological stress resulting from financial or other pressures, access to open space and effects on public health.
Surroundings	Including ecosystem services such as shade, pollution control, erosion control, public safety and security, access to and use of the natural and built environment, and aesthetic value and amenity.
Livelihoods	Including people's capacity to sustain themselves through employment or business.
Decision-making systems	Including the extent to which people can have a say in decisions that affect their lives, and have access to complaint, remedy and grievance mechanisms.

(Department of Planning and Environment, 2023a, p. 19)

2.2 SIA Objectives

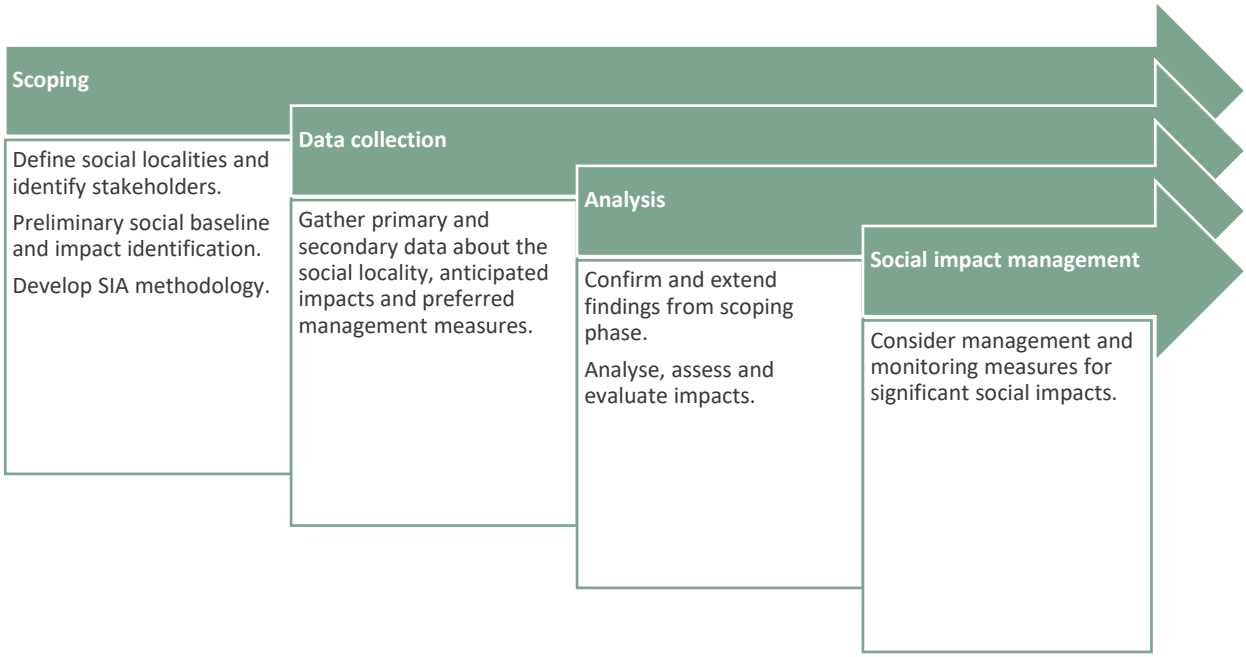
This SIA has been developed drawing on a wide variety of data sources. Commensurate with the SIA Guideline, it seeks to achieve three objectives:

1) identify likely social impacts associated with the Modification, and the stakeholders who may experience these;
2) assess and evaluate the identified social impacts to understand their nature and extent from the perspective of those affected; and
3) develop responses to prioritised social impacts, including management and monitoring measures.

2.3 SIA Process

The SIA proceeded over four phases described in Figure 2 below. Although these phases unfolded largely sequentially, there was also an element of overlap particularly as the analysis and consideration of management measures occurred in parallel with the primary and secondary data being gathered. These phases are further elaborated below.

FIGURE 2 SIA PROCESS



2.3.1 Scoping

The scoping phase for the SIA lasted between July and September 2022 and involved gathering information about the Modification and the community as well as finalising the SIA methodology. During this phase the social locality was defined (see Section 3) and a stakeholder consultation plan was developed which identified stakeholders to be involved in the SIA and methods for consultation (Section 4).

2.3.2 Data Collection

A wide variety of data sources were gathered for this SIA, broadly categorised as primary and secondary sources. Primary data sources consisted of interviews and meetings with a total of 50 stakeholders. Secondary data sources included:

- MAC and BHP operational data, including annual reviews with community engagement and complaints data, Local Buying Program data, and workforce statistics;
- project description and other specialist studies carried out as part of the Modification;
- social, economic and demographic data from the Australian Bureau of Statistics (ABS) and various NSW government departments;
- local and regional plans and publications; and
- relevant academic literature about social impacts with a focus on coal mining in the Hunter Valley.

2.3.3 Analysis

Data analysis involved a comprehensive review of the data gathered and included developing the social baseline (Section 5) and the impact analysis and evaluation (described in Section 6).

This analysis process unfolded over four steps. First, secondary data about the social baseline was reviewed and processed with the purpose of building an understanding of the existing community and to provide – where available and feasible – indicators against which the change associated with the identified social impacts can be measured. Secondly, all the notes from the stakeholder consultation were analysed based on what stakeholders expressed about their community, anticipated impacts from the Modification, and anticipated impacts of mine closure. As these first steps occurred somewhat in parallel, feedback from stakeholders about the community helped inform the development of the social baseline: if stakeholders described certain features of the community, we sought, where possible, to identify and include indicators about this in the social baseline.

Thirdly, likely social impacts associated with the Modification were identified. This involved listing all the aspects of the Modification and comparing these with the current approved operations at MAC. The type of change experienced by the community and which stakeholders may experience this change as a result of the Modification were described. These were then categorised in accordance with the SIA Guideline and described in succinct impact statements. At this stage it was also considered whether there was a cumulative element associated with each impact[1].

In the fourth step, the identified impacts were evaluated utilising the definitions and matrix provided in the Technical Supplement[2]. The impact evaluation drew on both a 'technical' evaluation conducted by the SIA lead author, and prioritisations expressed by stakeholders during the consultation process.

To ensure the robustness of the evaluation it was presented to MAC CCC and MSC for feedback and confirmation. Section 6 contains the impact evaluation.

[1] The impact identification is presented in APPENDIX A.
[2] These are provided in APPENDIX B for reference.

Importantly, although the findings are likely to be robust, social impact identification and evaluations should not be understood as exact predictions, but rather reasonable prioritisations of which impacts are important to address in association with the Modification.

2.3.4 Social Impact Management

Finally, considering impact significance, stakeholder feedback and existing BHP social and environmental mitigation measures, a framework for addressing and monitoring significant social impacts was considered. Importantly, as the Modification largely represents a continuation of current operations beyond 2026 for an additional four years, proposed mitigation and enhancement measures also largely build on already existing programs. Separate to the mitigation measures proposed for the Modification, measures to be incorporated in closure planning were also proposed.

2.4 Assumptions and Limitations

All SIA processes and methodologies come with limitations and rely on certain assumptions. For this SIA study, the following should be noted:

- This SIA has been developed seeking to follow the approach outlined in the SIA Guideline and Technical Supplement. Findings and conclusions should be interpreted in that context.
- Secondary social, economic and demographic data about communities always have a time lag between data gathering and publication. Although this SIA uses the most recent data available, there is always a possibility of change occurring between the time of data gathering and publication. In particular, due to the macroeconomic environment at the time of this SIA being developed, many economic indicators were undergoing rapid change.
- All findings are based on the information available at the time of writing. It is possible that social, economic, demographic, cultural, environmental or Project-related information may change following the publication of this SIA.
- Secondary data sources have been produced using various methodologies, which themselves come with assumptions and limitations. To ensure the data is credible and robust, official sources (e.g. Government) have been prioritised, and relevant limitations have been noted.
- The statistical data provided in the social baseline sometimes consists of averages or medians. It is important to note that although this data provides a description of the population in that area, it should not be inferred that it necessarily represents all social entities within these areas.
- Primary data and consultation were carried out using a qualitative approach following a strategic sampling process. This increases the depth of findings and enables the SIA to closer represent people's likely experiences of change. However, it also limits the potential to claim statistical representativeness of findings.
- All SIAs make statements about the future; about anticipated change processes and how these may be experienced by stakeholders. There is always an element of uncertainty associated with these change processes, and as such the findings in here should not be interpreted as exact predictions.
- Finally, the SIA process is not mechanistic, but one which relies to some extent on the judgements of the SIA practitioner. This SIA has aimed to transparently describe these judgements and the processes applied to identify them.

3. SOCIAL LOCALITY

3.1 What is a Social Locality?

The social locality is the area where the social impacts associated with the Modification are likely to be experienced. The SIA Guideline states that there is "no prescribed meaning" for a social locality, but that it should be defined for each project taking into account its nature and likely social impacts (Department of Planning and Environment, 2023a, p. 16). Factors to consider when determining the social locality are:

- The scale and nature of the project (in this case the Modification).
- Who may be affected.
- Whether any vulnerable or marginalised people may be affected.
- Built or natural features on or near the project (i.e. the Modification).
- Relevant social, cultural, and demographic trends or other change processes.
- The history of the proposed project and the area (Department of Planning and Environment, 2023a, pp. 16–17).

3.2 Determining the Social Locality

3.2.1 The nature and scale of the Modification

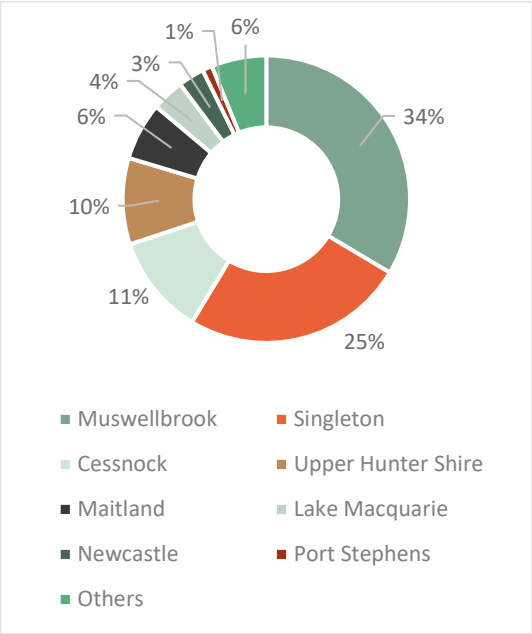
Whilst the existing MAC is a large coal mine, the Modification can be considered modest in scale. The Modification New Disturbance Area is approximately 25 ha (which is approximately 0.5% of the currently approved disturbance footprint), and taking into account the approved disturbance areas no longer required for development, the Modification represents a net reduction in disturbance. Production levels are proposed to be reduced compared to what is currently approved and be similar to what is currently achieved. The Modification also includes an extension of mining activities by an additional four years beyond 2026.

3.2.2 The existing Mt Arthur Mine

Workforce

MAC has an existing workforce of approximately 2,200 people. Muswellbrook is the largest LGA of residence for the BHP MAC workforce where data is available, with 34% of the workforce residing in the shire. This is followed by Singleton at 25%, Cessnock at 11%, Upper Hunter at 10% and Maitland at 6% (see Figure 3 below). Together, 86% of the BHP MAC workforce reside in the Hunter Valley. The Modification will involve the continued employment of the existing workforce, and as such it is likely people in these areas, particularly Muswellbrook, will experience much of the socio-economic benefits associated with it.

FIGURE 3 BHP MAC EMPLOYEE LOCATIONS

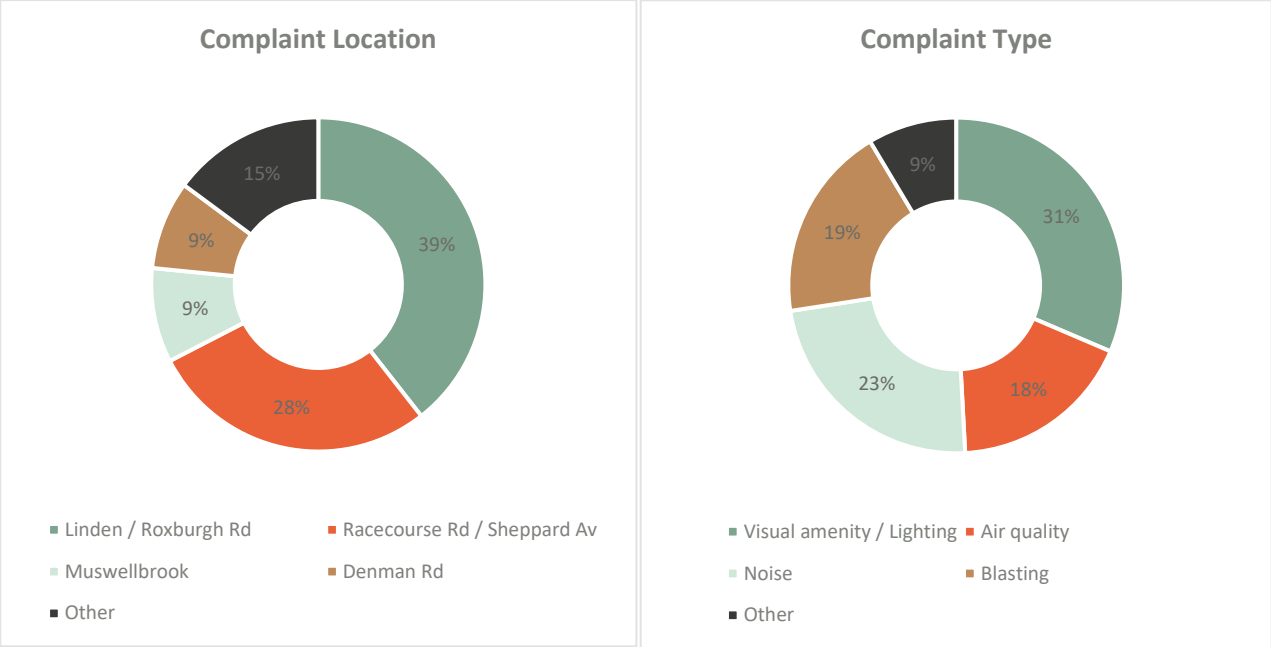


Source: BHP unpublished data.

Community Complaints

Complaints can provide an indication of current experiences of MAC, particularly with regards to environmental and amenity impacts. Figure 4 shows the location and types of complaints lodged with the Mt Arthur operations between 2019 and 2021. Four locations, Linden / Roxburgh Road, Racecourse Road / Sheppard Avenue, Muswellbrook and Denman Road account for 85% of all complaints received during this time, indicating these are the areas which are most experiencing negative impacts of the current operation. As the Modification will include a minor extension to mining in the Northern Open Cut Pits, it is likely these will continue to be affected. With regards to types of complaints, four categories dominate. Visual amenity/lighting, air quality, noise and blasting accounted for more than 90% of all complaints during the period.

FIGURE 4 COMPLAINTS DATA, 2019-2021



Source: BHP Mt Arthur Coal Mine Annual Reviews (2019, 2020, 2021).

3.2.3 Built or natural features in the area surrounding MAC

There are a range of built or natural features of value to local stakeholders in proximity to MAC. The town of Muswellbrook is located 5 km to the north-east of MAC, and other nearby towns include Denman approximately 20 km to the west and Jerrys Plains further to the south. Nearby roads include Thomas Mitchell Drive to the east of MAC, which is the main access road, Denman Road to the north, which connects Muswellbrook and Denman, and Edderton Road which connects Denman Road with the Golden Highway. The Muswellbrook Race Club is located a short drive from MAC, off Denman Road.

MAC is also surrounded by other coal mines, with Bengalla to the north and Mangoola further to the north-west. These are important in terms of potential cumulative impacts, particularly relating to noise, dust and visual impact. There are other mines surrounding Muswellbrook, as well as some in various stages of planning, which provide employment to many residents, as well as a visual reminder of the importance of the coal mining industry to the area.

A range of natural features also frame the site and its surroundings. Mount Arthur, which has given name to MAC, is a peak comprised in a Conservation Area within the site and which is important for its visual amenity and cultural and historical significance. To the north of MAC is the Hunter River which provides an important water source for the community, and its river flats support a variety of agricultural operations.

The existence of horse studs and wineries, and the visual amenity and tourism destination these provide are an important feature of the Hunter Valley; socially, economically, aesthetically and culturally. There are a number of thoroughbred horse studs in the vicinity of MAC and Muswellbrook including Edinglassie directly to the north of MAC, and Godolphin and Coolmore both located off the Golden Highway south of MAC.

3.3 The Social Locality for the Modification

The Modification is likely to affect stakeholders within a primary and secondary social locality. For the purposes of this SIA, the primary social locality has been defined as Muswellbrook LGA. This is the area where most stakeholders who are likely to directly experience social, environmental and amenity related impacts of the Modification are located. This impact is not evenly distributed however; residents in the direct vicinity of MAC are most likely to experience amenity related impacts, and other residents within the LGA are more likely to experience the social and economic effects of the Modification, both positive and negative. Further, as MAC is one of the largest employers in the LGA, it is reasonable to delineate this as a primary social locality.

A secondary social locality has been defined as the remainder of the Hunter Valley Statistical Area Level 4 (SA4). This statistical geography provides the closest approximation to the Hunter Valley region. It includes the shires of Upper Hunter, Muswellbrook, Singleton, Cessnock, Maitland, Dungog and Port Stephens. As MAC is located in the Hunter Valley coal province and is exporting coal through the Port of Newcastle, it is deeply intertwined with the social and economic identity of this area. However, it is also one of many mines in the area, and the impacts of MAC and the Modification are therefore likely to be less direct and more cumulative in nature within this area. As with the primary social locality, the experiences of the Modification are likely to vary. Areas with higher concentration of Mt Arthur Coal employees (such as Singleton) are likely to experience social and economic impacts of the Modification more acutely.

Figure 5 below shows the primary and secondary social localities for the Modification.

FIGURE 5 MAP OF SOCIAL LOCALITY

4. STAKEHOLDER ENGAGEMENT FOR THE SIA

4.1 Overview, Approach and Methods

Consultation with potentially affected stakeholders is an important step in the SIA process, and permeates the baseline analysis, the analysis of impacts and determining proposed impact mitigation measures. A total of 50 stakeholders have provided input to this SIA.

Planning for stakeholder consultation commenced during the scoping phase, and involved setting objectives, developing methods and consultation tools, and identifying stakeholders to consult. Consultation planning took into account the SIA Guideline, the Community Engagement Guideline as well as the practice notice for engaging with Aboriginal communities provided by the Department of Planning and Environment (2022a, 2022b, 2023a). The objectives for the stakeholder consultation process were developed to align with the objectives of the SIA Guideline (Department of Planning and Environment, 2023a) and included:

- collecting primary data about the potentially affected community (the social baseline);
- seeking stakeholder input into social impact identification and significance assessment, particularly seeking to understand how impacts may be experienced from the stakeholder's perspective;
- ensuring stakeholders have an opportunity to provide feedback into project planning and design; and
- collaborating on impact evaluation and prioritisation.

4.1.1 Interviews and meetings

Stakeholder consultation relied primarily on interviews and meetings with a cross section of the community. Interviews and meetings were primarily conducted in October and November 2022, were semi-structured in nature and followed a conversation protocol developed during the scoping phase (see Box 1). As is common in semi-structured interviews, the respondents' preferences guided the conversation to a large extent, meaning that not all questions were asked at all interviews and at some interviews other topics were also discussed. When discussing anticipated impacts of the Modification, open questions were asked, letting respondents describe the change they anticipated.

Respondents were provided with an information sheet and consent form and asked to provide their consent to participate verbally or in writing. All stakeholders provided this consent.

BOX 1 OUTLINE OF CONVERSATION PROTOCOL

1) Ensure consent is provided.
2) Present Modification.
3) Questions about the Muswellbrook community.
4) Anticipated impacts associated with the Modification.
5) Anticipated impacts associated with cessation of production.
6) What the respondent would like to see done to manage impacts.

Prior to or at the event, the respondents were also presented with a fact sheet about the Modification, and key features of this were presented during the meeting or interview[3]. After the interview a summary of the conversation was written up and shared with the respondents to enable them to review and confirm that the conversation was accurately captured. The SIA lead author conducted interviews and meetings with all stakeholders in Muswellbrook, Scone, Singleton and Newcastle, most of which were face-to-face. Where a face-to-face meeting was not possible, Microsoft Teams or Zoom videoconference platforms were utilised. A representative from BHP was present at most of these meetings, to enable the respondent to ask questions directly of the applicant.

A consultation sampling strategy was developed during the scoping phase and was primarily organised around the SIA stakeholder categorisation provided by the SIA Guideline (Department of Planning and Environment, 2023a, p. 28). The sampling strategy sought to:

1) Include participation from all stakeholder groups outlined in the SIA Guideline (column 1 in the table below)[4].
2) Prioritise directly affected stakeholders as well as those that participated in the SIA consultation for the Mt Arthur Coal Continuation Project (MACCP)[5].
3) Include a balance of voices representing social, cultural, economic and environmental perspectives, a balanced representation of males and females, and inclusion of both primary and non-primary production business interests.
4) Involve potentially vulnerable stakeholders, or where that is not possible or appropriate, organisations that represent their interests.

In total, 38 interviews or meetings were held with 50 participants. Table 3 below provides a summary of the stakeholders consulted for this SIA. It should be noted that the stakeholder grouping is not mutually exclusive; most stakeholders belonged to at least two of these categories, and many spoke both as 'general' residents of the area as well as representing a particular organisation or interest.

TABLE 3 STAKEHOLDERS CONSULTED FOR THIS SIA

Stakeholder group	Event
Aboriginal people and groups	• Four interviews with Aboriginal representatives, all who were Registered Aboriginal Parties (RAPs).
Existing and in-migrating residents and businesses	• Interviews with three nearby landholders. • Interviews with four CCC members. • Interviews with eight business representatives.
Councils	• Meeting with Singleton Shire Council community and economic development officers. • Meeting with and presentation to the MSC State Significant Development Committee.

[3] Consultation material is provided in APPENDIX C.
[4] Note that other than local councillors elected representatives were not included in this SIA. As part of the Modification application, BHP briefed the state and federal elected representatives from the area.
[5] BHP had previously commenced a process to seek approval for a 19-year extension to MAC; the MACCP. An SIA was commenced for this project, and initial consultation undertaken, however, no SIA or SIA Scoping Report were lodged.

Stakeholder group	Event
Community, including stakeholder groups, business, cultural and environmental organisations, advocacy groups and peak bodies	• Meetings with three community organisations, including one environmental advocacy group. • Meetings with the Muswellbrook Chamber of Commerce and Industry and Business Singleton. • Meetings with peak bodies for the wine, tourism and thoroughbred breeding industries: Hunter Valley Wine and Tourism Association and Hunter Thoroughbred Breeders Association.
Workers, contractors and suppliers	• Interviews with two workforce representatives.
Public and private service and infrastructure providers and regulatory agencies	• Meetings with emergency services, including NSW Police, NSW Fire and Rescue and NSW Ambulance services. • Meetings and interviews with community / housing services providers Upper Hunter Community Services and Home in Place. • Meetings and interviews with one childcare centre and Muswellbrook TAFE. • Meeting with Department of Regional NSW.

4.1.2 Feedback on impact assessment

The impact assessment was presented to the CCC and the MSC's Committee for State Significant Developments (SSD) for feedback. The purpose of this was to provide these key stakeholder groups with an opportunity to comment on the reasonability of the proposed impact assessment.

4.1.3 Information provision

In addition to the consultation undertaken to inform the SIA, BHP has undertaken additional consultation with regulatory agencies, community groups and stakeholders and elected representatives to inform about the Modification and the decision to cease production at MAC.

4.2 Themes Emerging from SIA Consultation

A small number of consistent themes emerged from the consultation, relating to the impacts communities are currently experiencing from coal mining in the area, the historical role coal mining and MAC has played in the community, impacts of the Modification and impacts of the eventual cessation of production at MAC. The following describes the most evident themes, and is presented broadly relating to the social baseline, anticipated impacts of the Modification, and finally impacts associated with closure.

4.2.1 Coal mining – and Mt Arthur Coal – is an integral part of the Muswellbrook community

Coal mining is an integral part of the Muswellbrook community and has been for decades. MAC, being the largest mine in the area is part of this fabric. Nearly all stakeholders who contributed to the SIA had some form of connection to MAC or the mining industry; either directly working at MAC, or indirectly having a partner or other family member who worked at a mine or for a contractor to one of the mining companies.

Stakeholders who had grown up in the area looked back at the sense of community that being in a mining town had provided, with one noting that:

> *"Everyone's dad or mum worked [at Mt Arthur]" (INT8)*

Although coal mining is a major industry in Muswellbrook and contributes to the towns' identity, stakeholders also talked about other industries and their contribution to the community and local economy, with the equine industry being the most commonly mentioned. One respondent described Muswellbrook as a "hybrid town" (INT25). The two industries had at times had a conflictual relationship and that had led to division in the community. Some stakeholders noted the difficulty during another mine proposal some years ago – which had been opposed by the equine industry – and how that had led to fights between community members.

Stakeholders acknowledge both the positives and negatives associated with Mt Arthur Coal. For most stakeholders the experience is mostly positive.

Most of the stakeholders who contributed to the SIA noted the positives associated with coal mining, including providing well paid jobs, ability to continue to live and work in their community, and the positive contribution mining companies made to community groups in town. Stakeholders also noted how MAC had enabled local entrepreneurs to start or expand businesses, and develop new business models. This included both contractors in the mining sector, as well as many other service sectors such as real estate, hospitality, land management and others.

> *"A lot of businesses have started and been built off Mt Arthur." (INT3)*
>
> *"[The contract with BHP has] assisted our business to build a model to service the mining sector." (INT6)*

Stakeholders who had experienced direct environmental impacts from MAC spoke about these, and how it had affected their lives. These effects had several dimensions. Stakeholders talked about direct impacts from noise, dust and blasting from the mines, including interrupted sleep, minor cracks in their homes (from blasting/vibration effects) and also how the process of dealing with BHP (and other mining companies) in relation to these sometimes had been challenging. Several stakeholders with this history also pointed out that the relationship with BHP had improved in recent years, and many were complimentary about the current community and environment staff who they felt were respectful and constructive.

Some nearby landholders could both see and hear two or more mining operations. As an example, one stakeholder pointed to nearby spoil dumps at MAC and Bengalla Mine and another described how they experienced noise from MAC and Mangoola. This particular stakeholder also had an open view of MAC from their residence, but expressed no concern about the visual impact, highlighting the individual, unique nature of the experience. Particularly long term residents expressed sadness about the changes brought about by MAC and other mines, including how the fabric of society and settlement pattern had changed, as one nearby landholder expressed it:

> *"I used to have paradise here, but I don't have it anymore." (INT7)*

The importance of rehabilitation of the disturbed land was frequently mentioned by stakeholders, although there were different perspectives on the success of existing rehabilitation. One stakeholder commented that he did not see much evidence of rehabilitation (INT36), another commented about the quality of the rehab at MAC noting that it was "off the charts, it's so cool" (INT18), and several others expressed the importance of continued engagement around rehab planning and ensuring it was culturally appropriate.

The cumulative impact of coal mining in the Hunter Valley

The broader social and environmental impacts of the mining industry were also discussed by some stakeholders. This included increased salinity in the Hunter River, although some stakeholders noted that that was not solely attributable to the mining industry and also that it had recently been improving, cumulative air quality issues, and the overall disturbance of the landscape.

One stakeholder talked about the "hollowing out" of rural areas in the Hunter Valley as mines had acquired nearby properties (INT28). The demise of the dairy industry was also raised although stakeholders generally attributed this to broader economic change in the early 2000's and not primarily due to the mining industry. The environmental group described multiple environmental changes, but for them, climate change was the most important issue, noting that:

> *"We're in despair" (INT28)*

Aboriginal stakeholders also commented that the landscape in the Hunter Valley had been disturbed and felt a degree of sadness or anger in relation to this. This was not only related to the presence of cultural heritage artifacts or human remains at some existing or proposed mines, but also to the disturbance of country in itself. A representative of the equine industry pointed out that they were not against mining, but felt that the expansion of mining had impacted their industry, and commented that they wanted to:

> *"preserve what we have, and give us a bit of buffer to grow." (INT37)*

However, most stakeholders who had a direct and personal negative experience of mining could also see positive aspects associated with the industry. The resident who commented about no longer having "paradise" also talked about family members who had worked in the mining industry, and specifically about Mt Arthur Coal that:

> *"I honestly think we can't complain." (INT7)*

Another stakeholder who described a challenging relationship with BHP also commented on the benefits of the mining industry, including for themselves:

> *"It [coal mining] has been good for Australia, it has been good for New South Wales, it has been good for Muswellbrook and it has been good for me." (INT9)*

Availability and affordability of housing is a key issue in the community

Several stakeholders talked about the various social challenges associated with living in a regional community that was also a mining town. These included large numbers of transient workers, income differentials between mining employees and workers in other industries, and lack of services. One respondent described the provision of services for vulnerable people in the Upper Hunter as woeful (INT2). Other social challenges mentioned included there being many vulnerable families in town, and drug use.

The main challenge nearly all stakeholders talked about however was the availability and affordability of housing, particularly rental housing. One respondent gave the example of one of their employees who had recently separated from a partner and was unable to find new housing on the open rental market, and had to rely on personal contacts to find somewhere to live (INT22). Other respondents talked about the increased incidences of couch surfing (i.e. seeking temporary, informal accommodation with friends or family) (INT2).

> *"There's no housing here." (INT22)*

No one attributed this lack of housing solely to the mining industry, but noted that this was a challenge across many rural communities and had been exacerbated by in-migration during the pandemic. In Muswellbrook, many stakeholders felt this was nevertheless made worse by the mining industry.

4.2.2 Certainty and ability to plan for the future is the main reaction to the Modification

Most stakeholders view the Modification as a positive

Nearly all stakeholders interviewed for this SIA saw the Modification as something overwhelmingly positive. Some were cautiously positive but wanted to know more, or took a relatively agnostic view of the Modification. One stakeholder group expressed their opposition. This support – or at least lack of major concern – was also evident among stakeholders who had had difficult relationships with BHP, had experienced negative impacts from MAC, or were generally opposed to mining in the Hunter Valley. Most also struggled to identify and describe any specific change associated with the Modification, either explicitly or implicitly noting it largely represented a continuation of current experiences.

> *"I support it 110%. It will keep people in jobs for longer." (INT1)*
>
> *"It [the Modification] doesn't worry us." (INT7)*

Representatives of one environment group acknowledged that it was a positive that BHP had announced closure of MAC, but felt that the impacts of climate change outweighed any benefits of a four year extension.

> *"Just get out by 2026! Why do you need four more years?" (INT28)*

The Modification provides time to prepare for closure

Nearly all stakeholders who expressed support for the Modification related this to the additional time it would provide for the community to prepare for a life after mining at MAC. Some noted the community had gone through years of drought followed by floods, and they felt the community needed stability and time to plan.

> *"Another four years of stability." (INT15)*
>
> *"[The Modification is] giving everyone the time they need to adapt." (INT3)*
>
> *"What a bonus having eight years' notice!" (INT17)*

Stakeholders related this additional time to prepare to the various situations they were in, including allowing the business community time to diversify, giving the workforce time to upskill and find other employment, and providing time for collaborative planning for post mining land use or service provision in the community.

Anticipated impacts are largely continuations of current experiences

Most stakeholders did not talk about any anticipated negative impacts associated with the Modification, and many found it difficult to describe any specific change arising from it. The stakeholders who expressed concern about negative impacts largely related these to the four-year continuation of existing environmental impacts, including air quality, water quality or noise or vibration.

Some stakeholders noted in the case of ongoing operations until 2030 as proposed by the Modification, that the proposed reduction in approved spoil dump heights was a positive from a visual amenity perspective. Likewise, the proposed Modification New Disturbance Area was modest from most stakeholders' perspective and of minor concern. Aboriginal stakeholders noted they would like to have more certainty about any cultural heritage items in this area, including the process that would be followed should any artifacts or human remains be found.

The Modification is interpreted in light of the eventual closure of MAC. The Modification in itself is not viewed as particularly significant

The fact that most stakeholders talked about the Modification as an opportunity to plan for closure suggest that impacts are interpreted in light of the announced eventual closure of MAC. As such, other than providing the time to plan for the future, most impacts that could be directly attributed to the Modification were not seen as particularly significant by most stakeholders. As one stakeholder commented:

> *"[The Modification] is a fly speck on the back of the elephant." (INT21)*

4.2.3 The impacts of closure

All stakeholders acknowledge closure will affect the Muswellbrook community, but struggle to articulate how

All stakeholders spoken with were aware of the announcement BHP had made to retain MAC in its portfolio and transition the site towards closure. This announcement had generated discussion within the community, but people commented it was no longer top of mind. For example, one business owner noted that "within a fortnight it [i.e. the closure announcement] was really old news" (INT6), and a Mt Arthur Coal employee commented that "it's not a crib room topic" (INT8).

By contrast to the impacts of the Modification, most stakeholders thought the eventual closure of MAC would impact the community significantly, with, as an example, one long term resident suggesting that the impact on town could not be understated (INT25). Many, however, struggled to articulate *how*, noting the uncertainty associated with something that may occur eight years in the future.

> *"What do we do next?" (INT22)*
>
> *"It's really tough to know exactly what will happen." (INT24)*
>
> *"I'm not sure what will happen with the town" (INT18)*

Closure is a cumulative challenge with many uncertainties

Many stakeholders positioned the closure as a cumulative challenge, and noted that the Liddell and Bayswater Power Stations were mooted to close shortly or about the same time as MAC. By contrast, stakeholders also noted that other mines near Muswellbrook were planning to expand, and mentioned the Mount Pleasant expansion project which had recently been approved, as well as talks about restarting mining at the Dartbrook mine. In this context, respondents also mentioned how another mining proposal in the region had recently been refused with reference to cultural heritage impacts. How the closure played out would affect both the impact on the community, as well as the opportunities available to the MAC workforce to find employment at other mine sites.

Impacts to the workforce are front and centre

The impact on the workforce and their families was a key concern for many stakeholders. Some respondents described this at a personal level, including the shock and fear they had felt when the closure announcement had been made. This also included respondents from other industries or organisations but who were related to or in a relationship with someone working at MAC. A MAC worker and union representative mentioned his reaction when he heard the announcement, that:

> *"there goes my long term plan" (INT8)*

Whilst the workforce expressed their concern regarding closure of the Mt Arthur Coal Mine, the Modification allows extended timing for closure (in 2030 rather than 2026), and most stakeholders understood the benefits of this.

Respondents expressed many different dimensions to this concern, including wondering what the opportunities to find other employment post closure would be; the large number of the workforce with relatively low skills but high salaries, and the potential difficulty in finding work with comparable wages; the importance of providing re-skilling or up-skilling opportunities; potential impacts to long term workers identity and mental health; the challenge for BHP in retaining the workforce leading up to closure, including maintaining morale, and expressing an expectation that BHP would treat the workforce fairly and equitably.

> *"what worries me are the men who don't have any other skills" (INT22)*
>
> *"there would be quite a few people who have lived their whole working life out there [at Mt Arthur]" (INT15)*
>
> *"look after the people who are loyal and stick around to turn the lights off!" (INT25)*

Several stakeholders talked about how the circumstances of the individual workers would dictate how they fared in this process. As examples, respondents commented that some long term employees who would be nearing retirement in 2030 may be looking forward to a redundancy payout and then retire early. On the contrary, some thought younger workers who may not have a large redundancy payout to look forward to would start looking for other employment early.

Whilst the concerns dominated, some respondents thought there were opportunities available for the workforce as well. Representatives from the wine, tourism and equine industries in the Hunter Valley talked about opportunities for workers to redeploy into their sectors, and several stakeholders mentioned opportunities for future employment in other industries, such as renewable energy. One business owner, who had previously worked in the mining industry and been made redundant, now saw that event as a positive. He thought some mine workers may need to:

> *"pop your bubble and put your feet out" (INT18)*

Anticipated impacts to the Muswellbrook community

When asked about how they thought the closure of MAC would impact the town, most respondents talked about housing, and a potential reduction in housing values. This was discussed at a personal level – people talking how they would be personally impacted as home owners – but also on a community level – where some respondents noted that during the previous downturn this had led to an in-migration of people from lower socio-economic groups, and there were insufficient services available in town to address their needs.

Another impact that was discussed was how the closure would affect community organisations. This had two aspects; on the one hand, the future loss of social investment was discussed by the organisations who currently receive funding from BHP, and on the other hand, some speculated that there would be a large number of people who left town which would reduce the number of volunteers and participants in community and sporting groups.

One long term resident commented that if half the town left, then half the people on committees would disappear, the committees would cease to function, or that:

> *"every second sporting club has to close" (INT25)*

The impacts on businesses in the community were also discussed by some respondents. All business representatives expressed some level of trepidation about their future, although the extent varied. This included both direct suppliers to MAC as well as retail and hospitality businesses. The main unknown for many businesses was how many of the workforce would remain in town – one business owner wondered whether Muswellbrook would become a ghost town (INT12) – and what the opportunities to work with BHP during the rehabilitation phase would be. For example, it was noted that the town may not be able to sustain the three pharmacies it currently had after the Mt Arthur Coal closure if many workers and their families chose to leave town:

> *"someone will probably suffer" (INT12)*

What BHP can do to manage the change

When respondents were asked what they would like to see BHP do to manage the change, very few suggested mitigation measures relating to impacts of the Modification itself. The suggestions provided were almost solely focussed on managing the transition to closure, and were dominated by a small number of themes:

- Stakeholders want BHP to **share information transparently**. Nearly all stakeholders mentioned the importance of transparent information sharing throughout the transition to closure. Several respondents complimented BHP on how they had shared information to date, and hoped this would continue. A specific question from stakeholders related to providing baseline information about where Mt Arthur Coal workers resided, how many businesses in the region supplied to Mt Arthur Coal, and how many community groups received funding from Mt Arthur Coal.
- Provide **upskilling and training** and **treat the workforce fairly**. Many stakeholders commented on the need to offer upskilling or reskilling opportunities for the workforce. This related to both the prevalence of low skilled workers in the mining industry, as well as the fact that – as some stakeholders commented – some employees' qualifications and role titles did not properly reflect the magnitude of their skills and responsibilities at Mt Arthur Coal. Ensuring that the redundancy process was fair and equitable was a particular concern for the workforce.
- **Involve stakeholders in planning for future land use and rehab**. Several stakeholders talked about planning for future economic use of the site – where feasible – and ensuring planning for this was undertaken in a collaborative way. A representative of emergency services commented that the proposed land use must be appropriate, and not increase the risk of adverse events (e.g. underground coal fires). Likewise, several stakeholders talked about ensuring the rehabilitation was planned and undertaken in a sensitive way and that stakeholders, including First Nations stakeholders, were included in the process. Representatives from a RAP commented on the importance of ensuring the Mount Arthur conservation area was protected after mining ceased. A related question which was not featured among as many stakeholders was the future use of the properties BHP owned surrounding MAC, and the process for relinquishing these.

Stakeholders also talked about the transition to closure for the Muswellbrook and broader Upper Hunter communities, including the importance of planning for economic diversification and service provision. Beyond providing information and advocating for the region, stakeholders generally did not think BHP should take a leading role in this, as one representative of a community organisation commented:

> *"we need services, we need housing, and that is not what you [BHP] do." (INT11)*

5. SOCIAL BASELINE

This section set outs a social baseline for the Modification, providing contextual information about the communities in the primary and secondary social localities of the Muswellbrook LGA and the Hunter Valley SA4. The social baseline describes existing and historical features and trends in the community, and has been developed to contain data that provides a description of the community, and, where relevant, potential indicators which can be applied to measure potential change as a result of the Modification.

Data has been sourced from official, publicly available sources and is supplemented by findings from the consultation process. The geographic delineations used in this social baseline are generally the primary and secondary social localities: Muswellbrook LGA and Hunter Valley SA4, with data for NSW provided as a comparison. A small number of indicators were not available for these geographies, and in this instance the closest approximation was selected.

5.1 General Location and Brief History

MAC is located near Muswellbrook in the Upper Hunter Valley, an established coal mining region with several operating mines. The Hunter Valley is the traditional home of people of the Wonnarua/Wanaruah language groups who inhabited the area for millennia prior to European settlement.

Coal mining has been an important feature of the Hunter Valley since the time of early European settlement. Coal was found in the estuaries of the Hunter River when it was first discovered by Europeans in 1797, and settlements were formed within the region to extract coal and timber resources (King & Woolmington, 1960). According to Evans (2008), prior to European settlement, Aboriginal communities used coal for cooking, as an insect repellent and for making tar to waterproof canoes.

Coal extraction was initially centred around Newcastle, and the European expansion inland along the valley was mostly driven by agricultural expansion (Blyton, 2012; King & Woolmington, 1960). Throughout the late 19th century and early 20th century, mining expanded further into the valley, with mining operations opening in Greta, Maitland and further inland near Singleton and Muswellbrook (Mcmanus & Connor, 2013; Wilson, 1968). Mining methods were often underground mining until the 1960's, when open cut mining became an increasingly common feature of the Hunter Valley (Day, 1988; Mcmanus & Connor, 2013).

Coal from the region has been used for local power generation and for the export market via the Port of Newcastle. In 2019, there was a total of 41 operating coal mines in the Hunter Valley, owned by eleven different companies (McArtney, 2019).

The Hunter Valley SA4 is the statistical geography that best approximates the Hunter Valley. It excludes Newcastle and encompasses the LGA's of Upper Hunter, Muswellbrook, Singleton, Cessnock, Maitland, Dungog and Port Stephens and covers an area of 21,492 square kilometres (km^2).

The Muswellbrook LGA covers 3,402 km^2 in the Upper Hunter, and approximately 40% comprising national parks, including the world heritage Wollemi National Park in the south-western part of the shire. The main

towns in the shire are Muswellbrook and Denman (Muswellbrook Shire Council, 2022). The Muswellbrook Shire is surrounded by Singleton Shire to the south and west, the Upper Hunter Shire to the north, and the Mid-Western Regional Council to the west.

The Muswellbrook Shire is traversed by the New England Highway which connects Newcastle and the Hunter Valley with Tamworth, the New England area of NSW and the Darling Downs in Queensland, and the Golden Highway which extends in an easterly – westerly direction between the Hunter Valley and Dubbo.

MSC has recently developed a community strategic plan for the period 2022 to 2032 (Muswellbrook Shire Council, n.d.). The plan acknowledges that coal mining has been an important feature of the community for the last 50 years at least and that previous community plans have largely centred around managing impacts and opportunities associated with this industry. The current plan is by contrast centred around the uncertain future of the thermal coal industry, and the concept of energy transition which currently, according to the Mayor's foreword, "moves from theory to reality" (Muswellbrook Shire Council, n.d., p. 4).

The community strategic plan was developed with substantial input from the community and sets out a vision and ten year goal across six themes: economic prosperity, social equity, environmental sustainability, cultural vitality, community infrastructure and community leadership (Muswellbrook Shire Council, n.d.).[6]

5.2 Demographic Profile

5.2.1 Population

At the time of the 2021 Census, the Muswellbrook LGA had a population of 16,357 persons. The Muswellbrook population is younger compared to both the Hunter Valley and NSW, with a median age of 37 compared to 40 and 39 respectively. It is also a predominantly male population with a sex ratio of 106 men to 100 women. Table 4 shows key demographic indicators, and Figure 6 and Figure 7 show the population pyramids for the three areas.

Since 2001, when the estimated resident population (ERP) was 15,099, population increased relatively rapidly through to about 2011, and continued to increase albeit at a slower rate through to 2019.

TABLE 4 KEY DEMOGRAPHIC INDICATORS

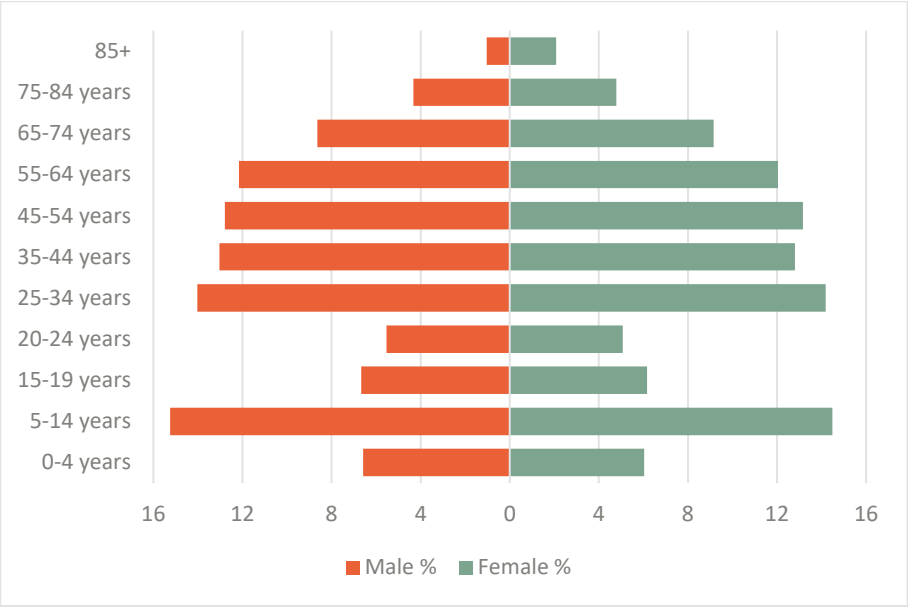
Geography	Population	Median Age	Sex Ratio
Muswellbrook	16,357	37	105.5
Hunter Valley SA4	291,946	40	98.9
NSW	8,072,163	39	97.5

Source: ABS Census 2021 (Australian Bureau of Statistics, 2022g).
Note the sex ratio denotes the number of males per 100 females.

[6] Note that this social baseline does not describe built or natural features, as these are provided in section 3.2.3.

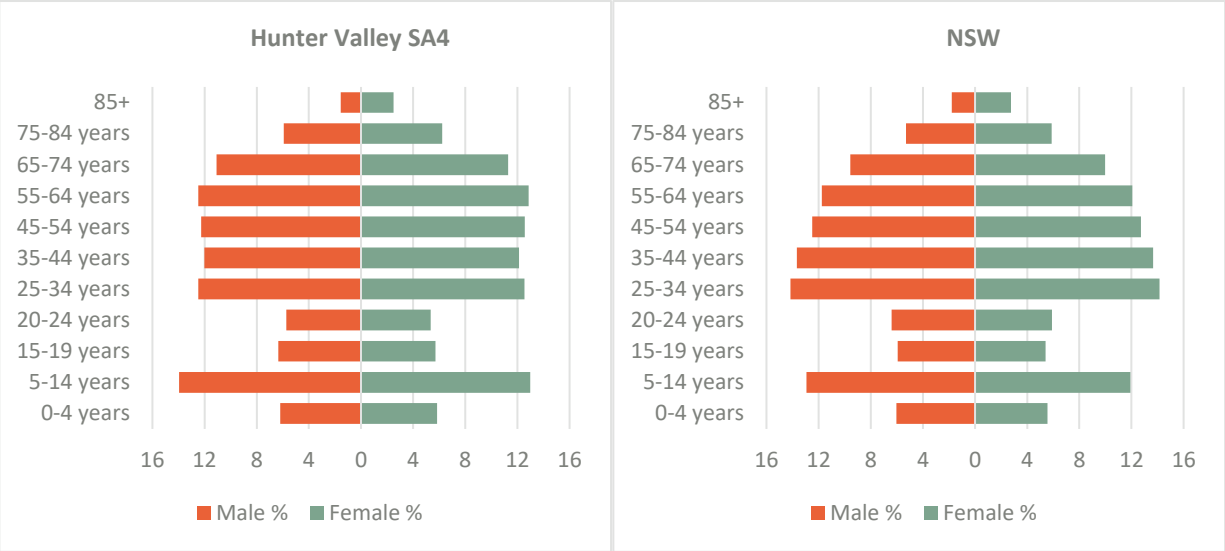
The population has since declined marginally, and the ERP was 16,463 by the 30 of June 2021. Figure 8 shows the ERP change in Muswellbrook from 2001 to 2021.[7]

FIGURE 6 MUSWELLBROOK LGA POPULATION PYRAMID



Source: ABS Census 2021 (Australian Bureau of Statistics, 2022e)

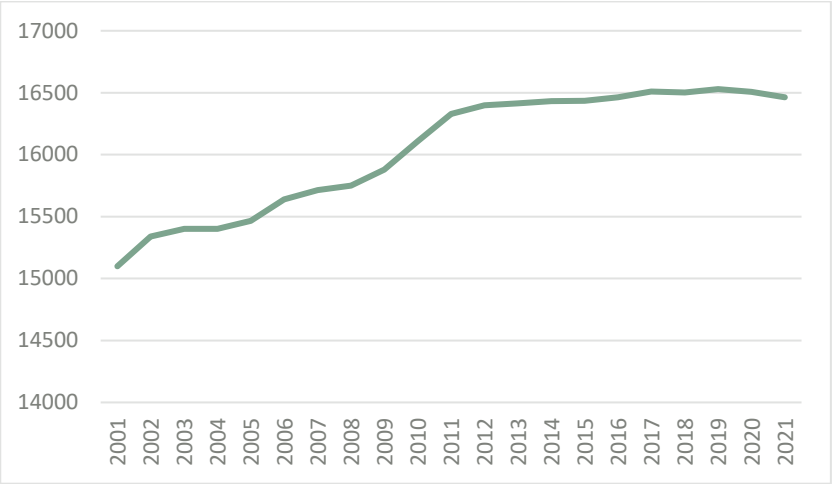
FIGURE 7 POPULATION PYRAMIDS: HUNTER VALLEY SA4 AND NSW



Source: ABS Census 2021 (Australian Bureau of Statistics, 2022e)

[7] There are differences between the ERP and enumerated population from the Census. Table 4 reports Census data, whereas Figure 8 reports ERP.

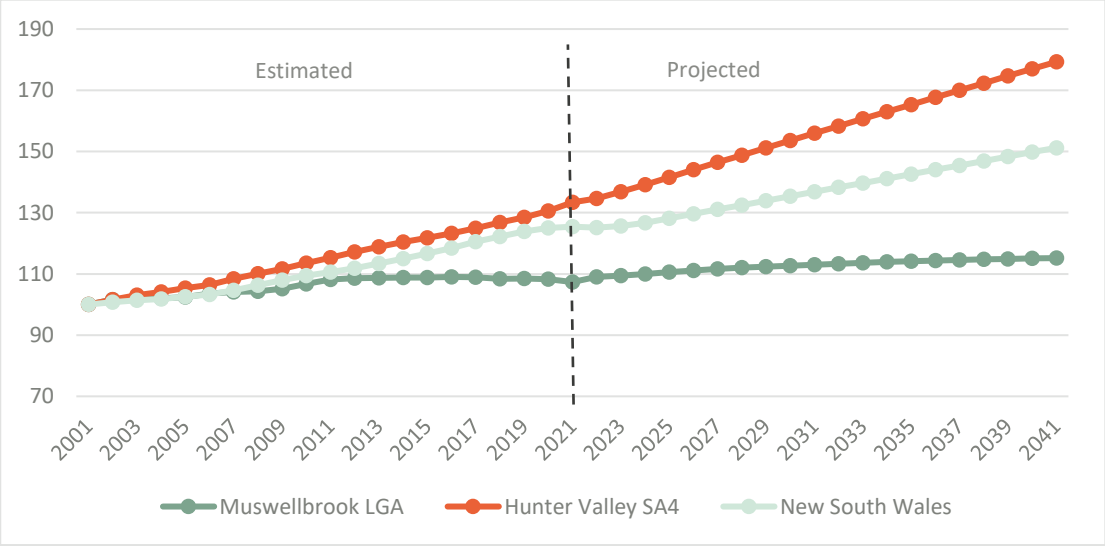
FIGURE 8 MUSWELLBROOK LGA ESTIMATED RESIDENT POPULATION 2001-2021



Source: ABS Regional Population 2020/21 (Australian Bureau of Statistics, 2022j)

Figure 9 compares the population evolution and projections for Muswellbrook, Hunter Valley and NSW from 2001 to 2041. By comparison, the Muswellbrook population grew at pace similar to the NSW population until 2007, and has since grown at a slower rate than both NSW and the Hunter Valley. The population of Muswellbrook is projected to grow to 17,387 in 2041, a projected annual population change of 0.36%. This is to be compared with a 1.72% annual population growth for the Hunter Valley SA4, and 1.03% for NSW (NSW Department of Planning and Environment, 2022).

FIGURE 9 INDEXED POPULATION WITH PROJECTED GROWTH (2001=100)



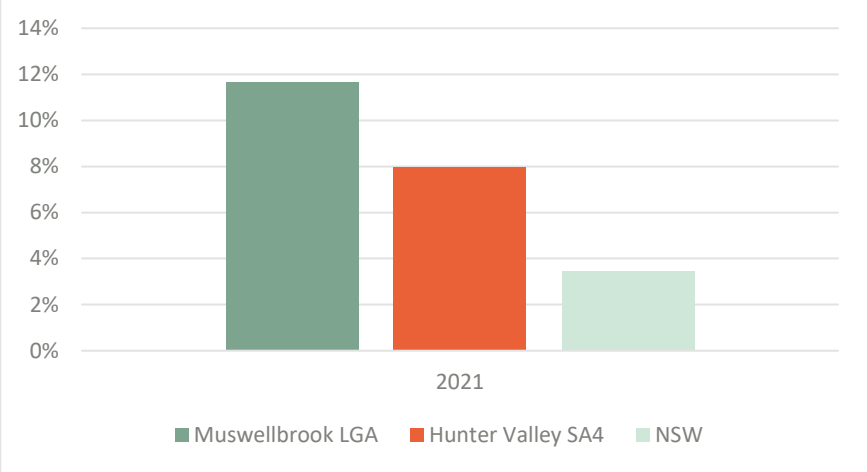
Source: Based on ABS regional population and NSW DPE population projections (Australian Bureau of Statistics, 2022j) (NSW Department of Planning and Environment, 2022)

Note: Projection is based on common planning assumptions (CPA). The population numbers have been indexed so that the population in 2001 equals 100 for all three areas. This enables comparing the population evolution for each area over time, relative to the others.

5.2.2 Aboriginal and Torres Strait Islander People

At the time of the 2021 Census there were 1,908 persons in the Muswellbrook LGA who were either Aboriginal, Torres Strait Islander or both, representing 12% of the total Muswellbrook population. This is higher than both the Hunter Valley (8%) and NSW (3%) (see Figure 10 below). A majority of the Muswellbrook LGA is located within the Wanaruah Local Aboriginal Land Council, with the southernmost portion of the LGA located within the Bathurst Local Aboriginal Land Council.

FIGURE 10 ABORIGINAL AND TORRES STRAIT ISLANDER PROPORTION OF POPULATION



Source: ABS Census 2021 (Australian Bureau of Statistics, 2022e)

5.2.3 Cultural Diversity

With regards to cultural diversity, Muswellbrook is most comparable to the Hunter Valley SA4. Both of these areas are more homogenous than NSW, with 85% and 86% of the population born in Australia compared to 65% for NSW. Likewise, 88% and 90% of the population in Muswellbrook and Hunter Valley use English only at home, compared to 68% for NSW, and the rate of Australian citizenship is similarly higher in Muswellbrook and Hunter Valley (see Table 5 below).

TABLE 5 COMPARISON OF SELECTED DIVERSITY MEASURES

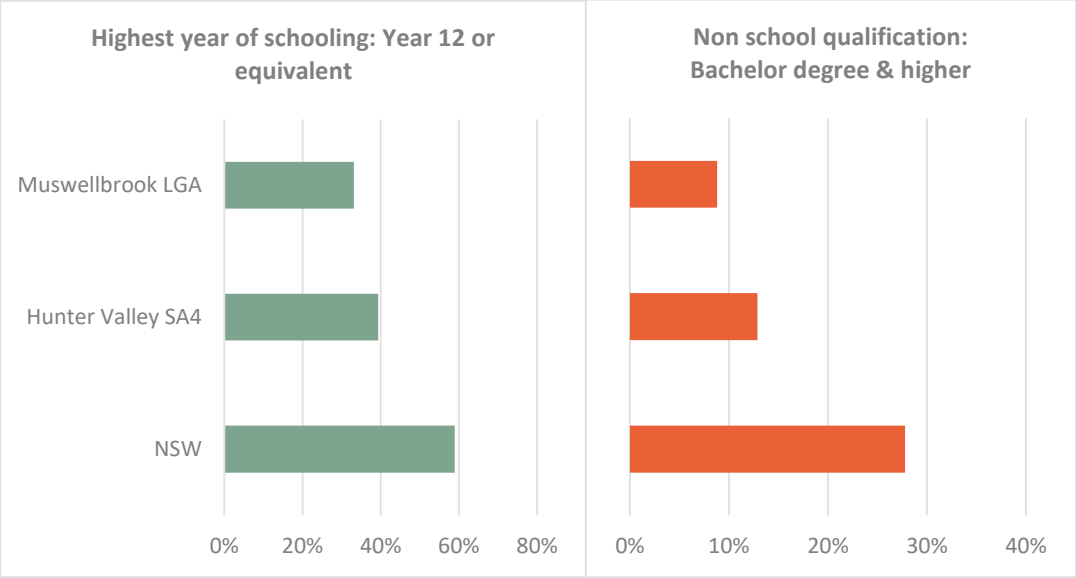
Geography	Born in Australia	English only used at home	Australian citizen
Muswellbrook	85%	88%	89%
Hunter Valley SA4	86%	90%	91%
NSW	65%	68%	84%

Source: ABS Census 2021 (Australian Bureau of Statistics, 2022e)

5.3 Education

School education levels in Muswellbrook are lower than the Hunter Valley and NSW. In Muswellbrook, 33% of the population had finished year 12, compared to 39% across the Hunter Valley and 59% for NSW. This is consistent with the feedback received during consultation, where some respondents talked about the prevalence of workers in the shire who had started working before finishing high school. Likewise, the proportion of population with a university degree (Bachelor degree or higher) is similarly lower in Muswellbrook (9%) than in the Hunter Valley SA4 (13%) and NSW (28%) (see Figure 11 below).

FIGURE 11 EDUCATION LEVELS

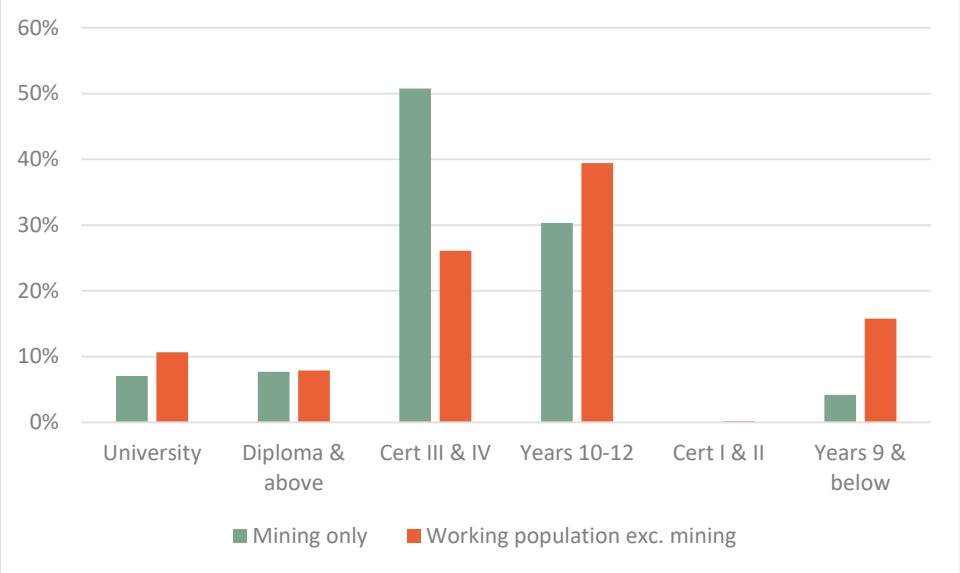


Source: ABS Census 2021 (Australian Bureau of Statistics, 2022a, 2022e)
Note: Highest year of schooling year 12 or equivalent is expressed as a percentage of people 15 years or older who are no longer attending primary or secondary school, and the non-school qualification – Bachelor degree or higher represents the percentage of people 15 years or older with a qualification.

During consultation, several stakeholders talked about the prevalence of low skilled workers in the mining industry in Muswellbrook. To examine this further, Figure 12 shows the highest educational attainment for all employees in Muswellbrook disaggregated by those who work in mining, and those in all other industries. Although the proportion of employees in other industries with a university degree is slightly higher than mining (11% compared to 7%), education levels are generally higher in the mining industry, compared to the general working population in Muswellbrook. This is particularly driven by a higher proportion of mining employees with a Certificate III or IV, which is 51% in the mining industry compared to 26% in other industries.[8]

[8] Note that the percentages here exclude the 'not applicable' category which is comparatively larger for the general population and zero for the mining population.

FIGURE 12 HIGHEST EDUCATIONAL ATTAINMENT: MINING AND OTHER INDUSTRIES

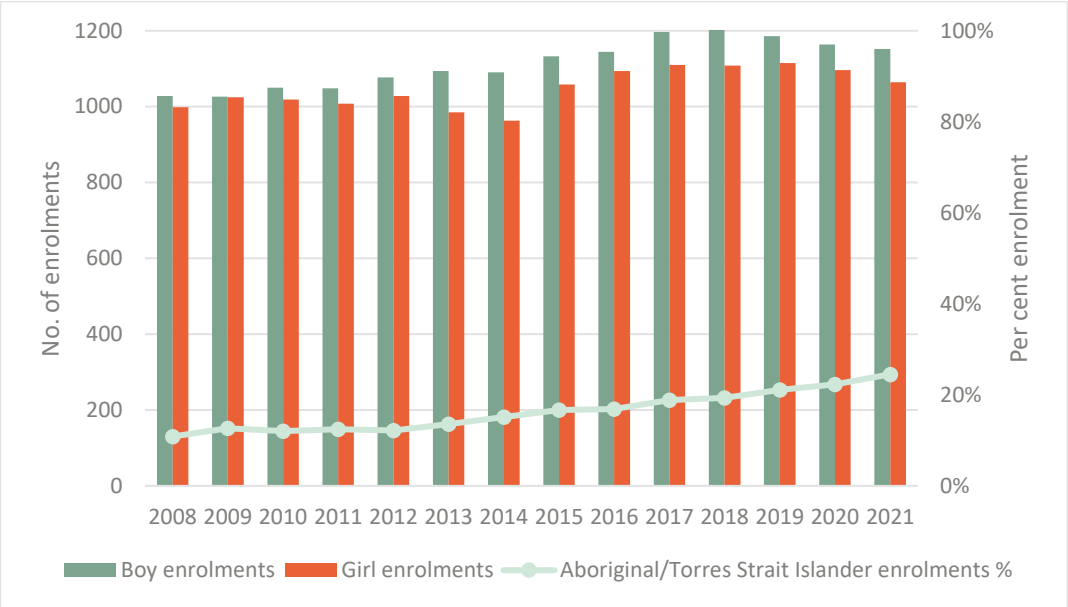


Source: ABS Census 2021 (Australian Bureau of Statistics, 2022a)
Note: Proportions are calculated excluding the categories inadequately described, no attainment, not stated, not applicable and overseas visitor.

In terms of current schooling, there were a total of 2,216 students enrolled in schools in the 2333 postcode in 2021.[9] School enrolments have been trending down since 2018 when they peaked at 2,317. There are slightly more boys than girls enrolled, and 25% of students identified as Aboriginal or Torres Strait Islander in 2021 (see Figure 13).

[9] Postcode 2333 is the postcode that most closely approximates the Muswellbrook LGA. It includes a large part of the LGA. It does not include the towns of Denman and Jerrys Plain and surrounding areas.

FIGURE 13 SCHOOL ENROLMENTS IN POSTCODE 2333



Source: ACARA (Australian Curriculum, Assessment and Reporting Authority, 2022)

5.4 Economic Indicators

5.4.1 Income and disadvantage

Median incomes in Muswellbrook were higher than in the Hunter Valley SA4, but lower than NSW at the time of the 2021 Census. For example, the median personal income per week was reported at $769 per week for Muswellbrook LGA, $733 per week in the Hunter Valley SA4 and $813 per week in NSW. Table 6 shows median personal, family and household incomes, and Figure 14 shows the distribution of personal income per week for Muswellbrook, Hunter Valley and NSW.

TABLE 6 MEDIAN INCOMES

Geographies	Median total personal income ($/week)	Median total family income ($/week)	Median total household income ($/week)
Muswellbrook LGA	$ 769	$ 2,019	$ 1,628
Hunter Valley SA4	$ 733	$ 1,925	$ 1,557
NSW	$ 813	$ 2,185	$ 1,829

Source: ABS Census 2021 (Australian Bureau of Statistics, 2022e)

Note: Total personal, family and household incomes include all the income the entity usually receives before tax, superannuation etc. are deducted.

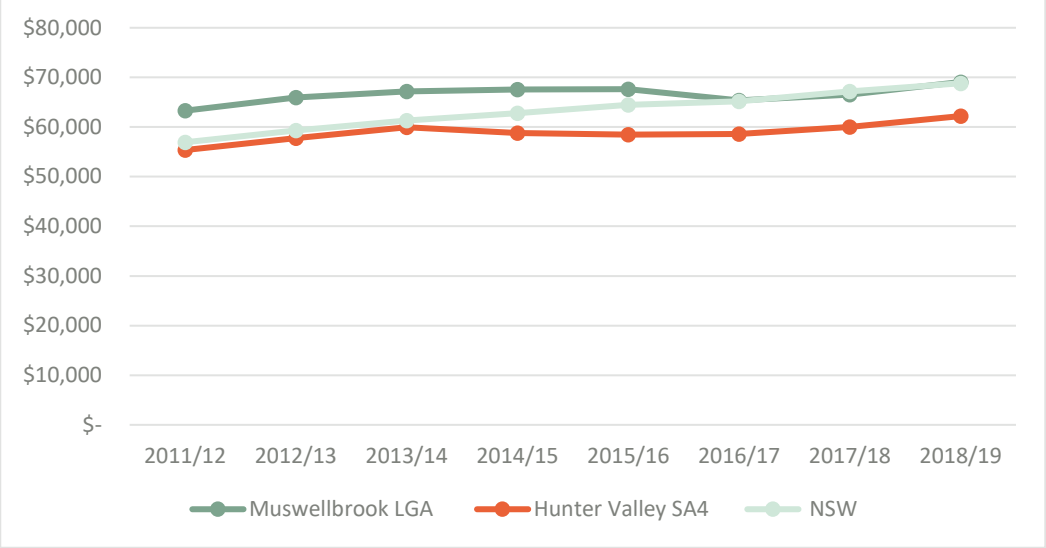
FIGURE 14 PERSONAL INCOME DISTRIBUTION (WEEKLY)

Source: Based on ABS Census 2021 (Australian Bureau of Statistics, 2022e).
Note: the $0-$500 category includes negative and nil incomes.

Figure 15 shows the mean incomes between the financial years 2011/12 and 2018/19 for Muswellbrook LGA, Hunter Valley SA4 and NSW[10]. Mean incomes in Muswellbrook and the Hunter Valley have followed a similar pattern during these years; increasing in the early years, reducing or remaining stable from 2013/14 and beginning to increase again from 2016/17. This reduction in mean incomes from around 2013/14 is likely associated with the downturn in the coal mining industry during this time, which several respondents talked about during the stakeholder consultation.

[10] Data in this diagram is calculated from Australian Taxation Office data and is different to the table above which is based on self-reported data through the Census.

FIGURE 15 MEAN TOTAL INCOME



Source: Based on ABS (Australian Bureau of Statistics, 2019, 2021a)

Table 7 below shows the median and mean personal income from latest available personal income in Australia data, as well as the Gini coefficient. The Gini coefficient provides a measure of income inequality, where values closer zero indicate higher equality and values closer to one indicate higher inequality (Australian Bureau of Statistics, 2021b). The Gini coefficient for Muswellbrook is lower than both Hunter Valley and NSW, suggesting incomes in this area are more equally distributed.

TABLE 7 PERSONAL INCOME AND GINI COEFFICIENT 2019/20

Geography	Median	Mean	Gini coefficient
Muswellbrook	$56,356	$70,521	0.458
Hunter Valley SA4	$51,362	$63,542	0.465
NSW	$52,849	$70,123	0.500

Source: ABS (Australian Bureau of Statistics, 2021a)

The Socio-Economic Indexes for Areas (SEIFA) rank areas in Australia based on their relative socio-economic advantage or disadvantage. The indexes capture various aspects of advantage or disadvantage and are based on a range of census indicators. In general, lower scores and deciles reflect greater disadvantage, or lower advantage.[11] Table 8 shows the four SEIFA indexes for Muswellbrook. A summary of the Muswellbrook LGA SEIFA index is described below and provided in Table 8.

- Index of relative socio-economic disadvantage – 3rd Decile.
- Index of relative socio-economic advantage and disadvantage – 3rd Decile.
- Index of economic resources – 4th Decile.

[11] A decile is one of ten equal parts of a population ranked in order. For example, if something is in the 1st decile, it is among the lowest 10% of that population.

- Index of education and occupation – 1st Decile.

In summary, across all indexes Muswellbrook is among the more disadvantaged/less advantaged LGA's in Australia. It is among the lowest with regards to education and occupation, likely reflecting lower educational attainment and a predominance of lower skilled employment. It ranks higher – in the fourth decile – for economic resources, and this is likely a reflection of the relatively high incomes in the area.

TABLE 8 SEIFA INDEXES

	Index of relative socio-economic disadvantage		Index of relative socio-economic advantage and disadvantage		Index of economic resources		Index of education and occupation	
	Score	Decile	Score	Decile	Score	Decile	Score	Decile
Muswellbrook LGA	930	3	917	3	964	4	883	1

Source: ABS (Australian Bureau of Statistics, 2022i)

5.4.2 Labour Market

Unemployment levels in Muswellbrook were slightly higher than the Hunter Valley and NSW at the time of the 2021 Census. This is the case for overall unemployment, as well as unemployment among men, women and young people (see Table 9).

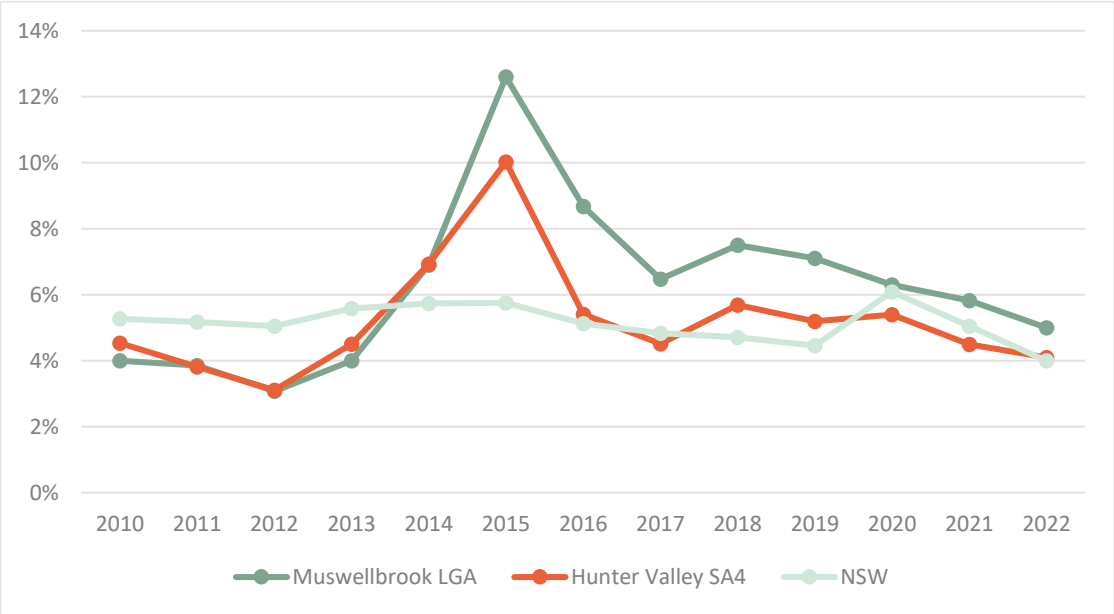
TABLE 9 UNEMPLOYMENT RATES

Geography	Overall	Male	Female	Youth
Muswellbrook	5.1%	5.3%	4.9%	10.1%
Hunter Valley SA4	4.7%	5.0%	4.4%	9.8%
NSW	4.9%	5.3%	4.5%	9.8%

Source: ABS Census 2021 (Australian Bureau of Statistics, 2022e)

Unemployment rates in Muswellbrook and the Hunter Valley have fluctuated over time. During the downturn in the coal mining industry in 2014/15, unemployment rates rose to 13% and 10% respectively, from a low of around 3% in 2012. Unemployment rates have followed a general downward trend since, and in 2022 were 5% in Muswellbrook and 4% in the Hunter Valley, comparable to the overall NSW unemployment rate (see Figure 16).

FIGURE 16 UNEMPLOYMENT RATE

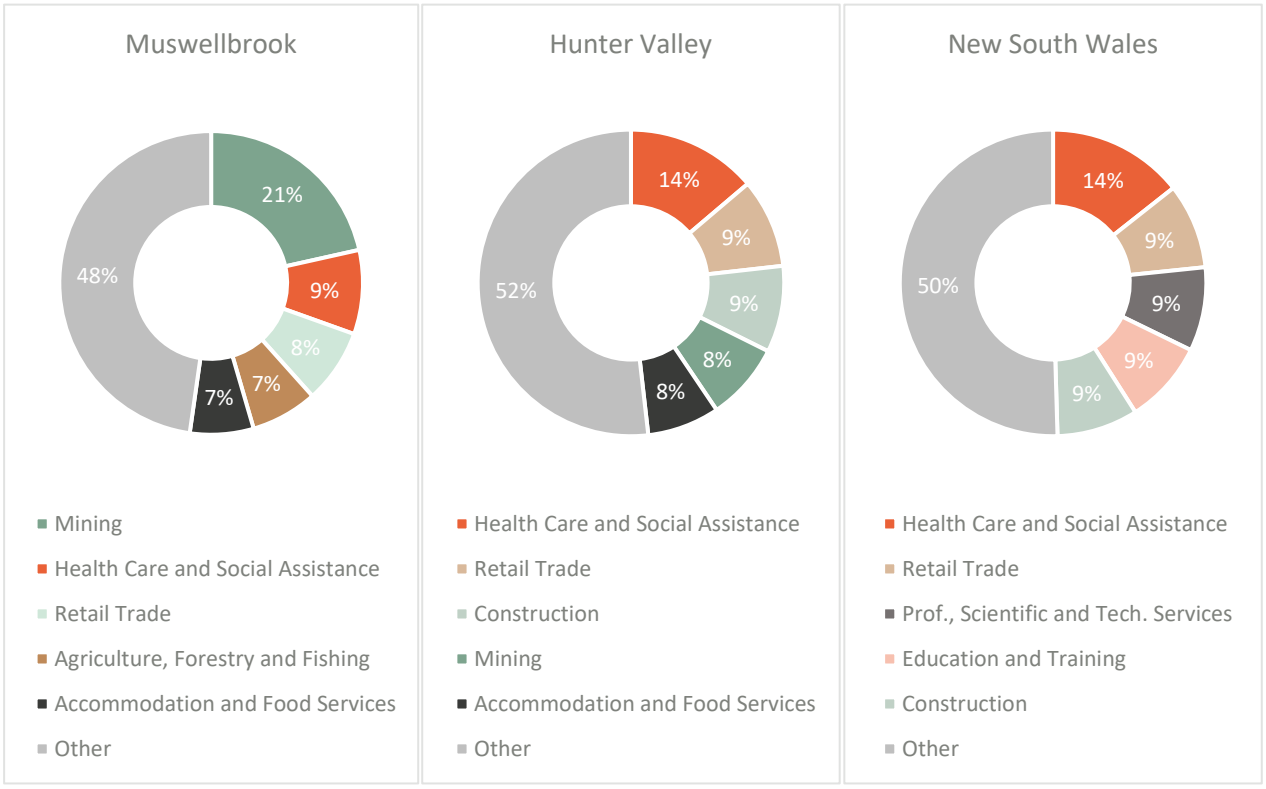


Source: Based on Labour Market Insights (LMI) and National Skills Commission (NSC) (Labour Market Insights, 2022; National Skills Commission, 2022)
Note: LMI for LGA is smoothed quarters. NSC for SA4 and NSW is rate that month. These were averaged to yearly data.

5.4.3 Economic structure and priorities

Mining plays an important part in the Muswellbrook economy. MSC community strategic plan reports that mining accounts for 60% of the economic output of the LGA, followed by the electricity, gas, water and waste service industry (Muswellbrook Shire Council, n.d.). The mining industry is also the largest employer in the Muswellbrook LGA, accounting for more than a fifth of all jobs. Other large industries of employment are health care and social assistance (9%), retail trade (8%), agriculture, forestry and fishing (7%) and accommodation and food services (7%). Mining is also a large employer in the Hunter Valley SA4 comprising 8% of employment (Figure 17).

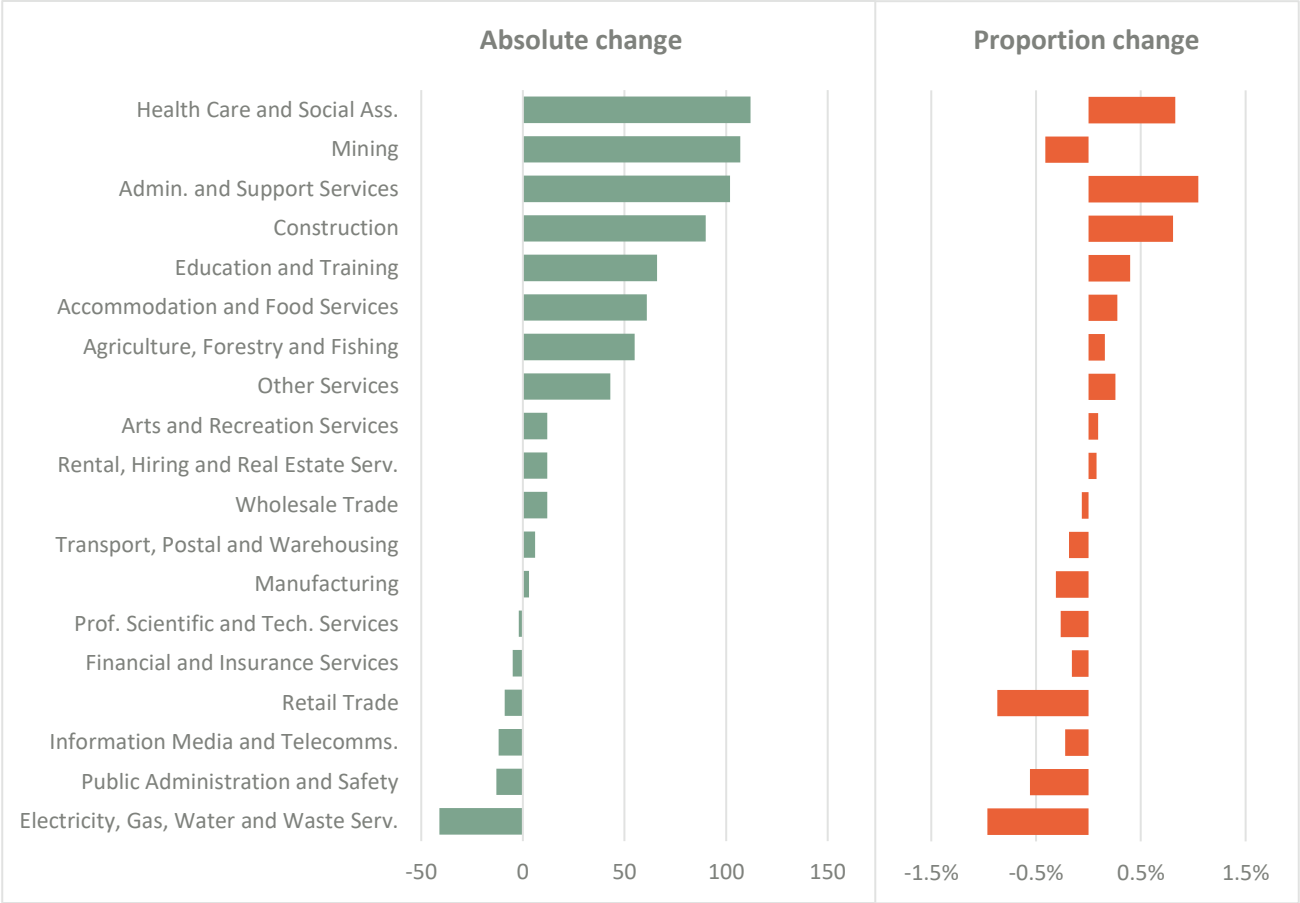
FIGURE 17 TOP FIVE INDUSTRIES OF EMPLOYMENT



Source: ABS Census 2021 (Australian Bureau of Statistics, 2022e)

Figure 18 shows the change in industries of employment for the Muswellbrook LGA between the 2016 and 2021 Census. In absolute numbers; the health care and social assistance, mining, and administrative and support services industries grew the most during this five year period, adding 112, 107 and 102 people, respectively. By contrast, the electricity, gas, water and waste services, public administration and safety, and information, media and telecommunications industries reduced the most, by 41, 13 and 12 people, respectively. In terms of proportional change, the picture is different, particularly for the mining industry which reduced slightly. In 2016, the mining industry accounted for 21.92% of all jobs in Muswellbrook, whereas in 2021 this had marginally reduced to 21.51%, a 0.41 percentage point reduction.

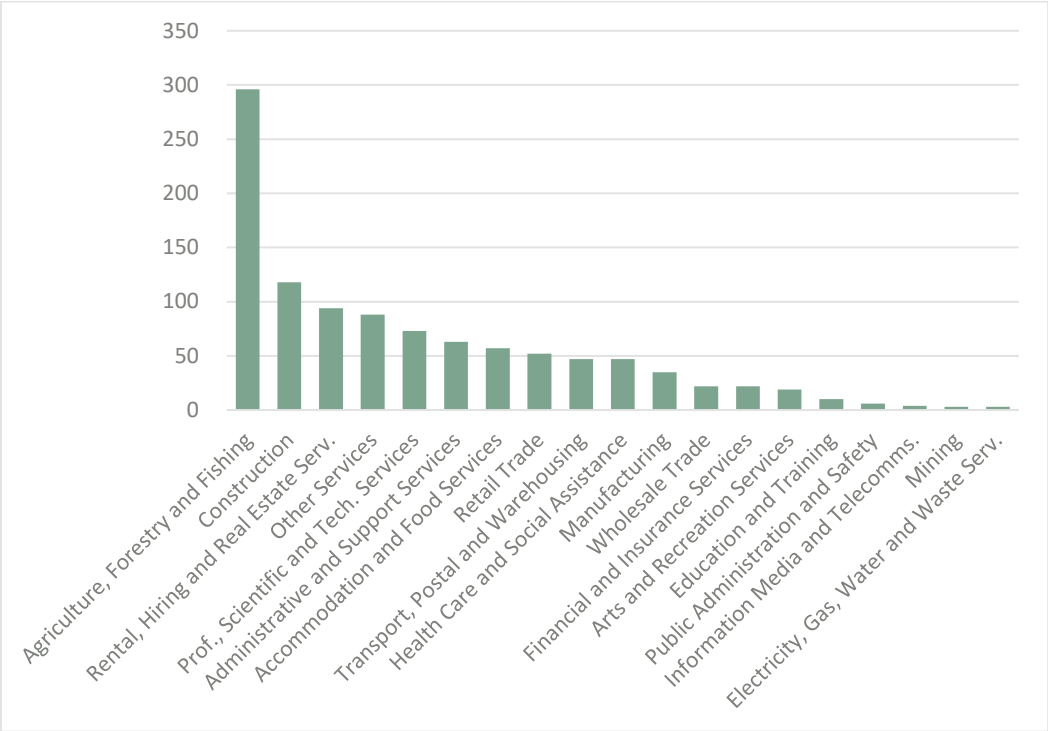
FIGURE 18 MUSWELLBROOK INDUSTRIES OF EMPLOYMENT: CHANGE BETWEEN 2016 AND 2021



Source: ABS Census 2021 Time series profiles (Australian Bureau of Statistics, 2022d)

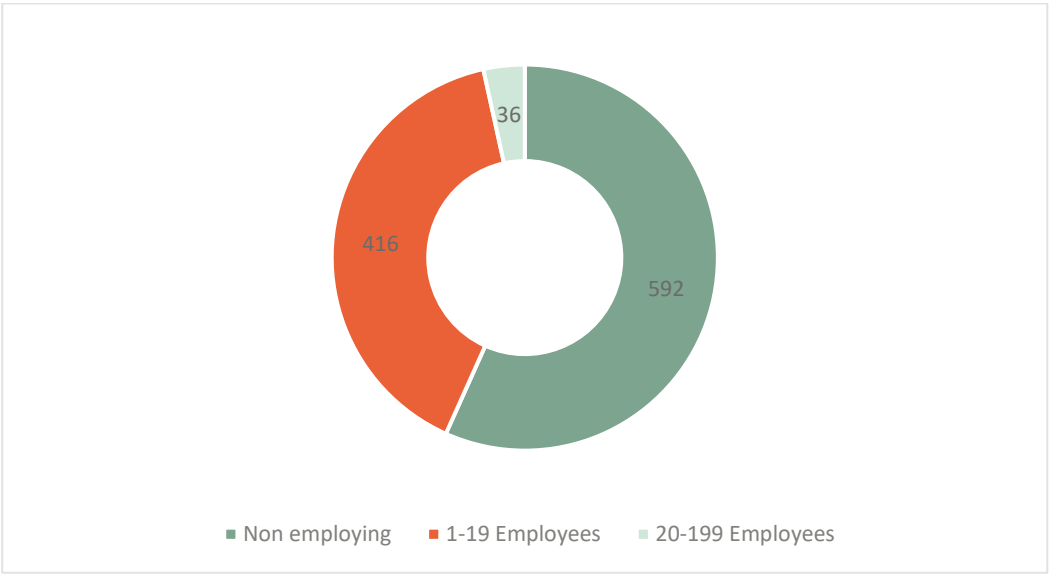
There were 1,044 business in the Muswellbrook LGA in June 2021. Close to one third of these were agricultural enterprises, followed by businesses in the construction industry, rental, hiring and real estate services and other services. Most businesses in Muswellbrook – 592 in total, or 57% – were non-employing, and 416 businesses (40% of all businesses) had between 1 and 19 employees. Figure 19 shows the number of businesses by industry, and Figure 20 shows the number of businesses by their employment size.

FIGURE 19 NUMBER OF MUSWELLBROOK BUSINESSES BY INDUSTRY



Source: ABS (Australian Bureau of Statistics, 2022f)

FIGURE 20 NUMBER OF MUSWELLBROOK BUSINESSES BY EMPLOYMENT SIZE



Source: ABS (Australian Bureau of Statistics, 2022f)

5.5 Housing

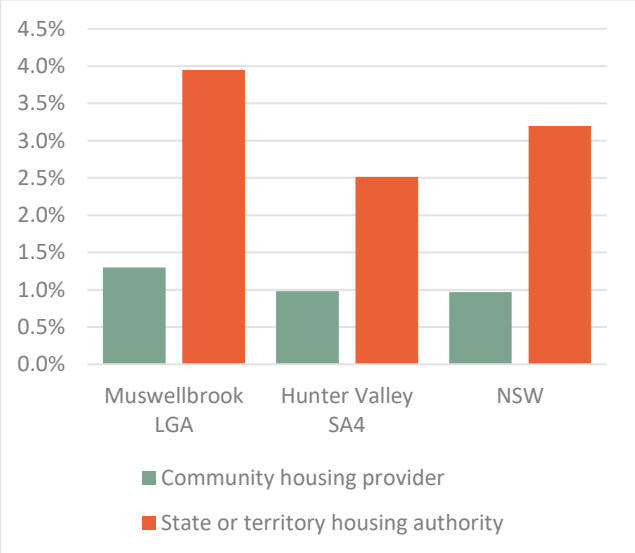
5.5.1 Housing tenure

In 2021 there were 6,001 occupied private dwellings in Muswellbrook and 107,191 in the Hunter Valley. Muswellbrook has a larger proportion of rented homes, compared to both the Hunter Valley and NSW; 34% of all occupied private dwellings are rented, compared to 27% in the Hunter Valley and 33% in NSW. Conversely, the proportion of dwellings being owned outright is lower, particularly compared to the Hunter Valley; 29% in Muswellbrook and 34% in the Hunter Valley (Figure 21).

FIGURE 21 OCCUPIED DWELLING TENURES

Source: ABS Census 2021 (Australian Bureau of Statistics, 2022e). Percentage of occupied private dwellings. Other tenure, or tenure not stated are excluded.

FIGURE 22 RENTING FROM STATE OR COMMUNITY HOUSING PROVIDER



Source: ABS Census 2021 (Australian Bureau of Statistics, 2022a). Percentage of occupied private dwellings.

The proportion of people renting from a state or territory housing agency or a community housing provider is also higher in Muswellbrook, with just over five percent of occupied private dwellings being under this form of tenure. This is consistent with feedback from some stakeholders who commented that there were a high proportion of social housing in Muswellbrook. In spite of there being higher proportions of social or community housing in Muswellbrook, several respondents commented that availability and affordability of housing, including social housing, was the number one community issue, suggesting that the current supply is insufficient. Figure 22 shows the proportion of occupied private dwellings that are being rented by a state or territory housing authority or community housing provider.

5.5.2 Housing costs

At the time of the 2021 Census, median mortgage repayment costs and median rents in Muswellbrook were lower than both the Hunter Valley SA4 and NSW. The median monthly mortgage repayment was $1,517 in the Muswellbrook LGA, compared to $1,733 in the Hunter Valley and $2,167 across NSW (Table 10).

TABLE 10 MORTGAGE REPAYMENT AND RENT MEDIANS

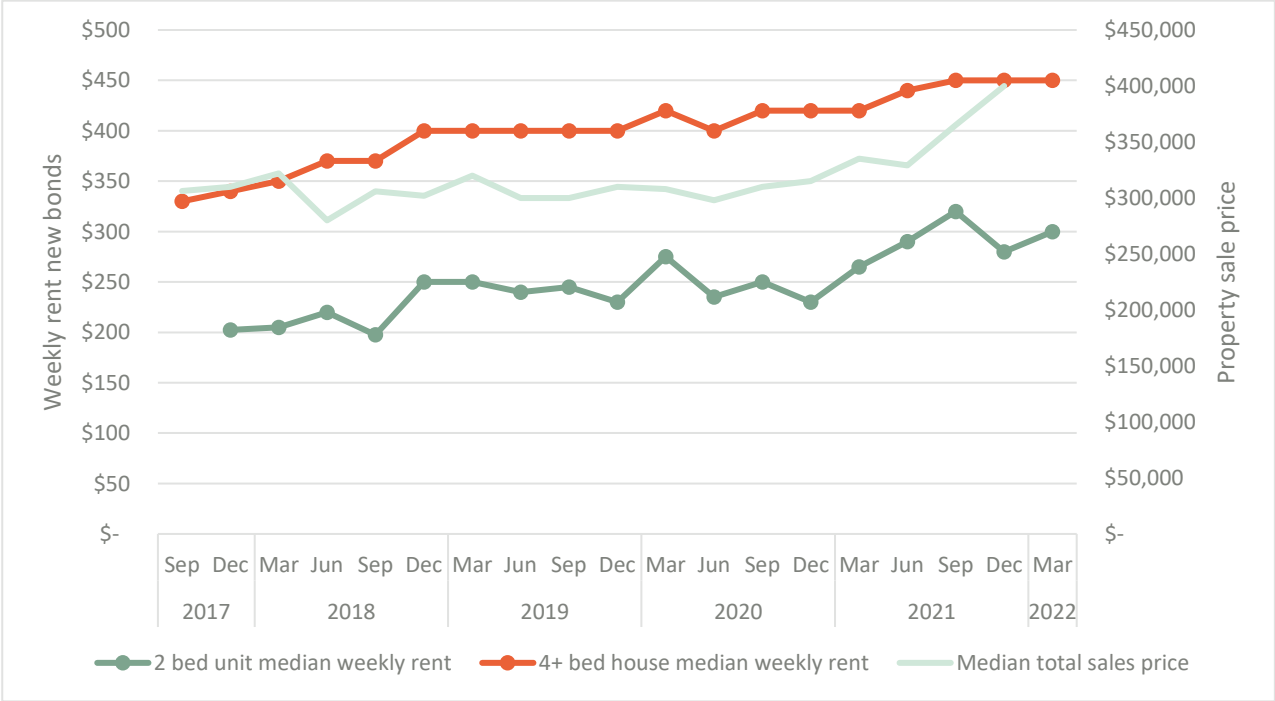
Geography	Median mortgage repayment ($/monthly)	Median rent ($/weekly)
Muswellbrook LGA	$ 1,517	$ 300
Hunter Valley SA4	$ 1,733	$ 350
NSW	$ 2,167	$ 420

Source: ABS Census 2021 (Australian Bureau of Statistics, 2022b)

Both rents and purchase prices have increased in Muswellbrook over the last two years as an increasing number of people had moved to the town. Several respondents talked about the increasing purchase prices, but also noted they were affordable compared to the outer suburbs of Sydney, and this – and its relative proximity to Newcastle and Sydney – had attracted people to move to the town.

Figure 23 shows the median weekly rent and property sales prices over time in the Muswellbrook LGA. Both sales prices and rental costs show an increase throughout 2020 and 2021. Purchase prices in particular increased from $298,000 in the June quarter of 2020 to $400,000 in the December quarter of 2021, an increase of 34%.

FIGURE 23 MEDIAN RENTS AND PROPERTY SALE PRICES

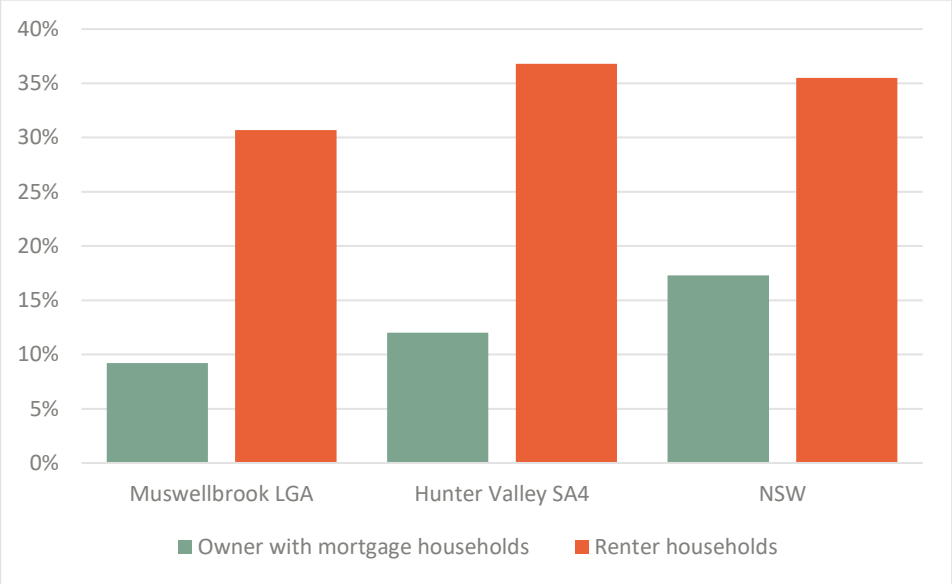


Source: NSW Department of Communities and Justice (NSW Department of Communities & Justice, 2022)

5.5.3 Housing affordability and availability

According to the rental affordability index prepared by SGS Economics and Planning (SGS Economics and Planning, 2022), rental affordability for an average Australian rental household is considered "acceptable" in the 2333 postcode, which approximates the Muswellbrook LGA. For a single person on benefits, rental affordability is rated as "unaffordable" (SGS Economics and Planning, 2022). There are fewer households in Muswellbrook who experience rental or mortgage stress, compared to Hunter Valley and NSW. Census data shows that the proportions of households who pay more than 30% of their household income in rent or mortgage repayments are lower than that of the Hunter Valley and NSW (see Figure 24).

FIGURE 24 MORTGAGE AND RENTAL PAYMENTS GREATER THAN 30% OF HOUSEHOLD INCOME



Source: ABS Census 2021 (Australian Bureau of Statistics, 2022g, 2022h). Percentage of households.

Rental availability in Muswellbrook is currently very low. Several respondents talked about difficulties in finding rental housing in Muswellbrook, particularly for people who did not earn mining wages. Data from SQM Research corroborates this feedback, suggesting rental vacancy rates for the postcode 2333 was 0.5% in October 2022 (SQM Research, 2022). Actors in the real estate industry often consider a vacancy rate around 3% to be an indication of a healthy market (Real Estate Institute of Queensland, 2020).

5.5.4 Mobility

During consultation, several stakeholders spoke about the high degree of transient workers in Muswellbrook, and some noted that this impacted community life. Table 11 below provides indicators of mobility, including whether the person was counted at home on census night and whether they lived at the same address one and five years ago. Across these three indicators, the Muswellbrook population appears slightly more mobile than Hunter Valley and NSW, with fewer counted at home and fewer living at the same address one and five years ago. However, the differences are minor.

TABLE 11 INDICATORS OF TRANSIENCE

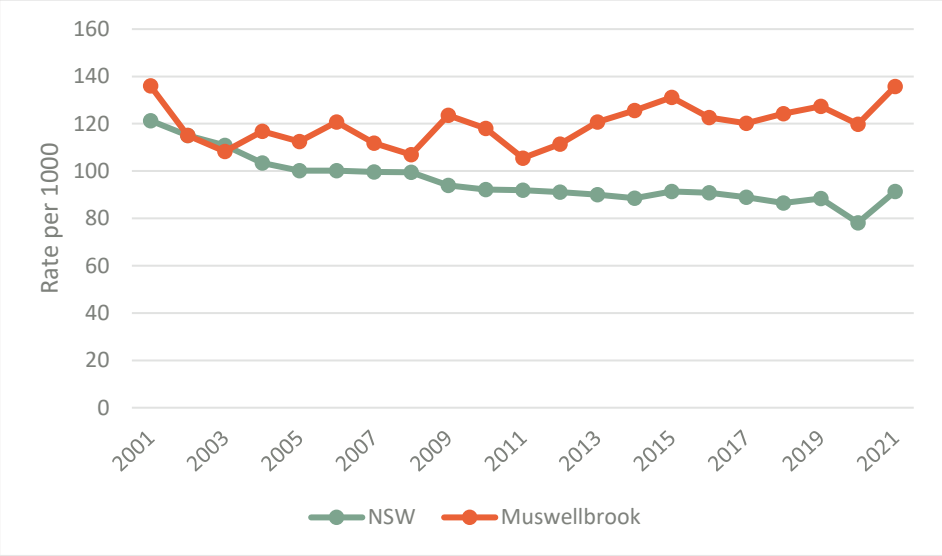
Geography	Counted at home on census night	Same address one year ago	Same address five years ago
Muswellbrook	94.3%	76.6%	50.8%
Hunter Valley SA4	96.2%	79.8%	52.9%
NSW	96.8%	79.4%	53.9%

Source: ABS Census 2021 (Australian Bureau of Statistics, 2022b, 2022c, 2022e). Note that counted at home at census night is based on place of enumeration, whereas the other categories are place of usual residence.

5.5.5 Community safety

Crime rates in Muswellbrook are higher than across NSW, and have generally been trending upwards since around 2011, albeit with a decrease between 2019 and 2020 followed by a rapid increase the year after, which is likely associated with the Covid-19 pandemic. Figure 25 below shows the rate of criminal incidents reported to or detected by police for Muswellbrook and NSW between 2001 and 2021.

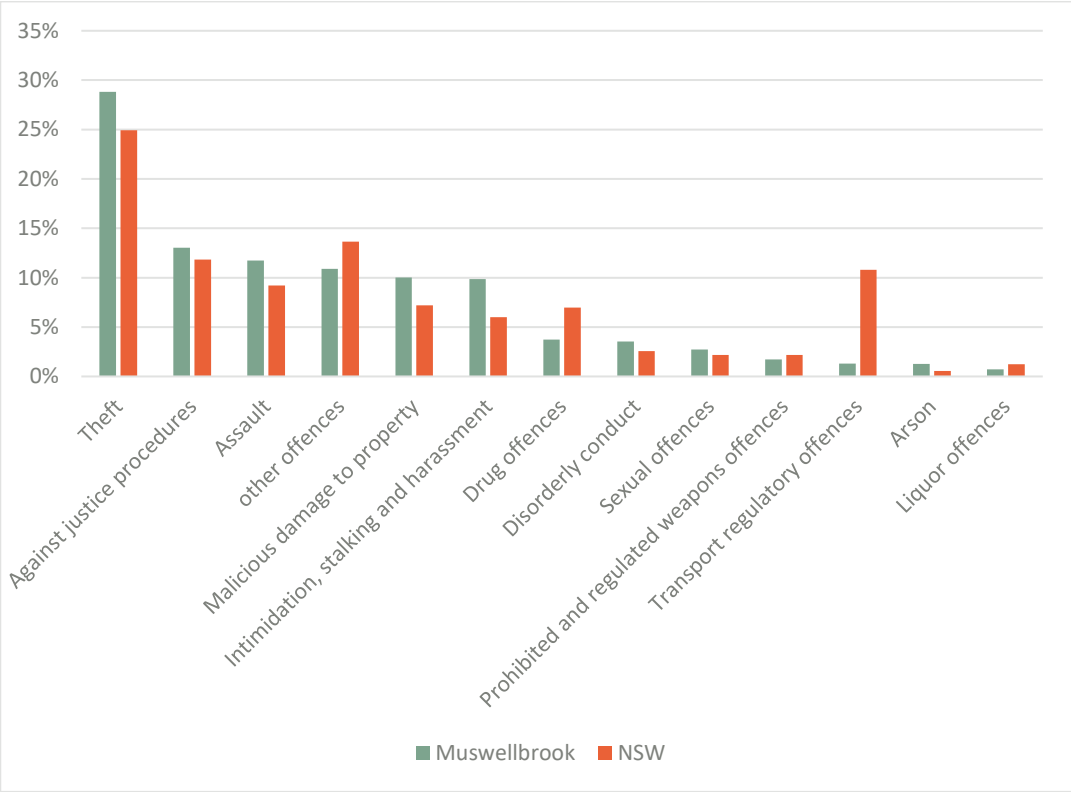
FIGURE 25 CRIMINAL INCIDENT RATES



Source: Based on NSW Bureau of Crime Statistics and Research (NSW Bureau of Crime Statistics and Research, 2022). Criminal incidents have been divided by the ERP for that year and multiplied by 1,000 to achieve a rate.

The types of criminal incidents occurring in Muswellbrook are largely consistent with NSW, with the major incidents being theft, crime against justice procedures, and assault. Figure 26 below shows the major criminal incidents for Muswellbrook LGA and NSW for 2021.

FIGURE 26 TYPES OF CRIMINAL INCIDENTS – MAJOR CATEGORIES



Source: Based on NSW Bureau of Crime Statistics and Research (NSW Bureau of Crime Statistics and Research, 2022).

5.6 Community Health and Wellbeing

Table 12 below shows the proportion of the population with a self-reported long term health condition in Muswellbrook, the Hunter Valley and across NSW. Overall, Muswellbrook and Hunter Valley have lower proportions of people without a long term health condition, 54% and 53%, compared to NSW at 61%, suggesting more people in these areas are suffering from at least one long term health condition. Regarding specific conditions, asthma and mental health conditions appear higher in these areas compared to NSW. This broadly accords with feedback from consultation; some respondents talked about poor air quality in Muswellbrook, and others of the importance of mental health in the context of the community changes associated with the energy transition (although it should be noted no one attributed causality for current health conditions to a particular industry sector or company). The higher prevalence of mental health conditions also accord with data from the Public Health Information Development Unit (PHIDU) at the Torrens University, which estimates the age standardised rate of people with high or very high psychological distress is 14.4 in Muswellbrook, compared to 12.4 across NSW (PHIDU Torrens University Australia, 2022).

TABLE 12 SELF-REPORTED LONG-TERM HEALTH CONDITIONS

Long-term health condition	Muswellbrook LGA	Hunter Valley SA4	NSW
Arthritis	10%	12%	8%
Asthma	11%	10%	8%
Cancer (including remission)	3%	3%	3%
Dementia (including Alzheimer's)	1%	1%	1%
Diabetes (excluding gestational diabetes)	6%	6%	5%
Heart disease (including heart attack or angina)	4%	5%	4%
Kidney disease	1%	1%	1%
Lung condition (including COPD or emphysema)	2%	2%	2%
Mental health condition (including depression or anxiety)	11%	12%	8%
Stroke	1%	1%	1%
Any other long-term health condition(s)	7%	9%	8%
No long-term health condition(s)	**54%**	**53%**	**61%**
Not stated	**11%**	**9%**	**8%**

Source: ABS Census 2021 (Australian Bureau of Statistics, 2022e)

5.7 Social Groups

There are numerous social groups within the primary and secondary social localities, some who may be affected by the Modification (see Table 13). Importantly, these groups have been described here in relation to the Modification, and members of these groups may define themselves in other ways as well. It is also important to note that, as is typical in a rural community, people often belong to numerous groups.

TABLE 13 RELEVANT SOCIAL GROUPS

Social group	Delineation and relevance to the Modification
Nearby landholders and residents	These include landowners and residents in the direct vicinity of MAC, including along Denman Road, Racecourse Road and Roxburgh Road and who may currently experience direct, amenity related impacts of the mine.
Employees and contractors and their families	These are the approximately 2,200 people who work at MAC, including direct employees of BHP and employees of major contractors such as Thiess. Some of these are organised in trade unions, including the Construction Forestry Mining Energy Union. They have an interest in continued employment at MAC and in a fair process leading up to closure.
Aboriginal people and groups	These include particularly the Wanaruah / Wonnarua people who are the traditional custodians of the area where MAC is situated, the Local Aboriginal Land Council and the Aboriginal stakeholders who are registered as RAPs for the Aboriginal Cultural Heritage Assessment (ACHA) for MAC and Modification.
Residents in Muswellbrook LGA	These include the residents in Muswellbrook, Denman and other towns and rural areas in the LGA, who may experience the visual impact of MAC as they travel to and from work, as well as the social and economic effects of MAC on the community. Many residents are also employees of BHP, a contractor or supplier to MAC, or another mining company, or are related to someone who is. For many residents, the experience of MAC is mostly positive. This experience may extend beyond Muswellbrook, but in a less direct way.

Social group	Delineation and relevance to the Modification
	A sub-group among residents are those on low income or in receipt of welfare payments and who may find it difficult to access housing and employment, including employment within the mining industry.
Business in Muswellbrook and the broader Hunter Valley	Businesses in Muswellbrook include 'town based' businesses such as in retail and hospitality, service sectors and others. These may not be directly supplying to MAC (although some do) but are dependent on mining industry workforces and their families as their clientele. There are also several businesses in the mining, engineering, or land management sectors who supply directly to MAC and other mines in the area.
Business, employees and families in primary production industries, primarily the equine and viticulture industries	These include people who work for or operate businesses in the equine, viticulture or other primary production industries in the vicinity of MAC. Notable businesses are Godolphin (Woodlands) and Coolmore studs. Such groups may experience competition for land use from the mining industry broadly, as well as amenity and visual impacts of MAC for those that are located in the direct vicinity of MAC.
Council and service providers	Organisations that represent residents in the primary or secondary social localities, and who provide public and social services and infrastructure to the community.

In addition to the abovementioned groups which are likely to have an interest in the Modification, there are several stakeholder groups beyond the primary and secondary social locality with an interest in the Hunter Valley energy transition, and hence also in MAC's closure process, including environmental and other advocacy groups, government departments, academia and other industries.

5.8 Summary of Social Baseline

This social baseline can be summarised as:

- Muswellbrook LGA is located in the Upper Hunter region of NSW. According to the 2021 Census, it has a relatively stable population of 16,357 persons, which is predominantly male, and comparatively younger, with a median age of 37. The population is more homogenous than the Hunter Valley and NSW.
- Approximately 12% of the population are Aboriginal or Torres Strait Islander, and the Wanaruah / Wonnarua people are the traditional custodians of the land.
- Both school and non-school qualification levels in Muswellbrook are generally lower than across the Hunter Valley and NSW. Fewer people have completed year 12 as their highest level of education, and fewer have completed a bachelor or higher degree. Among mining industry employees in Muswellbrook the most common highest qualification achieved is a Cert III or IV.
- Income levels are relatively high for a regionally based area, similar to the NSW average, although income growth in recent years has been comparably slow. Income inequality is lower for Muswellbrook than for Hunter Valley and NSW.
- Mining is the largest industry of employment accounting for more than one fifth of all jobs. The number of jobs in the mining industry has been growing in the last five years, although as a proportion of all jobs it has decreased marginally.

- Many stakeholders talked about a high degree of transience in the Muswellbrook population, and indicators of mobility are slightly higher in Muswellbrook than across the Hunter Valley and NSW.
- Availability of housing was described by many stakeholders as the number one community need, and rental availability is very low. Housing is however more affordable in Muswellbrook – both for rental and purchase – compared to the Hunter Valley and NSW.
- Crime levels are trending slightly up in Muswellbrook, and are slightly higher than for NSW. The types of criminal incidents are similar, with theft being the most common offence.
- More people in the Hunter Valley and Muswellbrook report suffering from a long term health condition, compared to NSW. Self-reported rates of asthma and mental health conditions are similarly higher in Muswellbrook and Hunter Valley, than NSW.

6. IMPACT ASSESSMENT AND PREDICTION

6.1 Overview

This section presents and evaluates the social impacts likely to be associated with the Modification. It first presents impacts that may occur should the Modification proceed, followed by impacts should it not proceed, and includes a discussion of intergenerational equity considerations and cumulative impacts.

All potential social impacts were analysed and evaluated by the SIA lead author, following the process and framework set out in the Technical Supplement to the SIA Guideline (Department of Planning and Environment, 2021)[12].

As an overall observation, most stakeholders struggled to describe any negative social impacts associated with the Modification. This is likely related to the fact the Modification represents a relatively modest extension to the current operations with limited, if any, change in scale or scope. As such the change in experienced impacts for most stakeholders is likely to be negligible. In addition, compared to the approved MAC, some of the changes proposed, such as a reduced disturbance area and reduced overburden emplacement height, were seen as a potential positive by stakeholders. Further, as the Modification is inscribed in BHP's transition to closure of MAC, stakeholders largely interpreted and spoke of impacts in relation to the eventual closure, and how this may affect their life and the broader community. Overwhelmingly, the main impact of the Modification discussed by stakeholders was that it provided an opportunity to prepare for closure.

Further, as this SIA is considering a modification to a currently approved operation, the referent is the approved MAC and its attendant experiences for the community. In relation to closure, the impact assessment in this section considers the impact of closing MAC in 2030 compared to 2026 (which is the term of the current MAC approval). Nevertheless, as the impact of closure in itself was front of mind for many stakeholders, APPENDIX D of this report will qualitatively discuss the impacts of closure, unrelated to the current approved MAC, and propose measures for BHP and other stakeholders to consider in this process.

With regards to cumulative impact assessment, it is important to note that all social impacts discussed here contain a cumulative aspect. As MAC is located in an area with three other operating coal mines within a few kilometres distance, and in a region with several more, it is often difficult to disentangle the individual and cumulative contributions to a stakeholders' experience of an impact.

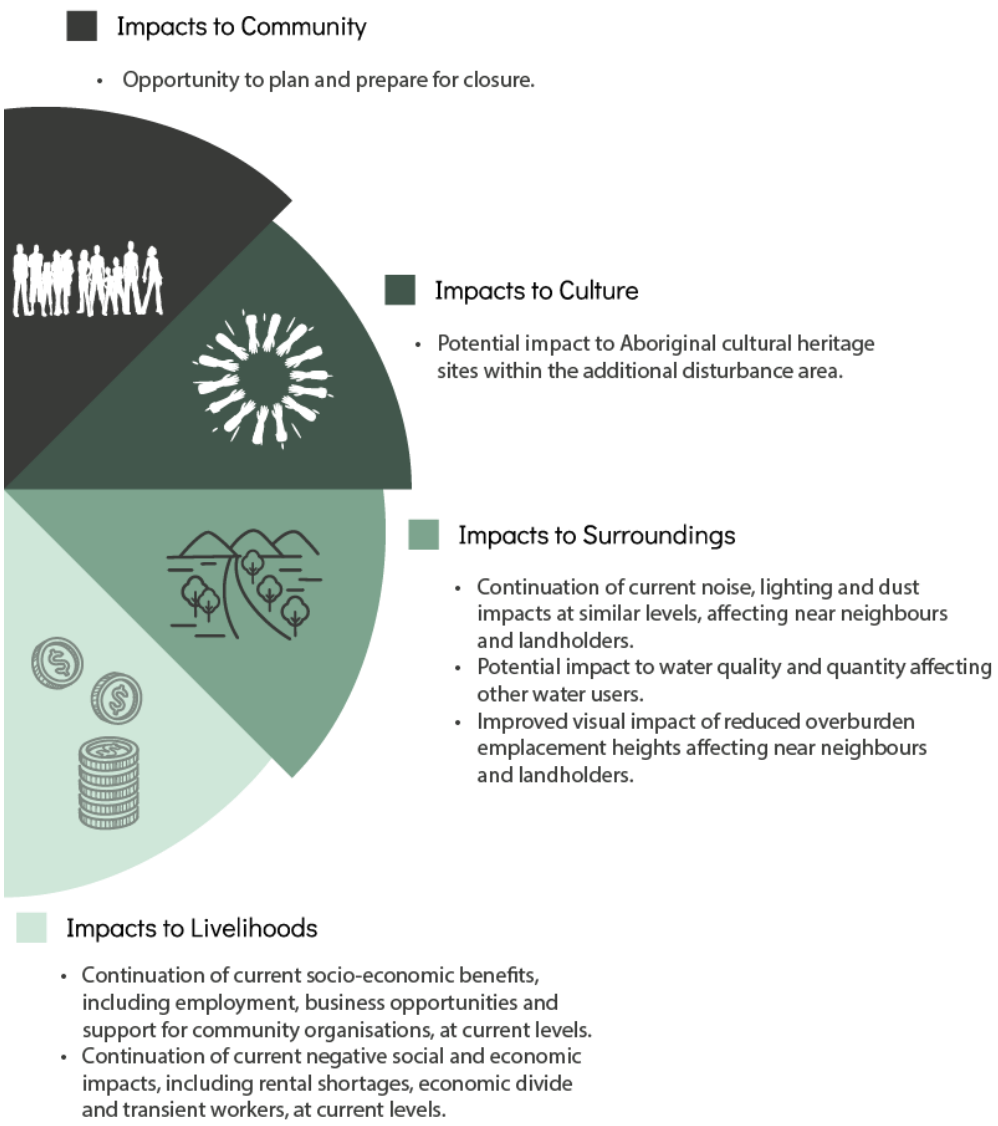
The cumulative aspects of impacts are therefore discussed throughout the assessment, followed by a brief discussion about the most pertinent other developments and projects which contribute to the cumulative experience.

[12] Contained in APPENDIX B.

The impact assessment was presented to the CCC and the MSC SSD Committee for feedback. The CCC members and council representatives largely considered the assessment of impacts associated with the Modification reasonable, however their interest was mostly in the impacts associated with the transition to closure at MAC. Council in particular expressed a strong expectation to be involved in the planning for the socio-economic transition, as well as ensuring a future productive use of MAC.

Finally, it is important to consider that assessments of social impacts are not exact predictions, as the social change brought about by a project often is uncertain, dynamic and recursive. In the sections below, impacts are presented ordered by the categorisation provided in the SIA Guideline (Department of Planning and Environment, 2023a, p. 19). No material impacts associated with the way of life, accessibility, health and wellbeing or decision-making system categories were identified. Figure 27 summarises the identified impacts.

FIGURE 27 SUMMARY OF SOCIAL IMPACTS



6.2 Impact Assessment for the Modification

6.2.1 Impacts to Community

Opportunity to plan and prepare for closure

The most frequently talked about impact of the Modification is the additional time it provides for stakeholders to plan and prepare for the eventual cessation of mining at MAC. Nearly all stakeholders noted this as the main benefit of the Modification. This included businesses who were directly supplying to MAC, other businesses in town, employees, community groups and general community members, as well as stakeholders with an interest in the post-mining land use at MAC. Some stakeholders suggested the additional four years of operation would also provide stability as the Upper Hunter communities had just emerged from years of drought followed by floods and the impacts of the Covid-19 pandemic.

Further, some of the industries that had been proposed for the area in light of the energy transition were considered nascent, and an additional four years beyond 2026 would assist in confirming whether or how these could be deployed at scale in the region.

There is a cumulative aspect associated with this, as *how* stakeholders plan for the future would be informed by, at least to some degree, changes in other industries and other mining projects. In particular, the planned closure of Liddell and Bayswater Power Stations as well as potential growth in other mining projects including the Mount Pleasant Optimisation Project, which would inform stakeholders responses to the planned closure.

This impact would be a positive for nearly all stakeholders, and how it would manifest depends on the situation of the individual stakeholder:

- For **businesses** who rely heavily on **supplying to MAC,** it would provide time to adjust business models, potentially develop new service lines, provide potential retraining of staff, and adjust lease arrangements.
- For businesses who are **not directly in the MAC supply chain,** the Modification would provide additional time to understand how the eventual closure would impact their clientele, including how many of the workforce are likely to stay in the area, enabling them to plan for the future.
- For the **workforce and their families,** it would provide time to engage in re-skilling or up-skilling, as well as financially plan for the future, and seek alternative employment. In this context, it was also mentioned that maintaining morale among the workforce would be a challenge for BHP.
- For **community groups** who receive funding from BHP or the Local Buying Foundation (a critical element of BHP's Local Buying Program), the Modification would provide time to review their business models and identify alternative funding sources. Other community groups would also be able to better grasp impacts of a potentially reduced population and volunteer base.
- For **service providers,** the Modification would provide time to understand potential future demand and plan for provision for services.
- For the **broader community,** the Modification would provide an opportunity to revisit and actively define its identity; what type of community the residents seek after the closure of MAC.

The additional four years would also enable BHP, various government departments and potentially other interested stakeholders to develop solutions with regards to the final land use of MAC. There is an aspiration from several stakeholders to ensure the future use of MAC is, where possible, productive and provides employment opportunities for the community.

The realisation of this benefit will largely depend on how the different stakeholder groups respond. Enabling them to respond and plan will depend on timely and transparent information provision from BHP. Sharing planning information transparently and collaboratively was mentioned by nearly all stakeholders in relation to managing impacts of the Modification and closure.

This is a positive, widespread impact that is important for many stakeholders in Muswellbrook and beyond. Like most impacts associated with the Modification, its temporal extent is limited to the life of the extension, although the benefit of this additional time would accrue beyond closure.

As such, the opportunity to plan and prepare for closure has been assessed with a likelihood level of *likely*, and a magnitude level of *major*, resulting in a *high* significance rating relating to a positive nature (refer to Appendix B for assessment definitions and matrices).

6.2.2 Impacts to Culture

Potential impact to Aboriginal heritage sites within the Modification New Disturbance Area
Some stakeholders, particularly those who are RAPs for the ACHA, talked about the importance of surveying the Modification New Disturbance Area for potential artifacts or human remains, as well as the management process should finds occur.

The ACHA for the Modification included consultation with 72 Aboriginal groups who identified themselves as RAPs. The Modification would involve direct impact to three sites; two artefact scatters and one isolated find. These three sites are of a low scientific (archaeological) significance, although it should be noted that all heritage sites are of a high cultural value to Aboriginal people. The ACHA concluded that the Modification would not result in any significant cumulative impact on Aboriginal heritage in the region.

MAC has an existing Aboriginal Heritage Management Plan which was prepared in consultation with Aboriginal stakeholders and sets out objectives and processes for managing cultural heritage at MAC (BHP, 2022).

It should be noted that the concerns relating to heritage impacts associated with the Modification itself were relatively small, provided the appropriate studies were conducted. Instead, these were spoken of mostly in relation to past disturbance from the mining industry at a landscape scale, but also expressing aspirations for the future protection of a massacre site near the Mount Arthur peak after mining had ceased. As such, it seems reasonable to assess the likelihood of this impact as it relates to the Modification as *almost certain*, with a magnitude rating of *minor*, resulting in a significance rating of *medium*.

6.2.3 Impacts to Surroundings

Continuation of current noise, lighting and dust impacts at similar levels, affecting near neighbours and landholders

The Modification would lead to a continuation of amenity impacts, including impacts of noise, dust, blasting and light emissions from MAC. Together, these represent approximately 90% of all complaints lodged with MAC feedback process. The nearby landholders interviewed for this SIA spoke about all these impacts, but their individual experiences varied significantly; some talked about lack of sleep and how their whole life had been affected, whereas, others contextualised the noise they experienced from other sources which they thought were worse. The experience was also cumulative in nature, and respondents attributed impacts to the Mangoola and Bengalla mines as well as MAC. Some of these stakeholders could be considered vulnerable.

Some respondents spoke about the environmental change associated with the mining industry in terms similar to those captured in the concept of 'solastalgia' (Albrecht, 2005; Albrecht et al., 2007), including expressing sadness of how the landscape in the Hunter Valley had changed. However, this related to past environmental changes, and sometimes to broader socio-economic change unrelated to the mining industry, and the Modification was not seen as materially contributing to these.

A common theme for most stakeholders was that the Modification itself was not a great concern, provided the impacts remain at current levels and it did not lead to an increase in these impacts.

A Noise and Blasting Assessment and Air Quality and Greenhouse Gas Assessment has been undertaken for the Modification. The Air Quality and Greenhouse Gas Assessment concluded that the Modification would result in a continuation of air quality emissions to 2030 but at a reduced rate relative to the approved MAC. There are no new air quality exceedances at privately-owned dwellings that are not subject to acquisition-upon-request conditions (Todoroski Air Sciences, 2023).

Similarly, noise and blasting impacts were found to be very similar to the existing MAC. The Noise and Blasting Assessment (RWDI Australia Pty Ltd, 2023) found that operational noise would comply with the relevant criteria during the day and evening assessment periods. Moderate night time exceedances at three receivers may be expected at times. One of these receivers is already subject to acquisition-upon-request rights (for air quality purposes) and the other two have rights to additional air quality mitigation-upon-request, in accordance with current approval conditions. The latter two would therefore be afforded rights to additional noise mitigation upon request, should the Modification be approved. Road noise results indicated that night-time noise levels generated by MAC with the Modification are expected to exceed the night-time approved road traffic noise criteria at one private dwelling, however daytime noise levels at this receiver would comply with approved road traffic criteria (RWDI Australia Pty Ltd, 2023).

Mt Arthur Coal has existing Noise Management, Blast Management and Air Quality Management plans which set out procedures for the management and monitoring of these impacts. Further, the complaints and feedback process allows affected community members to communicate directly with Mt Arthur Coal about their experiences. Management plans and outcomes from the complaints process are publicly available on BHP's website (BHP, 2022).

In light of this, in terms of likelihood, it is considered *almost certain* that this impact would occur, although the magnitude would be *minimal* as there is only minimal predicted increase. As such, this impact is considered to have a *low* significance.

Potential impact to water quality and quantity affecting other water users

A small number of the stakeholders who contributed to the consultation for this SIA talked about water related impacts and in particular, salinity in the Hunter River. As with most of the impacts discussed here, this was mostly framed as an existing impact with a cumulative aspect (i.e. related to the mining industry as a whole) and not as a discrete effect of the Modification. Stakeholders also noted that the water quality in the Hunter River had improved in recent times.

These concerns were raised by respondents with an interest in the environment, as well as by groups representing other water users, notably the agricultural industries.

Comprehensive Groundwater and Surface Water Assessments were undertaken for the Modification, which separately assessed these impacts. From a groundwater perspective, there are no predicted impacts on privately owned bores emanating from the Modification. From a surface water perspective, the Modification may lead to very limited changes in flow regimes in local creeks, and impacts to water quality in local watercourses or the Hunter River. Existing management and monitoring measures for potential surface water and groundwater impacts are also considered likely to be sufficient (ATC Williams, 2023; SLR Consulting Australia Pty Ltd, 2023). The likelihood that residents or other water users will be impacted by groundwater or surface water changes associated with the Modification is thus very low.

It is thus considered *unlikely* that this impact will occur. Considering that the number of potentially impacted stakeholders is likely to be relatively small, and that the incremental change is limited compared to the current MAC, the magnitude of this impact is considered *minor*. Consequently, this social impact is assessed as having a *low* significance.

Improved visual impact of reduced overburden emplacement heights affecting nearby neighbours and landholders

The Modification would lead to a reduction in the height of the northern overburden emplacement by approximately 20 m compared to the approved MAC (from an average of approximately 360 m AHD to an average of approximately 340 m AHD). Some stakeholders talked about the potential for improved visual amenity of this change, and at least one suggested this impact would also depend on the type of rehabilitation undertaken.

The Landscape and visual impact assessment undertaken for the Modification (BHP, 2023) found that the Modification would not increase the visual magnitude, and thereby visual impact of current operations.

Most stakeholders in Muswellbrook and travellers along Denman Road and Thomas Mitchell Drive would likely experience this impact to some extent, although it would be mostly noticeable for nearby landholders and residents. In that context, it is considered *almost certain* that this impact would occur, and its magnitude is considered *minor*, resulting in a significance assessment of *medium*.

6.2.4 Impacts to Livelihoods

Continuation of current socio-economic benefits, including employment, business opportunities and support for community organisations, at current levels

The Modification would see the continuation of employment at MAC and the utilisation of primary and secondary social locality businesses in the MAC supply chain for an additional four years. This is likely to remain at similar levels throughout most of this period, and reduce relatively rapidly in the last year of the Modification. Likewise, Mt Arthur Coal's contribution to community organisations through its social investment program and the Local Buying Foundation is likely to continue throughout this period.

These benefits would likely accrue to the existing workforce and their families, community organisations, existing suppliers as well as indirectly to other businesses in Muswellbrook and beyond. In this context, it is important to note that many of the respondents interviewed for this SIA had some form of relationship with MAC, either directly or via a partner, family member or other relative, which indicates how wide spread this benefit is.

Assuming that the residential pattern of the BHP employed workforce at MAC applies similarly to the whole workforce, and would continue throughout the extension, just over a third of the benefits of employment would accrue to Muswellbrook LGA, and a quarter to the nearby Singleton LGA. More than 80% would extend across the Hunter Valley. BHP has a commitment to employment of Aboriginal and Torres Strait Islander people and females as well as purchasing from locally based and Indigenous businesses. To the extent this is implemented throughout the Modification, this benefit would spread to people and businesses who traditionally are underrepresented or may experience economic vulnerability.

Several stakeholders spoke about the pervasive role of mining, and MAC, in the Muswellbrook and Hunter Valley socio-economic ecosystems. It should be noted that, as with most impacts associated with the Modification, these were mostly talked about in current or historic and cumulative terms.

The economic assessment for the Modification (AnalytEcon Pty Ltd, 2023) has assessed the economic effects of the Modification. In the economic assessment the local region has been defined as the Upper Hunter SA3, which incorporates the Muswellbrook LGA. If approved, the Modification would generate total net incremental benefits to this area of 898 full time equivalent (FTE) jobs, $364 million of disposable income, $15 million of local government rate payments, and $219 million in benefits to suppliers[13].

In summary, the socio-economic benefits associated with the Modification are likely to be widespread in the Muswellbrook community and beyond, and are of relatively high importance to many stakeholders. As with most other impacts associated with the Modification, these benefits are however likely to remain at a similar level to current, and are relatively short in duration. As such, this impact is considered *almost certain* to occur, and its magnitude is assessed as *moderate*, resulting in an overall significance assessment of *high*.

[13] Values are inclusive of flow on effects, Dollar values are expressed in 2022 Australian Dollars and are presented in net present value terms.

Continuation of current negative social and economic impacts, including rental shortages, economic divide and transient workers, at current levels

Some respondents spoke about the negative social and economic effects of living in a town that is largely dependent on mining. These issues included shortage of housing, particularly rental housing for people who were not earning mining wages, the economic and social divide between mine workers and others, and the presence of transient workers in the community[14].

The continued constraint on availability of rental housing was the most frequently talked about impact of this nature, with several stakeholders reinstating its impact on the community. As with the positive socio-economic impacts, most stakeholders spoke about rental shortages as an already occurring cumulative phenomenon, and not primarily in relation to the Modification. The Modification would nevertheless contribute to the continuation of rental unavailability through the continued employment of existing workforce.

MSC in particular noted the potential for cumulative pressures on the local housing market to occur during the period 2025 to 2027 due to construction of several projects during that time.

For most stakeholders, the socio-economic impacts of mining in Muswellbrook was considered positive, which suggests those that experienced the negative aspects are comparably fewer. By contrast, some, or perhaps many, of these are likely to be vulnerable. In this context, this impact is considered *almost certain* to occur and its magnitude is assessed as *minor*, resulting in an impact significance of *medium*.

6.2.5 Summary of Impact Significance

Table 14 shows the assessment of these impacts, should the Modification proceed.

[14] This could also be categorised as a community impact but is included here in accordance with the SIA Guideline which notes that neatly categorising impacts is less important than identifying and assessing them (Department of Planning and Environment, 2023a, p. 19).

TABLE 14 IMPACT SIGNIFICANCE – WITH THE MODIFICATION

Potential Social Impacts	Phase	Nature of Change	Potentially Affected Stakeholders	Impact Category	Nature	Likelihood	Magnitude	Significance
Opportunity to plan and prepare for closure	Duration of Mod and beyond	New impact	Muswellbrook community, businesses, workforce, community organisations, other industries, government	Community	Positive	Likely	Major	High
Potential impact to Aboriginal heritage sites within the Modification New Disturbance Area	Duration of Mod	Minor disturbance extension	Aboriginal stakeholders	Culture	Negative	Almost certain	Minor	Medium
Continuation of current noise, lighting and dust impacts, at similar levels of current operations	Duration of Mod	Continuation of existing experience	Nearby landholders and residents	Surroundings	Negative	Almost certain	Minimal	Low
Potential impact to water quality and quantity	Duration of Mod	Minor extension	Other nearby water users	Surroundings	Negative	Unlikely	Minor	Low
Improved visual impact of reduced overburden emplacement heights	Duration of Mod and beyond	Reduction compared to approved project	Nearby landholders, nearby equine, tourism operations and residents in Muswellbrook	Surroundings	Positive	Almost certain	Minor	Medium
Continuation of current socio-economic benefits, including employment, business opportunities and support for community	Duration of Mod	Continuation of existing experience	Muswellbrook and Hunter Valley residents, businesses and community organisations	Livelihoods	Positive	Almost certain	Moderate	High

Potential Social Impacts	Phase	Nature of Change	Potentially Affected Stakeholders	Impact Category	Nature	Likelihood	Magnitude	Significance
organisations, at current levels								
Continuation of current negative social and economic impacts, including rental shortages, economic divide and transient workers, at current levels	Duration of Mod	Continuation of existing experience	Residents in Muswellbrook, particularly those that are socio-economically vulnerable	Livelihoods	Negative	Almost certain	Minor	Medium

6.3 Impacts Should the Modification Not proceed

Should the Modification not proceed, mining operations would cease in 2026 in accordance with current approvals. As discussed above, many of the social impacts associated with the Modification are continuations of existing experiences, and should the Modification not proceed these experiences would consequently cease earlier.

Table 15 describes impacts should the Modification not proceed. Compared to Table 14 above the following would change:

- The potential impact to Aboriginal heritage sites within the Modification New Disturbance Area is not included as this would not occur without the Modification.
- The positive and negative impacts relating to noise, lighting and dust, socio-economic benefits, and negative social and economic effects would cease earlier.
- Impact to water quality and quantity would remain the same as under the currently approved MAC, and as such there would be no social change associated with it.
- The opportunity for the workforce, residents, businesses, service providers, governments and BHP to plan for closure would be noticeably reduced.

TABLE 15 IMPACTS SHOULD THE MODIFICATION NOT PROCEED

Potential Social Impacts	Phase	Nature of Change	Potentially Affected Stakeholders	Impact Category	Nature	Likelihood	Magnitude	Significance
Reduced opportunity to plan and prepare for closure	Duration of Mod	New impact	Muswellbrook community, businesses, workforce, community organisations, other industries, government and BHP	Community	Negative	Almost certain	Major	Very high
Earlier cessation of current noise, lighting and dust impacts, at similar levels	Duration of Mod	Cessation of existing experience	Nearby landholders and residents	Surroundings	Positive	Almost certain	Minor	Medium
Earlier cessation of current socio-economic benefits, including employment, business opportunities and support for community organisations	Duration of Mod	Cessation of existing experience	Muswellbrook and Hunter Valley residents, businesses and community organisations	Livelihoods	Negative	Almost certain	Moderate	High
Earlier cessation of current negative social and economic impacts, including rental shortages, economic divide and transient workers	Duration of Mod	Cessation existing experience	Residents in Muswellbrook, particularly those that are socio-economically vulnerable	Livelihoods	Positive	Almost certain	Minimal	Low

6.4 Intergenerational Equity Considerations

Intergenerational equity is a guiding principle in SIA practice and has been defined as meaning that projects or other interventions "should be managed so that the needs of the present generation are met without compromising the ability of future generations to meet their own needs" (Vanclay, 2003, p. 10). To trigger intergenerational equity considerations, the mere extension of an impact into a future generation is thus not sufficient; the impact must also compromise the ability of those future generations to meet their needs. This is arguably a high threshold.

Due to the minimal scale of change and short duration of the Modification, it is highly unlikely that any negative impacts associated with it will display any intergenerational equity aspects. By contrast, impacts of closure of MAC will likely extend into future generations, and may, if the closure process is not planned carefully, compromise people's abilities to meet their needs. As such, the only social impact identified in this SIA with potential to materially affect intergenerational equity is the opportunity to plan and prepare for closure; a positive impact.

6.5 Cumulative and Combined Impacts

All impacts described and assessed above had a cumulative aspect as stakeholders rarely described or experienced impacts of one operation only. Table 16 lists projects and operations within the Muswellbrook Shire LGA which may contribute to cumulative social impacts, and Table 17 below discusses the potential interaction between the most relevant of these and the Modification.

It should be noted that MSC in particular mentioned the risk of cumulative pressures on the housing market during the 2025 to 2027 period.

TABLE 16 PROJECTS WITH A POTENTIAL TO CONTRIBUTE TO CUMULATIVE SOCIAL IMPACTS

Project / Operation	Status	Life	Workforce	Scale / Output	Likelihood of significant cumulative impact
Maxwell Underground Project	Approved	26 years	Construction: 250 Operation: 350	8 Mtpa ROM Coal	High
Maxwell Solar Project	Approved	Approximately 30 years	Construction: 50 Operations: 2	25 Megawatts (MW)	Low
Bowmans Creek Wind Farm	EIS in preparation	Approximately 25 years	Construction: 156 Operations: 15	Up to 60 turbines	Low / Medium
Dartbrook Mine	Unknown	Unknown	Unknown	Unknown	Medium
Spur Hill Underground Coking Coal Project	Gateway certificate issued 2014	25 years	Unknown	8 Mtpa ROM coal	Medium
Liddell Battery and Bayswater Ancillary Works	Approved	Up to 20 years	Construction: up to 250	Battery up to 2 Gigawatt-hours	Medium

Project / Operation	Status	Life	Workforce	Scale / Output	Likelihood of significant cumulative impact
Mount Pleasant Optimisation Project	Approved	26 years	Average operational: 600	21 Mtpa ROM coal	High
Muswellbrook Bypass	Enabling works	N/A	Unknown	N/A	High
Mangoola Coal Operations	Operational	Until 2031	390 employees / contractors	13.5 Mtpa ROM coal	Very high
Bengalla Coal Mine	Operational	Until 2039	490 employees	15 Mtpa ROM coal	Very high
Closure of the Liddell and Bayswater Power Station	Operational	Closure in early 2023 (Liddell) and by 2033 (Bayswater)	620 people	1,500 MW and 2,640 MW	Very high

Source: (AGL, 2022; Department of Planning and Environment, n.d.; Glencore, 2021; MACH Energy, 2022; New Hope Group, 2022; Transport for NSW, n.d.)

TABLE 17 POTENTIAL FOR CUMULATIVE IMPACT

Development / operation	Potential interaction with Mod	Potential cumulative impact
Continued operations of Mangoola and Bengalla Mines	Bengalla Mine is approved to operate to 2039, and Mangoola coal to 2031 (Glencore, 2021; New Hope Group, 2022). Due to their proximity to MAC, some nearby landholders are experiencing amenity impacts from these, and the broader community are experiencing socio-economic impacts, both positive and negative. These would continue during the life of the Modification.	**Surroundings:** continued cumulative contribution to noise, lighting and dust impacts, at current levels, should the Modification proceed. **Livelihoods:** continued cumulative contribution to positive and negative socio-economic impact should the Modification proceed, at current levels.
Closure of the Liddell and Bayswater Power Stations	The operator of these – AGL – has announced the planned closure of Liddell in early 2023, and Bayswater by 2033 (AGL, 2022). These closures would coalesce with the Modification primarily from a socio-economic perspective, as well as affecting the closure planning.	**Community:** cumulative opportunity to plan and prepare for closure. **Livelihoods:** continued cumulative contribution to positive and negative socio-economic impact should the Modification proceed, at current levels.
Mount Pleasant Optimisation Project and Maxwell Underground Project	The Mount Pleasant Mine is approved to operate until 2026 however the Independent Planning Commission has recently approved the Mt Pleasant Optimisation project which would see continued operations until 2048 (MACH Energy, 2022).	**Community:** cumulative opportunity to plan and prepare for closure. **Livelihoods:** potential to reduce negative socio-economic impact should the Modification not proceed.

Development / operation	Potential interaction with Mod	Potential cumulative impact
	Should this project proceed, it may affect how MAC and the community plan for closure (as it would affect employment and business opportunities in the area), as well as potentially reduce negative socio-economic impact should the Modification not proceed. Conversely, it may contribute to negative socio-economic impacts, particularly relating to housing demand should the Modification proceed. Likewise, should the Maxwell underground project proceed to construction and operations, this will affect the potential for cumulative impact in a similar way.	**Livelihoods:** potential for cumulative increased negative socio-economic impact should the Modification proceed.
Muswellbrook Bypass	Main works for the Muswellbrook Bypass is currently scheduled between 2023 and 2027 (Transport for NSW, n.d.). Whether and how this project would interact with the Modification to generate cumulative impacts depends on a range of unknown factors. It seems likely the main potential interaction is related to additional pressures on the housing market.	**Livelihoods:** potential for cumulative increased negative socio-economic impact should the Modification proceed.

With regards to combined impacts (i.e. the combined effect of different impacts from the same development) (Department of Planning and Environment, 2023b, p. 8), several stakeholders described experiencing multiple social impacts, both positive and negative. As with the cumulative impacts, it seems there is a combined element to all or nearly all impacts assessed above. This has been considered in the impact evaluation.

7. SOCIAL IMPACT MITIGATION AND MONITORING

7.1 Mitigation and Enhancement Measures

Table 18 describes the existing and proposed mitigation measures pertaining to each impact, and provides an assessment of residual impact significance. In summary, for the impacts that represent continuations of existing impacts, no new mitigation measures are proposed. These impacts are generally well understood, of low or medium significance, and BHP has existing management plans, procedures and personnel that address the relevant impacts. BHP is instead recommended to continue to implement and improve these throughout the life of the Modification. As an example of an area for potential continuous improvement, one stakeholder commented how the personnel answering the community response line did not know the name of the street they were calling from. To address this, BHP could consider providing training to familiarise personnel regarding the geographies and street names surrounding MAC.

A consequence of this is that the residual impact significance for the impacts that represent continuations remains unchanged.

By contrast, there are no existing mitigation measures for the impacts that are 'new' and relate to closure or final landform. In the context of the Modification – that is, compared to the current approved MAC – these impacts are positive. To ensure the benefit of these impacts are maximised (and consequently potential negative impacts of the eventual closure are reduced), BHP is recommended to establish and provide substantial resources for a transition team which would work with the community and other stakeholders in the period leading up to closure to progressively build an understanding of impacts and community priorities, and develop actions to address these. It would also be sensible to redirect some of the social investment programs towards initiatives that build community and business capacity to adapt to the change that will be induced by the eventual closure. Some suggestions in relation to this is provided in APPENDIX D.

TABLE 18 MITIGATION AND ENHANCEMENT MEASURES

Potential Social Impacts	Evaluated Significance	Existing Mitigation and Enhancement Measures	Proposed Mitigation and Enhancement Measures	Residual Impact Significance		
				Likelihood	Magnitude	Significance
Opportunity to plan and prepare for closure	High	None	• Establish and resource a transition team • APPENDIX D provides recommendations for mitigations to consider throughout the transition to closure	Almost certain	Major	Very high
Potential impact to Aboriginal heritage sites within the Modification New Disturbance Area	Medium	Proposed management measures within the ACHA prepared for the Modification. Approved Mt Arthur Coal Aboriginal Heritage Management Plan.	• Continue to implement measures within the Aboriginal Heritage Management Plan	Possible	Moderate	Medium

Potential Social Impacts	Evaluated Significance	Existing Mitigation and Enhancement Measures	Proposed Mitigation and Enhancement Measures	Residual Impact Significance		
				Likelihood	Magnitude	Significance
Continuation of current noise, lighting and dust impacts, at similar levels	Low	Proposed management measures within the Noise and Blasting Assessment prepared for the Modification. Proposed management measures within the Air Quality and Greenhouse Gas Assessment prepared for the Modification Community Response Line Approved Mt Arthur Coal Noise Management Plan, Blast Management Plan and Air Quality Management Plan	• Continue to implement the community response line, as well as the existing approved relevant management plans at MAC	Almost certain	Minimal	Low
Potential impact to water quality and quantity	Low	Proposed management measures within the Groundwater Assessment and Surface Water Assessment prepared for the Modification Existing Mt Arthur Coal Environmental Management Strategy Existing Mt Arthur Coal Water Management Plan and Site Water Management Plan	• Continue to implement management measures within the existing Mt Arthur Coal Environmental Management Strategy, the Water Management Plan, and Site Water Management Plan	Unlikely	Minor	Low

Potential Social Impacts	Evaluated Significance	Existing Mitigation and Enhancement Measures	Proposed Mitigation and Enhancement Measures	Residual Impact Significance		
				Likelihood	Magnitude	Significance
Improved visual impact of reduced overburden emplacement heights	Medium	Proposed management measures within the Landscape and Visual Assessment prepared for the Modification Any visual impacts are managed consistent with the existing Mt Arthur Coal Visual Impacts Management Report	• Continue to implement management measures within the existing Mt Arthur Coal Visual Impacts Management Report • Establish and resource a transition team • APPENDIX D provides recommendations for mitigations to consider throughout the transition to closure	Almost certain	Minor	Medium
Continuation of current socio-economic benefits, including employment, business opportunities and support for community organisations	Medium	Local Buying Program Social Investment Program	• Continue to implement Local Buying Program and social investment program	Almost certain	Minor	Medium
Continuation of current negative social and economic impacts, including rental shortages, economic divide and transient workers	Medium	Social Investment Program Community Engagement Program	• Continue to implement Local Buying Program, social investment program and community engagement program • Establish and resource a transition team	Almost certain	Minor	Medium

7.2 Monitoring Framework

Through existing management plans and procedures, BHP has measures in place to monitor the impacts that represent continuations of current experiences/impacts. Outcomes of these are published in the Annual Environmental Review[15], monthly complaints reports, in the C-Res annual report (C-Res implements BHP's Local Buying Program) and in other publications. In light of the low to medium significance of these impacts, and the low level of concern from most stakeholders, no additional monitoring measures for these impacts are proposed.

By contrast, it is recommended for BHP to develop a comprehensive monitoring program for the impacts that relate to the transition to closure, in accordance with the framework provided in the Technical Supplement (Department of Planning and Environment, 2023b, p. 18). This is further discussed in APPENDIX D, with example indicators provided.

[15] Available at https://www.bhp.com/sustainability/environment/regulatory-information

8. CONCLUSION

This SIA has identified, described and assessed seven social impacts associated with the Modification. Four impacts were negative in nature and were rated low to medium significance. Importantly, these impacts mostly constitute a relatively short continuation of existing experiences, largely at current levels to approved operations. BHP implements several management plans, processes and has personnel to manage and monitor negative impacts, and publishes its performance in relation to these regularly.

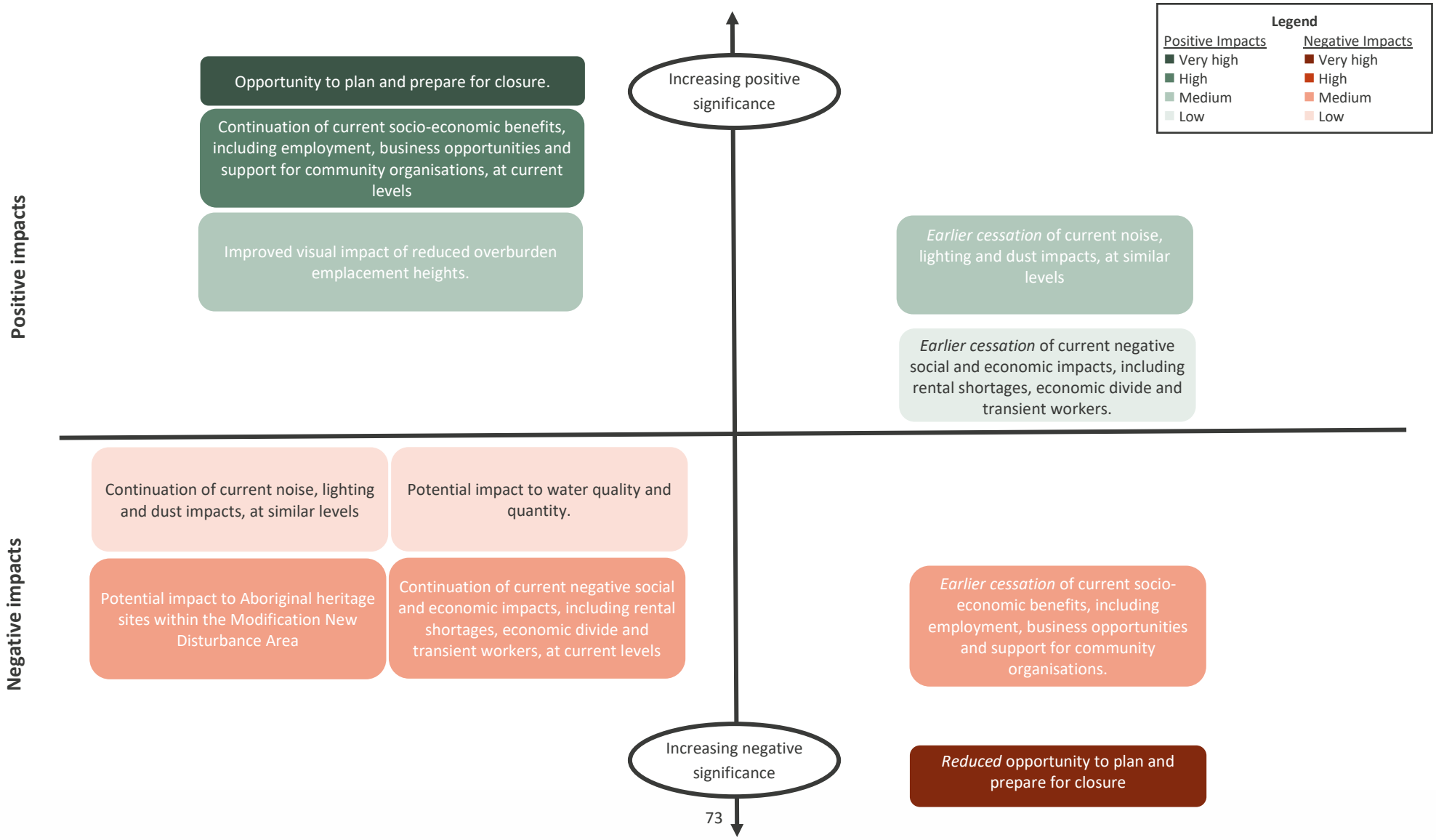
Three positive impacts were also identified, with two of these assessed with a medium significance. Overwhelmingly, the main benefit of the Modification would be the additional time it provides stakeholders to plan and prepare for the eventual cessation of mining at MAC. This impact is assessed with a high significance.

Should the Modification not proceed, the negative impacts would cease earlier, as would the positive socio-economic contribution BHP makes to the community. The benefit of an additional four years to plan for closure would also be foregone and this would likely lead to a suboptimal closure process with potential far reaching impacts on the Muswellbrook community.

Figure 28 summarises the impacts of the Modification as discussed above.

Overall, it seems likely the negative impacts of the Modification can be adequately managed through existing management processes. The benefits of the Modification proceeding provides a substantial opportunity for BHP, the community, local councils and governments to collaboratively plan for closure.

FIGURE 28 SUMMARY OF RESIDUAL IMPACT SIGNIFICANCE ASSESSMENT



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APPENDIX A Impact Identification

TABLE A-1 IMPACT IDENTIFICATION OF THE MODIFICATION – WERE IT TO PROCEED

Component	Approved Mt Arthur Coal Mine	MAC MOD 2030	Potential experienced change	Potential Social Impact	Likely cumulative impacts
Life-of-Mine	Approval for open cut mining to 30 June 2026.	Open cut mining to 30 June 2030 (i.e. additional 4 years).	Extension in time of the mine and its role in the local community. Continuation of current impacts and benefits. Additional time to plan for closure.	**Community:** Opportunity to plan and prepare for closure.	Yes
Annual ROM Coal Production Rate	Up to 32 Mtpa of ROM coal from the open cut mining operations. Handling of up to 36 Mtpa of ROM coal in total from the Mt Arthur Coal Mine (including 4 Mtpa ROM coal from the approved underground mine, which is approved but not operational).	Reduction in approved extraction, handling and processing of ROM coal from the open cut mining operations to 25 Mtpa (i.e. from 32 Mtpa). Reduction in overall approved ROM coal handling from 36 Mtpa to 29 Mtpa.	No experienced change as the proposed production rate is similar to current actual production rates.	-	-
Coal Processing Rate	Coal Handling and Preparation Plant (CHPP) processing of up to 36 Mtpa (including underground coal).	Continued use of the CHPP to facilitate the processing of up to 29 Mtpa of ROM coal from the total complex (i.e. reduction from 36 Mtpa to 29 Mtpa).	No experienced change as the proposed production rate is similar to current actual production rates.	-	-

Component	Approved Mt Arthur Coal Mine	MAC MOD 2030	Potential experienced change	Potential Social Impact	Likely cumulative impacts
Mining Areas	Open cut mining including the Northern Open Cut Pits (Windmill, Huon, Calool, Roxburgh and Ayredale) and Southern Open Cut Pits (Saddlers).	Minor extension of Northern Open Cut Pits.	Potential for minor change in experiences of noise, dust and visual impact. Potential for existing heritage artifacts or remains within the Modification New Disturbance Area.	**Culture:** Potential impact to Aboriginal heritage sites within the Modification New Disturbance Area impacting cumulative cultural value to Aboriginal stakeholders. **Surroundings:** Continuation of current noise, lighting and dust impacts at similar levels, affecting neighbours and landholders. **Surroundings:** Potential impact to water quality and quantity affecting other water users.	Yes

Component	Approved Mt Arthur Coal Mine	MAC MOD 2030	Potential experienced change	Potential Social Impact	Likely cumulative impacts
Overburden Emplacement	Development of northern overburden emplacement height to an average of 360 m Australian Height Datum (AHD) (maximum height of 375 m AHD). Development of Bayswater No 3 (Saddlers Pit) overburden emplacement height up to 250 m AHD. Development of Sublease CL 229 and Sublease CL 395 emplacement area up to 360 m AHD. Development of an out-of-pit overburden emplacement area up to 360 m AHD.	No requirement to develop the southern section of the out of pit emplacement. Reduction in height of the northern emplacement (from an average of approximately 360 AHD an average to an average of approximately 340 m AHD).	Overall reduced disturbance. Potential improved visual impact of reduced overburden emplacement height for surrounding stakeholders.	**Surroundings:** Improved visual impact of reduced overburden emplacement heights.	Yes
Disturbance Areas	Total MAC disturbance area of approximately 6,710 hectares (ha).	Decrease in net total disturbance of approximately 367 ha.	Unlikely to generate any experienced change as the out of pit emplacement area which is foregone by the Modification is not yet developed.	-	-
Mining Tenements	Mining Leases 1548, 1487, 1358, 1655, 1739, 1757, and 1593, Mining Purpose Lease (MPL) 263, Sublease Coal Leases (CL) 229 and 395, Coal Lease 396 and Consolidated Coal Lease (CCL) 744.	Unchanged.	None	-	-

Component	Approved Mt Arthur Coal Mine	MAC MOD 2030	Potential experienced change	Potential Social Impact	Likely cumulative impacts
Coarse Rejects and Tailings Management	Deposition of tailings in the tailings emplacement area at Bayswater No 2. Approval to dispose tailings in the void within Sublease CL 229. The tailings emplacement area up to 280 m AHD. Co-disposal of coarse reject within overburden emplacement areas.	Unchanged.	None	-	-
Product Coal Transport	Transport of up to 27 Mtpa product coal via rail. Maximum of 30 rail movements per day (i.e. 15-laden train departures).	Reduced transport of product coal to 20 Mtpa. Maximum of 20 rail movements per day (i.e. 10-laden train departures).	Minor or negligible experienced change as the proposed new rail movements are similar to current actual movements.	-	-

Component	Approved Mt Arthur Coal Mine	MAC MOD 2030	Potential experienced change	Potential Social Impact	Likely cumulative impacts
Employment	Total workforce of approximately 2,600 full-time equivalents employees during peak production. A workforce of approximately 240 full-time equivalent employees during peak construction phases.	Continuation of a total workforce of approximately 2,200 full-time equivalent employees to reflect current employment at MAC	Extension in time of employment for employees and contractors with flow on effects to the remainder of the Muswellbrook community and the broader Upper Hunter region.	**Livelihoods:** Continuation of current socio-economic benefits, including employment, business opportunities and support for community organisations, at current levels. **Livelihoods:** Continuation of current negative social and economic impacts, including rental shortages, economic divide and transient workers, at current levels.	Yes
Hours of Operation	All coal operations and associated activities undertaken 24-hours per day, seven days a week. Construction on-site may be on a 24-hour, seven day roster consistent with operational requirements.	Unchanged.	None	-	-
Explosives Facilities	Fully bunded on-site explosives magazine for the storage of detonators and other materials.	Unchanged.	None	-	-

Component	Approved Mt Arthur Coal Mine	MAC MOD 2030	Potential experienced change	Potential Social Impact	Likely cumulative impacts
Final Voids	Approval for three final voids (i.e. Northern Open Cut, Belmont Pit and MacDonalds Pit).	Retention of three final voids, comprising a final void at the Drayton Pit and backfill of the Belmont Pit.	Minor or negligible experienced change	-	-
Site Entrance	Various site accesses off Thomas Mitchell Drive and Edderton Road.	Continued use of existing site access roads on Thomas Mitchell Drive and Edderton Road.	None	-	-
Mining Method and Resource	Continuation of conventional open cut strip mining in the Windmill, Calool and Roxburgh Pits and terrace mining in the Ayredale Pit.	Unchanged.	None	-	-

TABLE A-2 IMPACT IDENTIFICATION OF THE MODIFICATION – WERE IT NOT TO PROCEED

Component	Approved Mt Arthur Mine	MAC MOD 2030	Potential experienced change	Potential Social Impact	Likely cumulative impacts
Life-of-Mine	Approval for open cut mining to 30 June 2026.	Open cut mining to 30 June 2030 (i.e. additional 4 years).	Earlier cessation of the mine and its role in the local community. Continuation of current impacts and benefits only until 2026 rather than 2030.	**Community:** *Reduced* opportunity to plan and prepare for closure	Yes

Component	Approved Mt Arthur Mine	MAC MOD 2030	Potential experienced change	Potential Social Impact	Likely cumulative impacts
Annual ROM Coal Production Rate	Up to 32 Mtpa of ROM coal from the open cut mining operations. Handling of up to 36 Mtpa of ROM coal in total from the Mt Arthur Coal Mine (including 4 Mtpa ROM coal from the approved underground mine, which is approved but not operational).	Reduction in approved extraction, handling and processing of ROM coal from the open cut mining operations to 25 Mtpa (i.e. from 32 Mtpa). Reduction in overall approved ROM coal handling from 36 Mtpa to 29 Mtpa.	No experienced change.	-	-
Coal Processing Rate	Coal Handling and Preparation Plant (CHPP) processing of up to 36 Mtpa (including underground coal).	Continued use of the CHPP to facilitate the processing of up to 29 Mtpa of ROM coal from the total complex (i.e. reduction from 36 Mtpa to 29 Mtpa).	No experienced change	-	-
Mining Areas	Open cut mining including the Northern Open Cut Pits (Windmill, Huon, Calool, Roxburgh and Ayredale) and Southern Open Cut Pits (Saddlers).	Minor extension of Northern Open Cut Pits.	The impacts associated with the mining areas will likely cease earlier.	**Surroundings:** *Earlier cessation* of current noise, lighting and dust impacts, at similar levels	Yes

Component	Approved Mt Arthur Mine	MAC MOD 2030	Potential experienced change	Potential Social Impact	Likely cumulative impacts
Overburden Emplacement	Development of northern overburden emplacement height to an average of 360 m Australian Height Datum (AHD) (maximum height of 375 m AHD). Development of Bayswater No 3 (Saddlers Pit) overburden emplacement height up to 250 m AHD. Development of Sublease CL 229 and Sublease CL 395 emplacement area up to 360 m AHD. Development of an out-of-pit overburden emplacement area up to 360 m AHD.	No requirement to develop the southern section of the out of pit emplacement. Reduction in height of the northern emplacement (from an average of approximately 360 AHD an average to an average of approximately 340 m AHD).	It is likely there would nevertheless be reduced overall disturbance and potential improved visual impact of reduced overburden emplacement height for surrounding stakeholders.	**Surroundings:** Improved visual impact of reduced spoil dump heights	Yes
Disturbance Areas	Total Mt Arthur Coal Mine disturbance area of approximately 6,710 hectares (ha).	Decrease in net total disturbance of approximately 367 ha.	It is likely there would still be a decrease in disturbance areas as part of approved operations due to closure in 2026 if the Modification were not to proceed, however no change is likely to be experienced by stakeholders.	-	-

Component	Approved Mt Arthur Mine	MAC MOD 2030	Potential experienced change	Potential Social Impact	Likely cumulative impacts
Mining Tenements	Mining Leases 1548, 1487, 1358, 1655, 1739, 1757, and 1593, Mining Purpose Lease (MPL) 263, Sublease Coal Leases (CL) 229 and 395, Coal Lease 396 and Consolidated Coal Lease (CCL) 744.	Unchanged.	None.	-	-
Coarse Rejects and Tailings Management	Deposition of tailings in the tailings emplacement area at Bayswater No 2. Approval to dispose tailings in the void within Sublease CL 229. The tailings emplacement area up to 280 m AHD. Co-disposal of coarse reject within overburden emplacement areas.	Unchanged.	None.	-	-
Product Coal Transport	Transport of up to 27 Mtpa product coal via rail. Maximum of 30 rail movements per day (i.e. 15-laden train departures).	Reduced transport of product coal to 20 Mtpa. Maximum of 20 rail movements per day (i.e. 10-laden train departures).	None.	-	-

Component	Approved Mt Arthur Mine	MAC MOD 2030	Potential experienced change	Potential Social Impact	Likely cumulative impacts
Employment	Total workforce of approximately 2,600 full-time equivalents employees during peak production. A workforce of approximately 240 full-time equivalent employees during peak construction phases.	Continuation of a total workforce of approximately 2,200 full-time equivalent employees.	Earlier cessation of employment and contracting opportunities for employees, contractors, their families and the broader community.	**Livelihoods:** *Earlier cessation* of current socio-economic benefits, including employment, business opportunities and support for community organisations. **Livelihoods:** *Earlier cessation* of current negative social and economic impacts, including rental shortages, economic divide and transient workers	Yes
Hours of Operation	All coal operations and associated activities undertaken 24-hours per day, seven days a week. Construction on-site may be on a 24-hour, seven day roster consistent with operational requirements.	Unchanged.	None.	-	-
Explosives Facilities	Fully bunded on-site explosives magazine for the storage of detonators and other materials.	Unchanged.	None	-	-
Final Voids	Approval for three final voids (i.e. Northern Open Cut, Belmont Pit and MacDonalds Pit).	Retention of three final voids, comprising a final void at the Drayton Pit and backfill of the Belmont Pit.	None	-	-

Component	Approved Mt Arthur Mine	MAC MOD 2030	Potential experienced change	Potential Social Impact	Likely cumulative impacts
Site Entrance	Various site accesses off Thomas Mitchell Drive and Edderton Road.	Continued use of existing site access roads on Thomas Mitchell Drive and Edderton Road.	None	-	-
Mining Method and Resource	Continuation of conventional open cut strip mining in the Windmill, Calool and Roxburgh Pits and terrace mining in the Ayredale Pit.	Unchanged.	None	-	-

APPENDIX B Impact Assessment Tools and Definitions

The following tables and figures are drawn from the Technical Supplement to the SIA Guideline.

FIGURE B-1 SOCIAL IMPACT SIGNIFICANCE MATRIX

		Magnitude Level				
		1. Minimal	2. Minor	3. Moderate	4. Major	5. Transformational
Likelihood Level	A. Almost certain	Low	Medium	High	Very High	Very High
	B. Likely	Low	Medium	High	High	Very High
	C. Possible	Low	Medium	Medium	High	High
	D. Unlikely	Low	Low	Medium	Medium	High
	E. Very Unlikely	Low	Low	Low	Medium	Medium

TABLE B-1 DEFINING LIKELIHOOD LEVELS OF SOCIAL IMPACT

Likelihood Level	Meaning
Almost certain	Definite or almost definitely expected (e.g. has happened on similar projects)
Likely	High probability
Possible	Medium probability
Unlikely	Low probability
Very unlikely	Improbable or remote probability

TABLE B-2 DIMENSIONS OF SOCIAL IMPACT MAGNITUDE

Characteristic		Details needed to enable assessment
Magnitude	Extent	Who specifically is expected to be affected (directly, indirectly and / or cumulatively), including any vulnerable people? Which location(s) and people are affected (e.g. near neighbours, local, regional, future generations)?
	Duration	When is the social impact expected to occur? Will it be time-limited (e.g. over particular project phases) or permanent?
	Severity or scale	What is the likely scale or degree of change (e.g. mild, moderate, severe)?
	Sensitivity or importance	How sensitive/vulnerable (or how adaptable/resilient) are affected people to the impact, or (for positive impacts) how important is it to them? This might depend on the value they attach to the matter; whether it is rare/unique or replaceable; the extent to which it is tied to their identity; and their capacity to cope with or adapt to change.
	Level of concern/ interest	How concerned/interested are people? Sometimes, concerns may be disproportionate to findings from technical assessments of likelihood, duration and/or intensity.

TABLE B-3 DEFINING MAGNITUDE LEVELS FOR SOCIAL IMPACTS

Magnitude Level	Meaning and Examples
Transformational	Substantial change experienced in community wellbeing, livelihood, infrastructure, services, health and/or heritage values; permanent displacement or addition of at least 20% of a community.
Major	Substantial deterioration/improvement to something that people value highly, either lasting for an indefinite time, or affecting many people in a widespread area.
Moderate	Noticeable deterioration/improvement to something that people value highly, either lasting for an extensive time or affecting a group of people.
Minor	Mild deterioration/improvement, for a reasonably short time, for a small number of people who are generally adaptable and not vulnerable.
Minimal	Little noticeable change experienced by people in the locality.

APPENDIX C Consultation Material

Information Sheet: Mt Arthur Coal Mine Mod 2030 – Social Impact Assessment

Thank you for your interest in the Social Impact Assessment (SIA) for the Mt Arthur Coal Mine Modification 2030 Project (MAC MOD 2030). BHP is seeking development consent for MAC MOD 2030 which would involve a modest increase in the approved extent of surface development (within the existing mining leases) and a reduction in the approved mining rate. The project would extend the life of the Mt Arthur Coal Mine by about four years to 2030.

BHP is preparing an application to modify the project approval, and this application will be supported by an SIA. The SIA is being developed in accordance with the Department of Planning and Environment's (DPE) SIA guidelines which are available at their website: https://www.planning.nsw.gov.au/Policy-and-Legislation/Under-review-and-new-Policy-and-Legislation/Social-Impact-Assessment

The SIA will identify, analyse and evaluate the potential impacts to people that may be associated with the Project. BHP has engaged Square Peg Social Performance Pty Ltd, a specialist social performance consultancy, to conduct the SIA. Reports from the SIA will be published on the DPE website, and there will be an opportunity for the public to make submissions in relation to these.

Your participation is important

We are seeking your input to the SIA. Your participation may involve contributing to an interview, meeting or focus group. You will be asked questions about your community, the people who live there, your thoughts on the Modification, how you think it will affect people, and what you think is most important to manage in relation to it.

When it comes to your participation, we would like you to note the following:

1) It is entirely voluntary to participate, and you can choose to withdraw at any time for any reason without any consequence for yourself. Should you wish to withdraw the information you have provided will be deleted and your information will not be used in the SIA.
2) During our conversation we will take notes. These will be transcribed and stored in our password protected cloud server.
3) Notes will be kept confidential by Square Peg Social Performance and business partners working on this SIA, including BHP. They will not be shared with any other organisations other than if required by law.
4) Your information may be cited or referred to in any SIA report or related material for the purpose of the Project only.
5) Your name will not be disclosed in any published reports. The name of the organisation you represent (if applicable) will be mentioned, and statements you make may be attributed to it, if you give us permission to do so.
6) We will send you a summary of our conversation and ask you to review it. We will also ask you to confirm that you are comfortable with any quotes attributed to you in the SIA reports.

If you have any questions or concerns in relation to this SIA you are welcome to contact Daniel Holm at Square Peg Social Performance (daniel.holm@square-peg.com.au), or Sarah Bailey at BHP (sarah.k.bailey@bhp.com).

Consent Form: Please complete applicable sections below

I, _____ have read this information sheet and consent form and agree to participate in the SIA for the Project.

_____ _____

Signature Date

Do you consent for the information you provide to be attributed to the organisation you represent, are a member of or work for?

☐ Yes ☐ No ☐ Not Applicable

Name of organisation: _____

If you would like to review transcripts, quotes or statements from our conversation prior to these being published in an SIA report, please indicate below:

☐ I would like to review the summary notes from our conversation.

☐ I would like to review any quotes or statements emanating from me prior to publication in any report.

☐ I do not need to review summary notes, quotes or statements prior to publication.

You can also elect to provide your consent verbally at our meeting.

Mt Arthur Coal
Modification Project (MOD 2030)

BHP

BHP is seeking a modification to Mt Arthur Coal's planning approval for an additional four (4) years, as part of a responsible process to cease mining in 2030.

Overview

Mt Arthur Coal is an open-cut energy coal mine in the Hunter Valley region of New South Wales. Mining at the Mt Arthur Coal complex has occurred since the 1960's. Mt Arthur Coal is located approximately five kilometres south of the township of Muswellbrook and engages a workforce of around 2,000 people.

Following an extensive two-year divestment review process, BHP announced that it will retain the Mt Arthur Coal mine in its portfolio and proceed with a managed process to cease mining by the end of the 2030 financial year. The plan to continue operating until 2030 is subject to obtaining a Modification to the current Planning Approval (PA 09_0062), which currently expires on 30 June 2026.

The four year consent life extension provides sufficient time to work with our people, local business partners, Traditional Owners and local and state governments to operate safely and productively, prepare for closure and sustainable rehabilitation of the site, and ensure the pathway to closure is managed in a way that meets community and regulatory expectations.

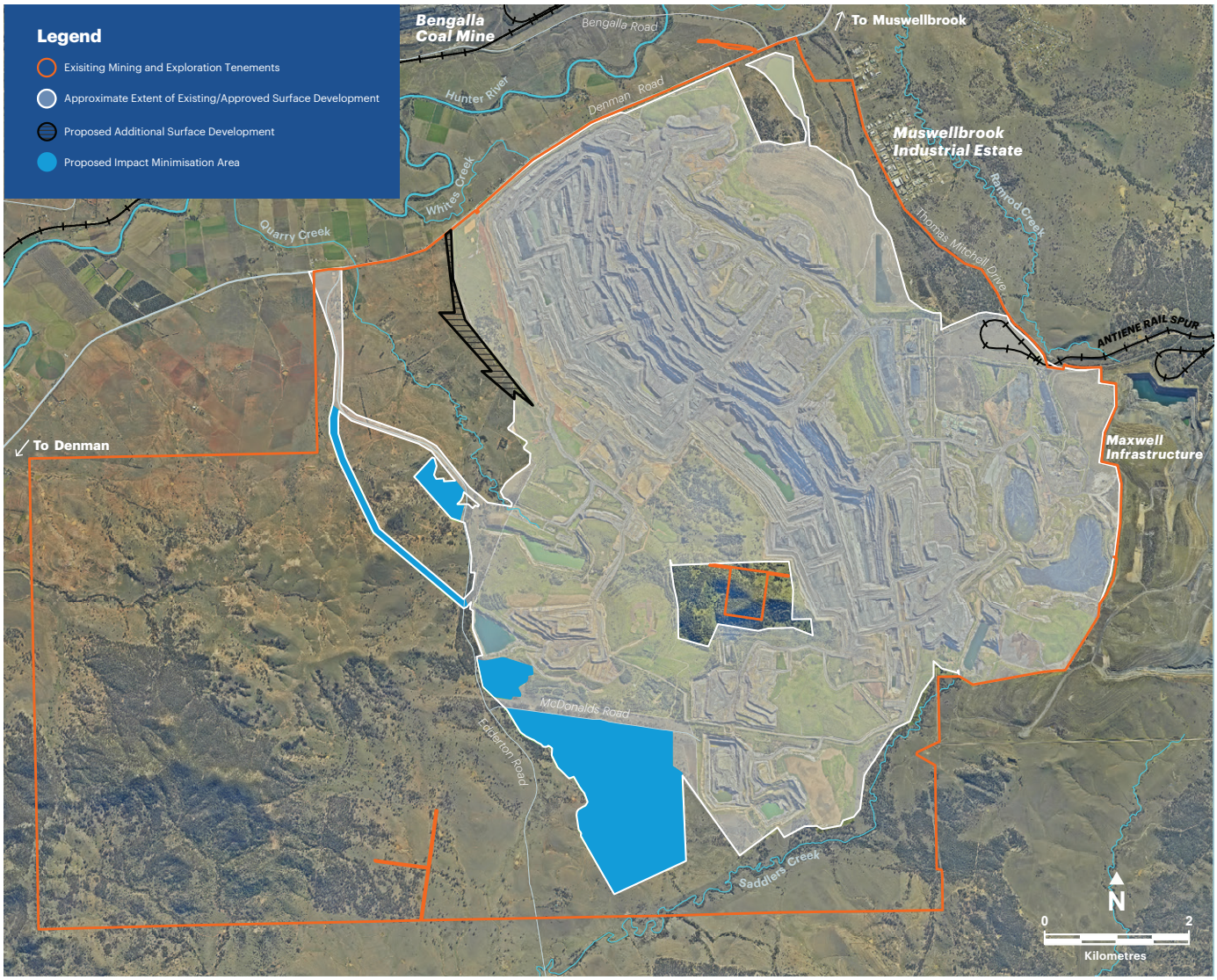
About the Modification Project

Key aspects of the Mt Arthur Coal Modification Project (MOD 2030) include:

- ☑ Four year extension of mining consent to 30 June 2030;
- ☑ Reduction in the approved mining rate from 32 Mtpa ROM to a max of 25 Mtpa ROM (similar to actual production);
- ☑ Reduction in maximum total coal rail transportation from 27 Mtpa to 20 Mtpa, and a reduction in train movements from 30 to 20 movements per day (similar to actual rail movements);
- ☑ Mining to occur within existing Mining Leases, no new mining tenure is required (refer to map on the following page);
- ☑ Continued progressive rehabilitation of landforms to contemporary standards using the latest technology in landform and hydrogeological modelling;
- ☑ An overall reduction in approved disturbance, as some previously approved disturbance areas are no longer required (refer to map on the following page);
- ☑ An overall reduction in height of the final landform; and
- ☑ Revised void configuration.

The Modification Project will not require changes to existing approved hours of operation.

Map showing Mt Arthur Coal's proposed open cut Modification Project (MOD 2030)



Benefits of the Modification Project

The Mt Arthur Coal complex has operated as part of the local community since the 1960s. Benefits associated with the Modification Project and pathway to closure include:

- ☑ Continuation of employment for a further four years from 30 June 2026, for the existing workforce who predominantly live and work in the region;
- ☑ A suitable timeframe for the workforce and community to be involved in the transition planning;
- ☑ Additional royalties to New South Wales from the coal resource that will be mined for a further four years; and
- ☑ An opportunity for the local community to work together with BHP and other agencies to identify economic transformation pathways for the local economy.

Modification Project progress

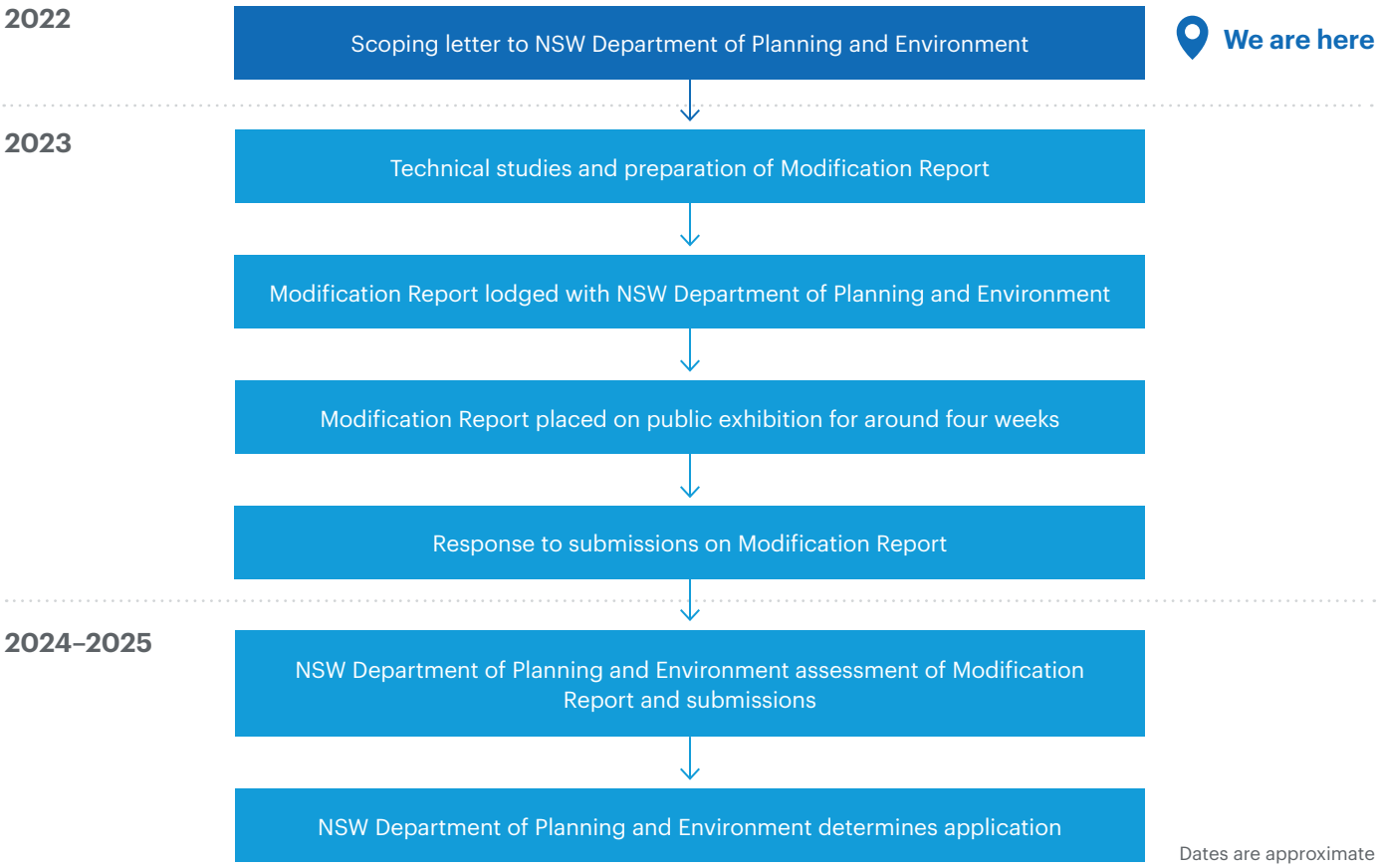
A Modification Report will be prepared to accompany the Development Application for a 'modification' in accordance with section 4.55(2) of the *NSW Environmental Planning and Assessment Act 1979*.

The Modification Report will involve the completion of a number of specialist studies to assess the potential impacts of the Modification Project, and to identify impact mitigation measures.

Feedback from the local community and key stakeholders will also inform preparation of the Modification Report.

A summary of the approval process including key milestones for the Modification Project is outlined on the following page.

Project milestones



Community involvement

Community and key stakeholder involvement is an essential part of the Modification Project. Mt Arthur Coal is commencing a comprehensive engagement program to ensure our community and stakeholders are consulted and can provide feedback on the proposal.

Over the coming weeks and months, Mt Arthur Coal will continue to meet with interested stakeholders including neighbours of our operation, community members and business representatives to conduct meaningful consultation on the Modification Project.

During this process, potential social impacts associated with the proposal will be identified and where possible addressed through mitigation measures.

Public feedback received will be considered in the Modification Report associated with the 'modification' application which is expected to be lodged with the State Government in the second half of 2023.

If you would like further information on the Project or to arrange a meeting, please call Mt Arthur Coal's Community Response Line on **1800 882 044** or email **NSWEC.Community@bhp.com**

For further information on the Project including updates, go online to **www.bhp.com/pathway-2030**

bhp.com

October 2022

APPENDIX D Impacts of Mine Closure

Overview

As discussed throughout this report, this SIA considers impacts of the Modification. In relation to closure, this means impacts are assessed considering cessation of mining at MAC in 2030 as compared to 2026, and not compared to continued operations; that is, the impacts of closure per se.

Nevertheless, almost all stakeholders who participated in this SIA talked primarily about the impacts of closure of MAC in itself, and some commented on the difficulty in disentangling the impacts of the Modification from the impacts of closure.

The following therefore contains a qualitative description of potential social impacts associated with closure, as well as recommendations relating to these. It is based on the feedback from stakeholders, as well as relevant literature about mine closure and social and economic transitions. Conducting a reliable evaluation of these impacts is both difficult due to the significant uncertainties associated with each, and also out of scope for this SIA. The extent to which many of the impacts described below eventuate will depend on social and economic conditions in the region closer to the time of closure. For example, at the time of writing, the labour market in the region was very tight, and the coal market strong. Should this continue, many impacts such as those related to potential unemployment and outmigration, may be significantly reduced. Nevertheless, the impacts of closure on the workforce, local businesses and generally the town of Muswellbrook would likely be transformational in nature.

Importantly, this section considers the potential impacts of transition to closure at MAC only. This is different to, however inscribed as a part of, an overall energy transition in the Hunter Valley, and which includes closures of power stations and potentially other mines, but also the potential for new mines opening, others extending their life or new industries being established. How this broader transition eventuates is likely to substantially influence how the Upper Hunter communities experience the eventual closure of MAC.

Likely Impacts to Community

Potential for population decline

There is a potential for population decline in Muswellbrook and the Upper Hunter as production ceases at MAC and the workforce transitions away. The scale of this impact is unknown, as it would depend on the number of workers residing in these shires at the time, the size of their families or households, and whether these decide to remain in the region following closure. The extent to which this impact materialises would also in turn affect the other impacts to community, including a potential reduction in house prices, and the reduced volunteering capacity and community group patronage. It would also influence a range of livelihoods related impacts, particularly for retail and hospitality businesses and their employees, as well as reducing the rate base for local council.

Reduction in house prices and consequent changing population composition

One of the most frequently mentioned impacts throughout this SIA was the potential for house prices to reduce should there be a substantial outmigration from Muswellbrook or a reduction in the wages of those that remain. This would initially affect existing homeowners.

Some stakeholders also noted that previous downturns in house prices had led to a corresponding in-migration of people from lower socio-economic groups, and that this had changed the composition of the town. Service providers also commented that, should this occur, the services available to support these in-migrating people were currently inadequate.

Reduced volunteering capacity and patronage for community and sporting groups

Another impact associated with the potential population decline is the potential for reduced volunteering and patronage in the various community organisations and sporting clubs in the area. Some stakeholders commented on how this may lead to some of these activities having to fold or consolidate.

Opportunity to reimagine a vision for Muswellbrook

Many stakeholders described Muswellbrook as a mixed or hybrid town, relying both on coal mining and other industries such as the equine industry. The MAC closure would affect the social and economic composition of the town, and change the nature of this hybridity. How it does so is however not a given, and this provides an opportunity for the community to reimagine its future.

Likely Impacts to Livelihoods

Reduction in business revenue and potential for businesses to fold

The closure of MAC would lead to a reduction in revenue for businesses who supply directly to MAC, or are sub-suppliers to these, as well as those that rely on patronage from the workforce and their families. This is likely to affect many of the businesses in Muswellbrook, and is also likely to lead to businesses reducing their workforces or permanently closing, which could further accelerate other impacts to community and livelihoods.

Potential for unemployment and reduced economic wellbeing

The closure of MAC, and the consequent potential for other businesses to close or reduce their workforces is likely to increase the unemployment rates in Muswellbrook and the surrounding LGA's, with a consequent reduction in overall economic wellbeing. This will affect the MAC workforce as well as employees in other businesses. As noted in section 5, the education levels of workers outside of the mining industry in Muswellbrook are generally lower than of those in mining. Whilst it is almost certain that MAC employees and contractors would lose their current jobs, the relatively higher education levels within the mining industry suggests they are less vulnerable to long term unemployment and its attendant socio-economic challenges. On the contrary, employees in other industries affected by the closure may be more at risk of long term unemployment and reduced socio-economic wellbeing.

The extent to which this occurs is contingent on multiple factors, including the extent of outmigration, the emergence of other employment opportunities, market conditions for the coal industry more broadly in the region and the outcomes of businesses' transition planning.

Opportunity for workforce and business participation in rehab

The transition to closure will also provide opportunities for business' to participate in the rehabilitation process, which is likely to take several years. The nature and extent of these opportunities are likely to be developed as the planning for closure progresses.

Opportunity to develop productive use of Mt Arthur site

The closure of MAC would also lead to opportunities to develop other productive uses at MAC, which may contribute to economic diversification of the region and positive flow-on effects. This however comes with risks, including relating to land use. During consultation, a representative of the NSW Fire and Rescue pointed out that inappropriate land use may increase health and safety risks, including relating to underground coal fires. Aboriginal stakeholders also expressed an interest in the future land use, including for potential productive uses, and ensuring the Mount Arthur area remains protected as it contained a historic massacre site.

Impacts of sale of land

Beyond the MAC boundary, BHP owns some surrounding buffer land. This land may be sold following closure. Unless this is done in an equitable manner, this process risks creating perceptions of unfairness which may lead to division within the community.

Likely Impacts to Health and Wellbeing

Uncertainty about the future

The most frequently discussed impact of the transition to closure was uncertainty about the future. This manifested first at an individual level. People whose livelihood, or whose family member's livelihood depended on the mining industry and Mt Arthur Coal, wondered how they would fare in the transition. This included workers, and employees and owners of suppliers, retail and hospitality businesses and community organisations. As noted in the consultation section (section 4), several stakeholders spoke about how the shock and disbelief they had felt when the decision to close MAC had been announced. Although this initial shock had largely receded, it can be expected that the uncertainty will remain in the period leading up to closure.

This uncertainty also extends to the community level. How the town of Muswellbrook would evolve leading up to and in the wake of closure was an open question and matter of speculation for many stakeholders.

Potential impacts to mental health for the workforce

A number of stakeholders commented on how coal mining was more than just a job but provided a source of identity for the workforce, and that many workers had spent their entire life at MAC or in the mining industry. In that context, being retrenched could impact more than people's livelihoods, but also their sense of worth and identity, leading to potential mental health consequences.

Likely Impacts to Surroundings

Reduction in amenity impacts

The eventual cessation of production at MAC would see a reduction in amenity impacts for surrounding landholders and residents, including noise, dust, lighting and blasting. This would however not coincide with cessation of production, as the rehabilitation works would likely involve activities causing noise, dust or lighting impacts.

Recommendations

The transition to closure is a multifaceted and challenging process which is likely to affect and be influenced by many different stakeholders. This means that many impacts associated with closure are interrelated and highly contingent on multiple decisions and actions by multiple stakeholders across multiple geographies and scales. Which is to say that it is difficult to assign a specific mitigation measure to a specific impact. The following therefore provides a non-exhaustive list of potential actions that BHP could undertake to address many of these impacts.

Communicate clearly

When asked about what they wanted to see from BHP in the transition process, nearly all stakeholders mentioned communication. Communicating clearly and with sufficient frequency about decisions made throughout the transition process would serve to gradually reduce the uncertainty that several stakeholders experienced.

Whilst stakeholders did not elaborate on how they wanted this to occur, it seems reasonable that multiple methods would be needed, as multiple stakeholders will experience the transition to closure differently and have different information needs. Key stakeholders are the workforce, suppliers, local councils, community organisations and residents.

Establish and maintain a baseline

Another way to reduce uncertainty would be to establish and maintain a baseline about MAC's contribution to the Muswellbrook and Upper Hunter communities. This could include the number of workers residing in the various shires, the number of businesses supplying to MAC, the total spend with local suppliers, and contribution to community groups. This could also – as appropriate – be communicated to the various stakeholders who are involved in planning the broader transition, to enable them making more informed decisions.

This baseline could also be coupled with building understanding (e.g. through a survey) of the intentions of the workforce; for example whether they intend to stay in the region or relocate, whether they intend to retire or seek alternative employment, or if so in which sectors.

Engage with stakeholders throughout the process

As the transition to closure is a process that is affected by and will affect many stakeholders, engaging and involving these in the process is pivotal (Bainton & Holcombe, 2018). Developing an inclusive and adaptable stakeholder engagement program for the transition to closure should be a priority for BHP.

Provide training and upskilling opportunities for the workforce

A frequently mentioned request was for BHP to support its workforce to train and gain qualifications that supported their transition into other employment, as well as ensuring the redundancy process was fair. It would be sensible for BHP to do so, as well as ensuring workers have access to an employee assistance program to address potential mental health issues.

However, as noted in the social baseline section, the skill levels among employees in other sectors in Muswellbrook are generally lower than in the mining industry. As such, to the extent that workers in those sectors would be affected by closure, they are likely to be more vulnerable. It would therefore be sensible for other stakeholders part of the transition process, such as governments, to support the up-skilling or re-skilling of workers in industries that are exposed to but not part of the mining industry, potentially supported by the proponent.

Actively participate in community or government led dialogue processes (and encourage other sectors to do the same)

Studying the outcomes of two comparable towns in the American 'rustbelt', Safford (2004) argues that the nature of social ties within these two towns led to divergent economic outcomes with regards to the transformation of large companies, creation of new firms, and the ability to attract outside investment. The town with the more successful outcomes displayed a social dialogue involving local organisational leaders. The other town, which had a history of contentious social relations, did not manage to engage these leaders, and in turn these formed networks outside of the community.

This suggests that a social dialogue that includes the active participation from leaders from different social and economic sectors is more likely to lead to a successful transition. It is also pertinent as, according to some respondents in this SIA, Muswellbrook has a history of conflict between the mining and agricultural sectors, similar to the town with less successful outcomes. This conflict had however dissipated according to some stakeholders. In this context, BHP could continue to participate in community or government led dialogue processes and encourage others to do the same.

Support initiatives that build community self-organising capacity

Several articles discussing economic transitions highlight the importance of community resilience, agency and self-organising and adaptive capacity. Community resilience can be construed of as including social capital, the ability learn, adapt and self-organise. Other factors that have been studied include community leadership, collective efficacy, community trust and inclusive decision making processes (Bainton & Holcombe, 2018; Leonard et al., 2016; Roemer & Haggerty, 2021). A community that displays these capacities is arguably more able to navigate the inevitable change associated with the transition to closure, and forge a positive future. As such, BHP through its social investment program, as well as other actors, could support initiatives that enable these factors to develop. How this should be done would ideally be developed in concert with the community, but a sensible starting point could be to develop a baseline and gap analysis of community resilience.

Support initiatives that enable businesses to build transition capacity

Businesses, both suppliers to MAC, and other businesses in the community are likely to be affected by the transition to closure, albeit in different ways and to different degrees. It would be sensible for BHP, either

directly or through other platforms eg the Local Buying Foundation, and for other stakeholders to support the capacity of businesses to adapt to this transition.

This could take many forms. As a pertinent example, a study of 400 firms in the coal seam gas regions in Queensland gauged their performance and identified resilience factors over three distinct phases, an investment phase, a transition to operations phase and a future phase (Ford et al., 2016).

The factors that were most strongly associated with future strong performance – in the context of a reducing resource industry – included pro-activeness, adaptiveness and slack (i.e. spare human and financial resources). The study also identified the resilience factors where regional firms were lacking (including connectedness, adaptiveness and innovative problem solving), and areas where firms could be supported to strengthen their resilience (including building pro-activeness and slack).

Although it would be up to the stakeholders in the transition process to define the projects that suit their needs, a potential approach to assist businesses building transition capacity could include developing a baseline of the prevalence of business resilience factors in the Upper Hunter and develop a targeted program to address any gaps.

Build knowledge about transitions

As part of this SIA we conducted a review of mine closure related literature. A pertinent finding is that there is a dearth of empirical studies addressing the social aspects of mine closure or energy transitions in hybrid towns in developed economies. The few empirical articles we located were mostly from South Africa and India, and generally describe negative outcomes of closure, including social disruption, crime levels, disproportionate impacts on women, inadequate planning capacity, population outmigration, reduced house prices and business closures (Marais, 2013; Marais, Cloete, et al., 2022; Marais, Ndaguba, et al., 2022; Marais & Cloete, 2013; Ntema et al., 2017, 2017; Rao & Pathak, 2005; Sesele & Marais, 2022; Siyongwana & Shabalala, 2019). Examples from developed economies include case studies of mining downturns in Broken Hill in Australia and Kiruna in Sweden during the mid 1990's (Lansbury & Breakspear, 1995)[16].

Both the articles by Bainton and Holcombe (2018) and Roemer and Haggerty (2021) mention this lack of empirical studies, indicating there is a gap in the knowledge base that informs the decisions companies, governments and communities make as they prepare for closure and transition. It also means there is an opportunity for stakeholders in this transition to contribute to building this knowledge base. A first step could be to work with an academic institution to develop a systematic literature review about the social aspects of closure. Another option could be to consider an action-research oriented project throughout the transition to closure, to both build knowledge and concurrently put it in practice.

[16] Although the title of Lansbury's and Breakspear's publication contain 'closure', it should be noted that the Kiruna mines did in fact not close, but have on the contrary been expanding in recent decades, leading to an extensive program of societal transformation where a large portion of the Kiruna town has been relocated to make way for an expanding mine.

Outlines of a Monitoring Program

It will be important to monitor how the transition to closure evolves to enable adaptive management (Bainton & Holcombe, 2018; Lamb & Coakes, 2012). To that end, BHP is recommended to establish a monitoring program that identifies and tracks the evolution of key indicators of success. Whilst it will be important to establish and design this program in conjunction with the community, some key principles are relevant:

- The monitoring program would do well to include a relatively small number of quantitative indicators which address the closure process and closure outcomes. The program could include both 'objective' indicators of change and perceptual indicators (that is, stakeholders experiences and perceptions). Indicators of social change relevant to the transition to closure could include:
    - Population growth / decline
    - Unemployment rates
    - Crime rates
    - Industries of employment
    - Housing costs and housing availability
    - Number of business entries and exits

  Relevant perceptual indicators could include measures of:
    - Community wellbeing
    - Community connectedness
    - Perceptions of impacts occurring
    - Trust in companies, government and other institutions
    - Perceptions of BHP and other stakeholders' performance
- Regular 'groundtruthing' or seeking community members sense-making of the data is also important.
- Whilst it is important that desired outcomes and indicators are established collaboratively with the community, establishing criteria for selecting these is important. Example criteria include salience, validity, credibility, measurability, and comprehensibility (Uhlmann et al., 2014).
- Monitoring data should be publicly available.

Table D-1 below provides an example of a monitoring framework, following the template provided in the Technical Supplement. Data gathering methods for this monitoring program would include a workforce survey, a community survey and a business survey, as well as secondary data from official sources. These methods could be deployed by BHP, potentially in collaboration with local stakeholders such as the business chambers, or an academic institution. In terms of frequency of data gathering, it would be sensible to balance the need for up to date monitoring of performance data with the risk of creating 'survey fatigue' within the community. As such it would be sensible to deploy surveys no more frequently than biennially. Secondary data can be gathered annually.

TABLE D-1 POTENTIAL MONITORING FRAMEWORK

Desired Outcome	Example indicators	Methodology	Frequency	Responsibility
Indicators of a successful closure process				
Stakeholders are informed about and engaged in the transition to closure	• Stakeholder satisfaction with BHP information provision and engagement	Community survey	No more than biennially	BHP alone or in collaboration with local stakeholders
Workforce is satisfied with the transition to closure	• Perception of fairness • Confidence about future	Workforce survey	No more than biennially	BHP alone or in collaboration with local stakeholders
Communities and businesses build capacity to adapt to closure	• Community self-organising capacity • Prevalence of social ties • Levels of community trust • Prevalence of business resilience factors	Community survey Business survey	No more than biennially	BHP alone or in collaboration with local stakeholders
Indicators of successful closure outcomes				
Community wellbeing is maintained or improved	• Community wellbeing • Community functioning	Community survey	No more than biennially	BHP alone or in collaboration with local stakeholders
Businesses thrive through closure and beyond	• Business performance • Business exit and entries	Business survey ABS	No more than biennially Annually	BHP alone or in collaboration with local stakeholders
Community social and economic change is positive	• Perceptions of impacts / change • Estimated population • Unemployment levels • Income levels • Crime rates • House sales prices	Community survey Various secondary data sources: ABS, ATO, NSW Bureau of Crime and Statistics Research, NSW Department of Communities and Justice	No more than biennially Annually	BHP alone or in collaboration with local stakeholders

Conclusion

To conclude this discussion about impacts of closure of MAC, the impacts of closure will be multifaceted, widespread, interrelated and will affect a multiplicity of stakeholders in different ways. It would be sensible for BHP to invest significant efforts in ensuring these impacts are well understood, and are managed adaptively throughout the transition to closure and beyond. The recommendations and outlines of a monitoring program described here provides a starting point for that effort.

DOCUMENT PROPERTIES

Version	Purpose	Issued	Contributors	Approver
1.0	Issued for use	2023/09/01	Jon Simpson Daniel Holm	Daniel Holm

DECLARATION

The lead author of this SIA Report is Lars Daniel Holm (Daniel). Daniel is the director and principal consultant of Square Peg Social Performance Pty Ltd. He holds a master's degree in political science from Uppsala University in Sweden and has approximately 15 years of professional experience in the field of social impact assessment, social performance, social policy and communications, and is a member of the International Association of Impact Assessment. Daniel has contributed to or led more than fifteen SIA's or other projects studying community and stakeholder experiences of projects or policy interventions. He is currently undertaking PhD studies at the University of Queensland.

In submitting this SIA Report the following declarations are made:

- This SIA Report contains all information deemed relevant for the purposes of meeting the requirements set out in the Social Impact Assessment Guideline for State Significant Projects (Department of Planning and Environment, 2023a).
- None of the information presented herein is to the knowledge of the lead author false or misleading.
- The lead author is aware of and has endeavoured to abide by the ethical principles and considerations outlined in the National Statement on Ethical Conduct in Human Research (National Health and Medical Research Council, 2018) and the Principles for ethical research involving humans: ethical professional practice in impact assessment Part I (Vanclay et al., 2013).
- The qualifications, experience and professional memberships of the lead author are set out in the paragraph above.

Signed and dated:

2023/09/01

Lars Daniel Holm

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