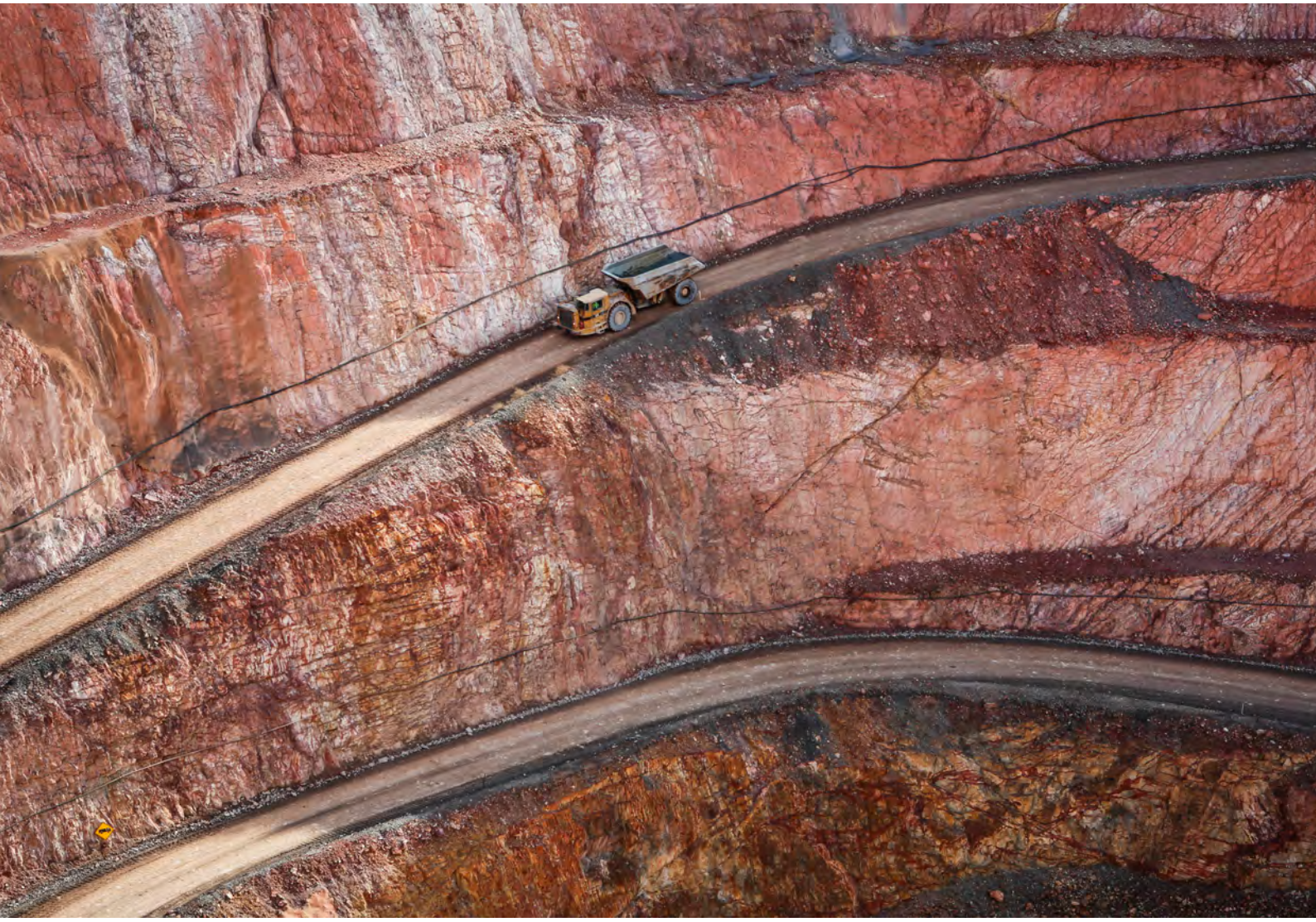
New Cobar Complex Project, State Significant Development (SSD10419)

Environmental Impact Assessment

Prepared for Peak Gold Mines
February 2021



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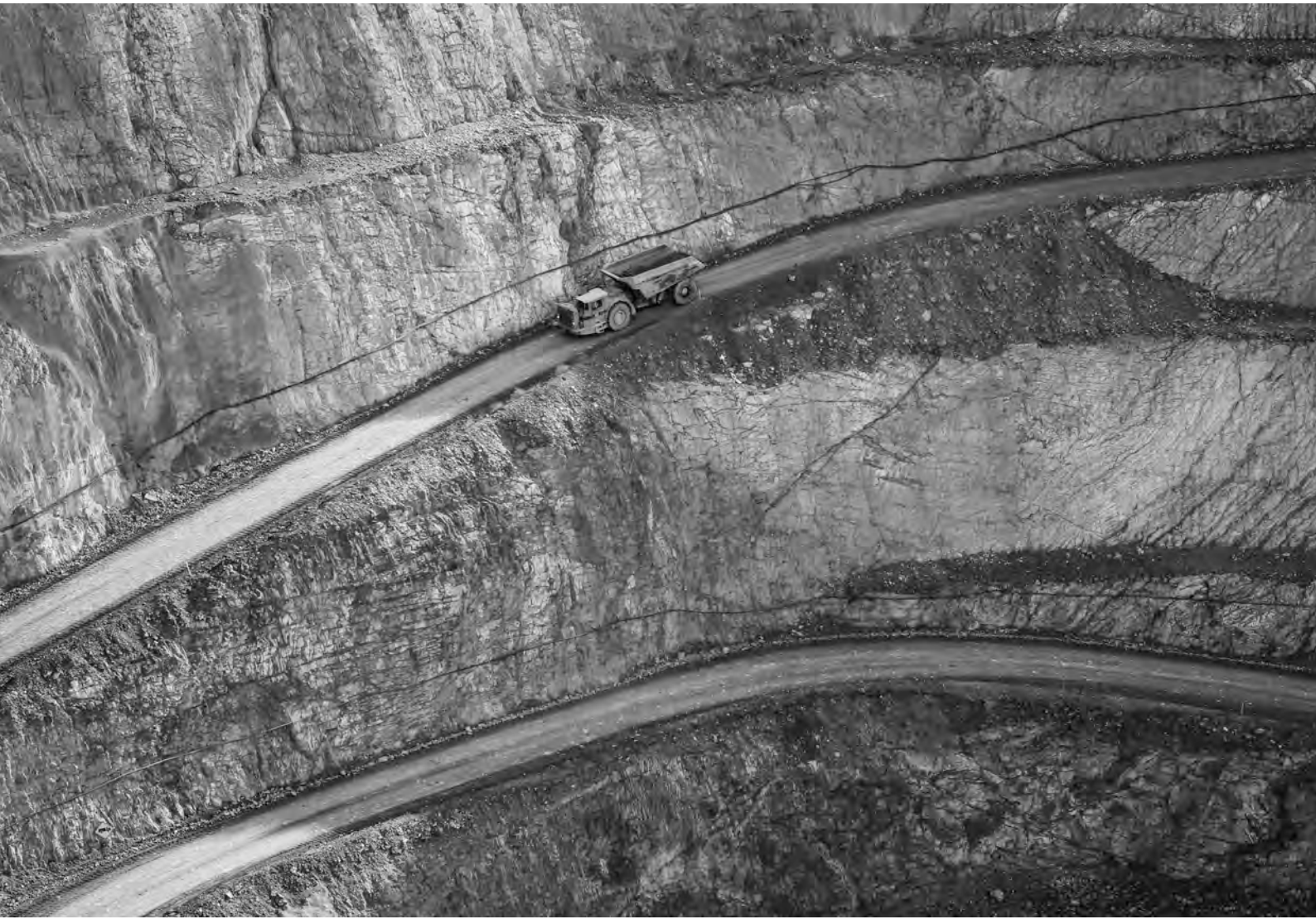

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20 Social

20.1 Introduction

A social impact assessment (SIA) was completed by EMM to assess the predicted social impacts and benefits associated with the project. The SIA was prepared in general accordance with DPIE[2] document, Social impact assessment guideline: For State significant mining, petroleum production and extractive industry development, September 2017 (SIA Guideline) (DPE 2017). The SIA is provided in full in Appendix Q.

20.2 Assessment requirements

The SEARs require an assessment of the likely social impacts of the project. The specific requirements relating to social impacts are provided in Table 20.1.

Table 20.1 Social requirements

Relevant authority and assessment requirement	Relevant section of this report
DPIE	
An assessment of the likely social impacts of the development on the local and regional community generally in accordance with the Social Impact Assessment Guidelines for State Significant Mining, Petroleum Production and Extractive Industry Development (2017), including:	Across Chapter 20 but in particular in Section 20.6 Appendix Q
the likely impacts of the development on the local community;	Section 20.6 Appendix Q
cumulative impacts (considering other mining developments in the locality); and	Chapter 22 of the EIS Appendix Q
consideration of workforce accommodation.	Section 20.4 Section 20.6 Appendix Q

20.2.1 Methodology

This SIA has been informed by best practice guidance and standards set out by the International Association for Impact Assessment (IAIA) and International Finance Corporation (IFC), and developed in accordance with the SIA Guideline (DPE 2017). The assessment of the social impacts considered a range of complex factors and often competing interests.

The methods and a detailed summary of assessment for the projects against key policy requirements, is contained in in the SIA (Appendix Q).

20.2.2 Evaluation of community effects

The impact assessment is reflective of this, and has:

- assessed some aspects of the project as both negative and positive as they relate to different groups of people;

[2] Formerly the Department of Planning and Environment at the time of publication of the SIA Guideline.

- included negative impacts on local communities while documenting the benefits to the broader region;
- identified management strategies to maximise identified benefits and mitigate and minimise negative impacts;
- considered the impacts on vulnerable groups and provided management strategies to ensure that any existing disadvantages are not exacerbated; and
- considered each community's access to critical resources, such as housing and health care, and how this affects their resilience.

20.3 Existing environment

This section provides a summary of the baseline information for the local area and key social conditions for the area of social influence for the project that contribute to the identified social impacts. The complete baseline study that forms the basis for the SIA is provided in Appendix B of the SIA (Appendix Q of the EIS).

20.3.1 Area of social influence

The project is located south of the town of Cobar and as such its community makes up the local area of social influence for the SIA. The area of social influence to which this assessment applies, is defined in Table 20.2.

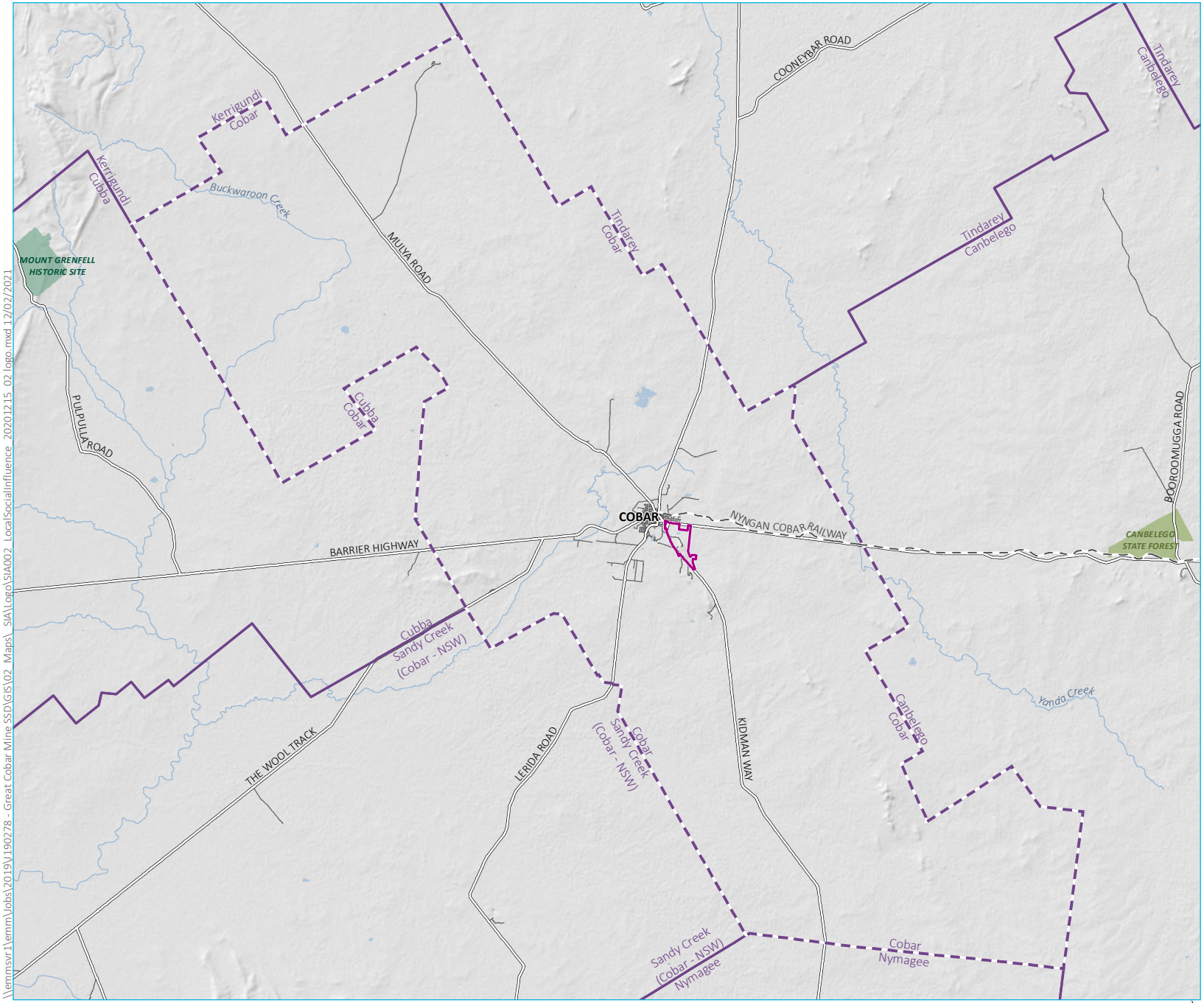
The project is likely to have a broader influence on the wider region due to supply chains, haulage routes, transportation of goods, materials and equipment, and the movement of its workforce, some of which may be fly-in/fly-out and drive-in/drive-out (FIFO/DIDO) arrangements (DPE 2017). These factors require the area of social influence to include regional areas likely to be impacted by the project which will extend to cover the Cobar LGA. This region forms the regional area of social influence. These communities have the potential to benefit and/or be impacted as a result of the project.

For comparative purposes, Far West and Orana SA4 statistical districts were identified as the area of reference. This area will provide social trends and data for communities more consistent with the local and regional areas of influence, thus providing a meaningful point of comparison. Similarly, comparison is made against the state of NSW.

These communities have been mapped to the ABS categories used for data collection (Table 20.2) and the local and regional area of social influence (ie Cobar LGA) hereto referred to as local area or regional area, illustrated in Table 20.2and Figure 6.2.

Table 20.2 Area of social influence

Areas	Geographic area	ABS data category	Referred to in report as:
Local area of social influence	Cobar Suburb	Cobar State Suburb (SSC)	Local area
Regional area of social influence	Cobar region	Cobar LGA	Regional area
Area of reference	Far West and Orana region	Far West and Orana SA4	Area of reference
State of New South Wales	State of New South Wales	New South Wales STE	NSW



Local area of social influence

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Figure 20.1

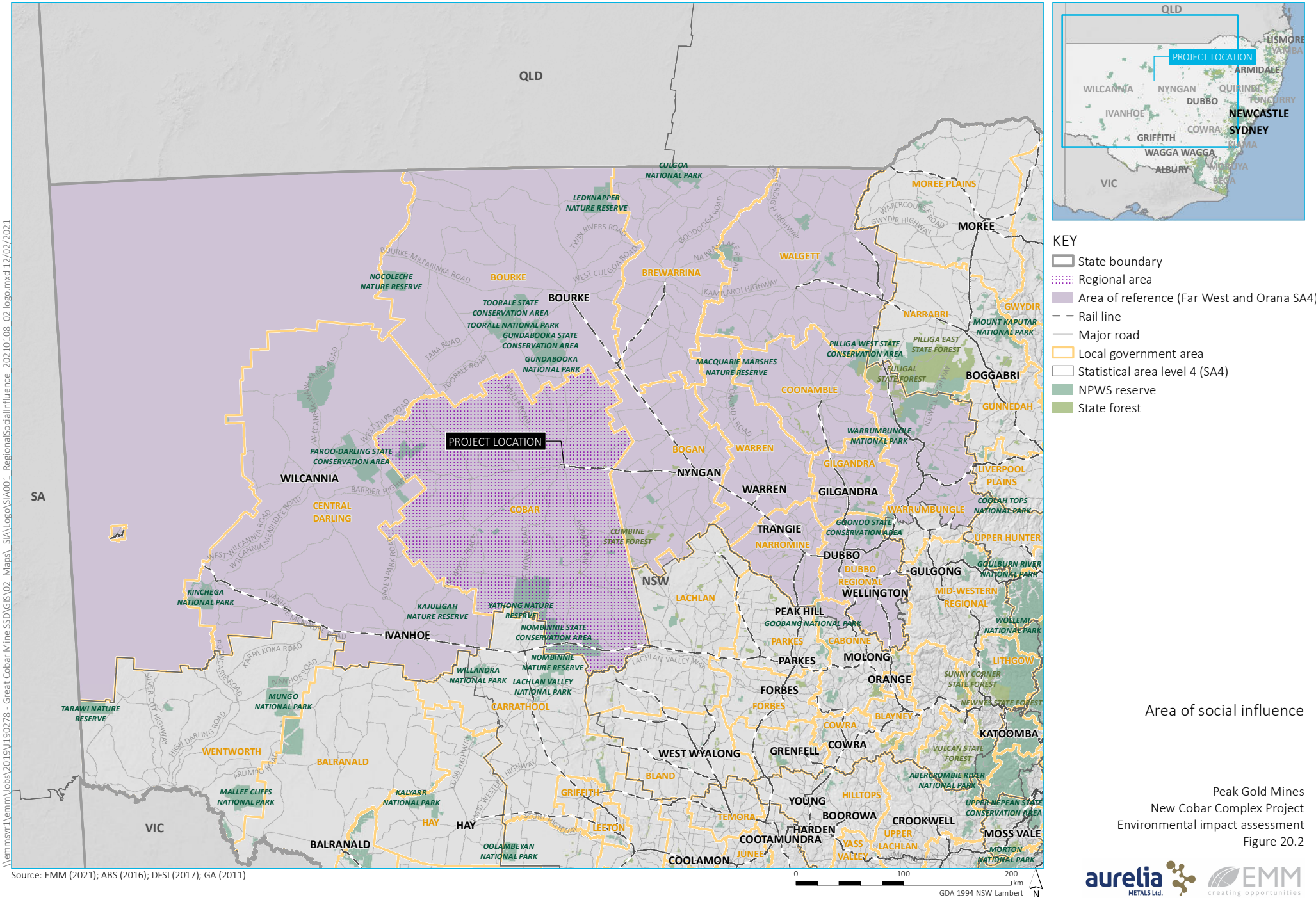

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Figure 20.2

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20.3.2 Social baseline

The community vision as described by CSC is for Cobar Shire to be "an attractive, healthy and caring environment in which to live, work and play, achieved in partnership with the community through initiative, foresight and leadership". There is a dedication to values that promote cooperation and equity, the sustainable ecological and economic development of the region, and community involvement in decision-making processes (CSC 2019).

Analysis of the 2016 Census of Population and Housing (ABS 2016) reveals that the local area has a total population of 3,990 people, representing a 5.0% population decrease since 2006. The population of the regional area also decreased by 6.0% from 2006–2016. The population of the regional area is projected to continue to decline. The declining population is a result of migration out of the regional area which could be influenced by people seeking education or work opportunities not readily available in regional communities and enhanced access to community, social and health services (AIHW 2005; Hugo and Harris 2011; D'Alessandro and Bassu 2015). Community consultation conducted as part of the SIA field study revealed that a declining population is a particular concern amongst residents of the local area, as this affects local businesses, provision of social services, and their ability to engage in recreation activities.

Overwhelmingly, mining is the single largest industry of employment in the local, and regional areas of social influence, with 35.9% and 32.0% of the workforce, respectively. Other top industries of employment in the local area include health care and social assistance (8.0%) and retail trade (7.6%). The unemployment rate in the local area is 5.8%, which is lower than both the area of reference and NSW (ABS 2016).

There are a few identified groups that would be considered vulnerable in the local area and regional areas. Within the regional area, 4.0% of residents require assistance when undertaking core activities due to a long-term health condition, a disability or old age (ABS 2016). Unemployed youth represent another potentially vulnerable group in the local area. The youth unemployment rate in the local area (15.6%) is higher than the NSW average (13.6%) and the regional area (13.5%) (ABS 2016).

Cobar is the central hub for the regional area and offers a range of community services, including Aboriginal services and organisations, ageing services, children's services, community legal services, counselling, disability services, family and women's services and housing and homelessness services. Although the services offered are varied, there are a relatively small number of providers. The local area and regional area have access to the Cobar Health Service, a 10-bed public hospital and health service. However, an absence of admissions for acute emergencies, non-emergencies and mental health treatment in the period 2011–2017 (AIHW 2020) and community feedback that a reduced range of health services, necessitates travel to larger regional centres like Dubbo to receive adequate care.

The local area is located within Western NSW Local Health District (LHD). Western NSW LHD has a higher percentage of the population who are obese, smoke daily, and consume alcohol at high-risk levels in comparison to NSW (Ministry of Health 2019). PHIDU (2019) reports the proportion of people with high or very high psychological distress based on the K10 Scale to be 12.8% in the regional area and 11.0% in NSW. The trend data is only available at the LHD level and indicates that levels of psychological distress rated between high and very high in the Western NSW LHD have been mostly in line with those seen across NSW, with a slight decrease in Western NSW LHD since 2017 (Ministry of Health 2019).

At the time of the 2016 Census, there were significantly fewer proportion of private dwellings occupied in the local area compared to NSW. This oversupply of private dwellings may indicate a departure from the local and regional areas to regional centres and larger cities due to the lack of social and health services within local and regional areas and the employment opportunities within regional centres and larger cities (AIHW 2005; Hugo and Harris 2011; D'Alessandro and Bassu 2015).

While there are a range of sporting clubs and facilities in Cobar (eg rugby union, rugby league, netball, soccer, athletics, cricket, shooting, horse riding, horse racing, swimming, bowling, motocross, dance, and judo), evidence from the local community suggests that involvement in recreational activities such as sporting clubs and subsequent use of these facilities is declining. This may be indicative of the declining population within the local area.

20.3.3 Community strengths and vulnerabilities

A summary the key strengths and vulnerabilities within the community based on the existing social conditions raised by community members during the SIA field study is provided in Table 20.3.

Table 20.3 Community strengths and vulnerabilities

Vulnerabilities	Values	Strengths
• Declining population.	Community	• Close, interconnected community structure with strong support.
• High socioeconomic disadvantage. • Lack of opportunity for residents.	Lifestyle	• 'Small-town' feel, suitable for raising a young family. • Recreational and sporting oriented, evidence of various recreational facilities (ie Newey Reservoir) and sporting clubs.
• Lack of diversity in terms of larger businesses and industries. • New businesses deterred and not being established in the area.	Business	• Evidence of high-paying roles attributed to the mining industry.
• Undersupply of rental properties and tight rental market. • Oversupply of private dwellings (vacant or for sale) indicative of residents relocating.	Housing	• Availability of private dwellings.
• High youth unemployment. • Low higher-qualification and education attainment.	Workforce	• Available workforce with skills suitable for mining and construction industries. • Low (adult) unemployment.
• Limited range of health services resulting in residents travelling to larger towns (eg Dubbo) for additional services. • Decline in the creative industries and infrastructure.	Access to information services	• 'Central Hub of the regional area'. • Well-serviced in terms of community services. • Road (Barrier Highway and Kidman Way), rail and air links to most major cities).
• Reduced participation in recreational activities (eg sports and arts)) and declining provision of social services due to declining population affecting social determinants of health.	Health and community wellbeing	• Close-knit community.
• Dry and arid landscapes (low agricultural value).	Surroundings	• Local heritage and mining history supporting the tourism within the local area.

20.4 Field study

The social field study consisted of an online community survey and in-depth interviews with a range of local and key stakeholders. Full details of the social field study process and outcomes are provided in Chapter 6 of Appendix Q.

20.4.1 Participation

Consultation for the SIA was carried out during the COVID-19 pandemic and conducted in accordance with applicable Australian and NSW Government health agency advice.

An online community survey was open to the general public to identify issues and potential impacts relating to the project. The survey included open ended, multiple choice, and rating-style questions which provided both qualitative and quantitative data. The survey was available for response from 24 September 2020 – 30 October 2020. There was also the opportunity for respondents to provide their contact details for any follow up information or consultation regarding the project. The online survey was advertised using the Aurelia Metals Facebook page and the New Cobar Complex Social Pinpoint website.

Interviews and meetings which informed the SIA were conducted with Cobar community members, representatives of service providers, councillors from CSC, and the CCC from 27 October 2020 – 29 October 2020. Due to the COVID-19 pandemic, interviews were conducted as a teleconference either via phone or online. A total of 25 stakeholders were invited to participate in consultation, with 11 interviews successfully conducted with landholders, CCC members, representatives from the Cobar Rugby Club, State Emergency Services, Ambulance Station, the Cobar Memorial Services Club, the Great Cobar Heritage Centre, the Cobar Health Service, Cobar Public School, Cobar High School, and CSC.

The methods of SIA field study with community and key stakeholders and details of participation are summarised in Table 20.4.

Table 20.4 Participation by engagement event

Method	Event	Administered	Timeframe	Invited	Participated
Survey	Online community survey	Online	Available from 24 September 2020 – 26 October 2020	Open to all residents of the local and regional areas and key stakeholders	24
In-depth interview	Briefing and SIA consultation meetings	Teleconference (on-line or via phone)	Conducted from 24 September 2020 – 30 October 2020	25	11
Information session[1]	Cobar Community information session	Face to face	Conducted from 4 – 5 December 2020	Open to all residents of the local and regional areas and key stakeholders	9

1. The information session formed part of the engagement phase of the EIS (rather than the SIA), but was used to confirm the findings of the SIA.

20.4.2 Findings

i Online community survey

Survey respondents identified that the issues they have previously raised with PGM or Aurelia concerned impacts from noise and vibration on the Great Cobar Heritage Centre, air pollution, dust, FIFO/DIDO workers and rostering, the Cobar Rugby Club bore water, mental and physical health of workers and the local community, and traffic. Awareness for the project varied, with 33% of respondents reporting very poor or poor awareness, 25% reporting a fair awareness, and 42% reporting having good or very good awareness.

Participants were provided with a list of potential impacts associated with the project and were asked to rate each impact as either very negative, negative, neutral, positive or very positive. The most negatively rated were health (29%) and vibration (29%) impacts, followed by noise (25%), air quality (25%) and ground water (25%). Survey respondents also raised concerns over the FIFO/DIDO working rosters, particularly regarding

the negative impact of a seven day on, seven day off arrangement on the local community. Concerns were also raised related to health due to the mining of lead and zinc. The most positively rated impacts associated with the project were local economy (17%), employment (17%) and regional economy (13%) where some respondents felt that the continuation of the site will sustain employment.

ii Interviews

Interviews found that participants perceive Cobar to be a welcoming and inclusive mining town with a wonderful, unique, and friendly community. Many noted that Cobar is a safe town and an ideal location to raise children as it has an environment suitable for small families. However, stakeholders felt that Cobar is in decline due to the lack of services and product availability in the local area which is believed to have influenced the decrease in population. Participants described there to be a high level of cohesion within the small community. Although, some respondents felt that Cobar was 'losing its sense of cohesion' due to the divide in values and perceptions of mining in the local area. The current nature of the mining workforce and rostering was also believed to influence this divide.

Significant concerns and issues were raised by residents in relation to the FIFO/DIDO workforce with respondents stating that Cobar was a vibrant town prior to introduction of FIFO/DIDO associated with contemporary rostering arrangements. Many interviewees felt that there would be benefits and opportunities with the project if the workforce consisted of a predominantly residential workforce, where workers contribute to and are involved with the local community which would help increase services in the area, improve on infrastructure, and attract new residents to the area.

Stakeholder perceptions of mining often concerned how mining has impacted the local population, recreational activities, and community cohesion. However, it was frequently mentioned that Cobar is recognised as a 'mining town' that receives industry support from mining. Stakeholders mentioned that sporting culture throughout the town has been greatly impacted, with an insufficient number of community members involved in sports such as little league, swimming club, and soccer. This was believed to be a result of the declining population and poor work/life balance of mining families as they were unable to commit to recreational activities. The impacts of water draw down on the rugby club's bore water raised concerns over how it could impact the maintenance of the fields during drought, as the fields require bore water to sustain the fields. It was identified that the fields cannot last longer than eight weeks without water, rendering them unusable.

Overall, many stakeholders felt that the project will provide workforce stability as a result of the ongoing employment the project offers, and this would benefit the local community through the flow on effect of supporting local businesses and services. The increased availability of traineeship opportunities would also be useful for the community.

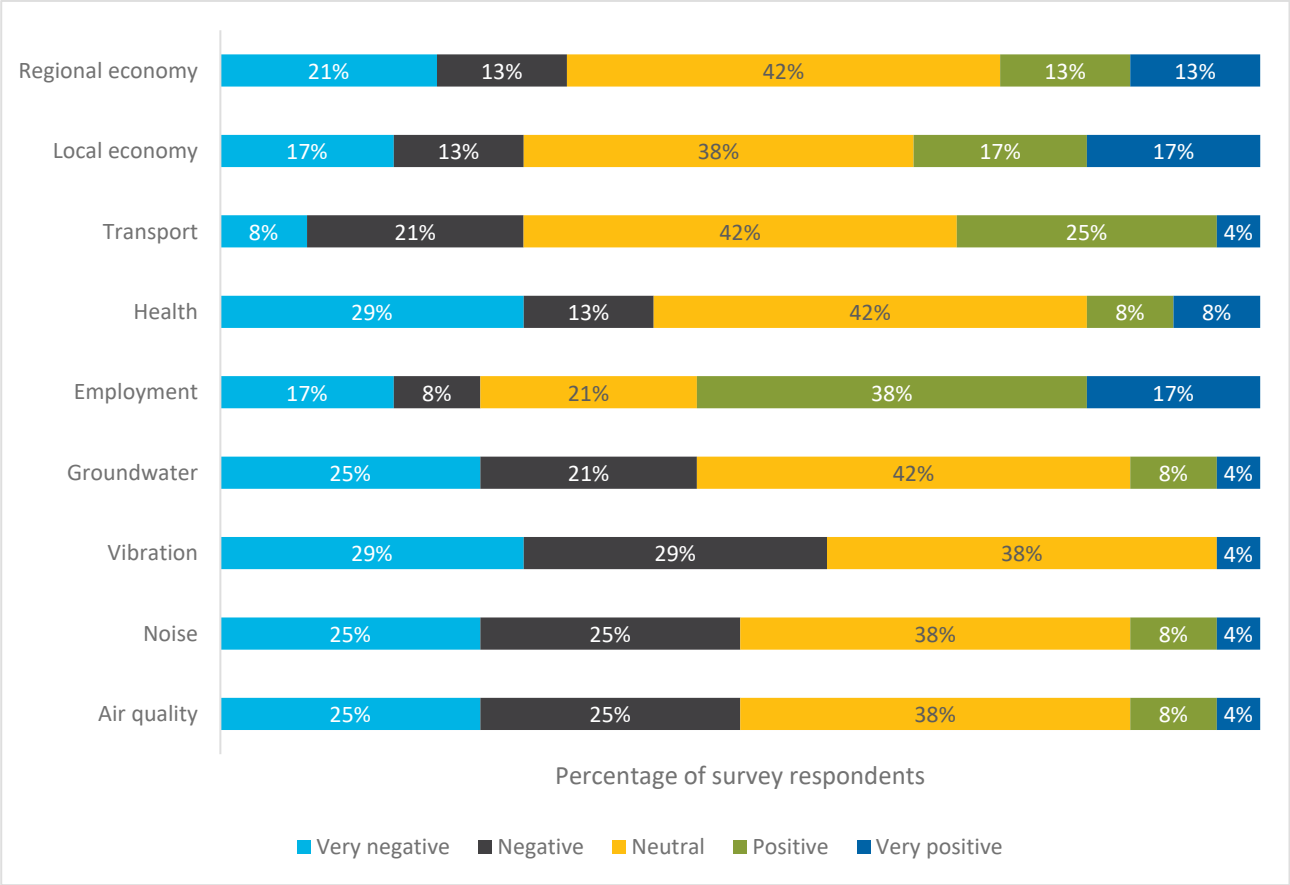


Figure 20.3 Potential impacts associated with the project as identified by survey respondents

A summary of the community and stakeholder consultation findings from the online community survey and consultation interviews are shown in Table 20.5.

Table 20.5 Summary of community and stakeholder SIA field study findings

Issue	Detail
Livelihood and employment	Perceived benefits from ongoing employment of the project, particularly for local workers.
Local economy and resilience	Cobar is identified as a 'mining town' that receives industry support from mining. Mining is necessary to the continued economic and social sustainability of the local area
Community engagement	Recognition during stakeholder consultation that community consultation has improved in the last two years (since Aurelia Metals acquired PGM), which has improved the relationship between the local community and PGM. Participants often mentioned that they appreciated the contributions and the improved community engagement and were interested in the continued development and strengthening of this relationship.
Water drawdown	Concerns over how water drawn down may impact the bore water supply used to maintain the Cobar Rugby Club playing fields during drought.
Recreational use of the Newey Reservoir	Concerns were raised over the impact of water quality on the Newey Reservoir and how it will disrupt recreational use.

Table 20.5 Summary of community and stakeholder SIA field study findings

Issue	Detail
DIDO/FIFO Workers	Many participants felt that the FIFO/DIDO workforce has greatly impacted the community due to the lack of contribution from workers which has led to a divide in the community and sense of cohesion decreasing. Concerns that the FIFO/DIDO workforce deters local businesses from establishing their business in the local area.
Traffic and road safety	Mention of the road quality and how increased movements of heavy vehicles will impact the road. Concerns were raised regarding road damage and who will be monitoring and maintaining it.
Lack of services	Concerns were raised regarding the lack of services in the area, which influences residents to move away from Cobar.
Vibration and blasting	Concerns that existing mining operations have impacted the infrastructure of local buildings and residential properties. Vibrations from blasting can also be felt within the town.
Noise	Noises from existing operations can be heard from the town which causes annoyance. Blasting noises scaring younger children.
Air quality	Perceived health impacts of air emissions and dust from site on the air quality for local residents, particularly for children.

20.5 Assessment criteria

The aim of the SIA was to assess the proposed change to the current social conditions from the project. It has utilised data from several sources to develop a layered picture of the potential social impacts that are likely consequences or changes experienced by the community in which the project is located.

In order to prioritise the identified social impacts, a risk-based framework has been adopted in the assessment of social impacts. Consideration of the findings from technical reports as well as the perceptions of stakeholders when conducting the social risk ranking to ensure an integration of expert and local knowledge in impact assessment and the development of appropriate impact mitigation, amelioration, and enhancement strategies.

Assessment of social impacts is complex and as such requires the balancing of a range of factors and often competing interests. The impact assessment is reflective of this and has:

- assessed some aspects of the project as both negative and positive as they relate to different stakeholders;
- included negative impacts on local communities while documenting the benefits to the broader region;
- considered the impacts on vulnerable groups and provided management strategies to ensure that any existing disadvantages are not exacerbated; and
- considered each community's access to critical resources, such as housing and health care, and how this affects their resilience.

The social impacts below have been assessed on a worst-case scenario initially and then the residual effect is assessed on the basis that mitigation of negative impacts or enhancement of positive impacts are

successfully implemented. The assessment uses the terms unmitigated and mitigated when referring to negative impacts and un-enhanced or enhanced when referring to positive impacts.

The following data and information have been used to identify the impacts and their associated risks:

- data collected as part of the social baseline;
- findings from community and stakeholder consultation activities;
- findings from technical studies;
- academic research; and
- relevant high-quality government and agency reports.

A social impact workshop was conducted to assess impacts using the social risk matrix shown in Figure 20.4. The workshop took place once potential impacts were identified and described. The workshop was conducted by two associate social scientists with a combined 42 years' experience in completing SIAs and other types of social science research. One social planner and two graduate social planners also contributed to the workshop.

Using the consequence and likelihood framework allows the assessment of the level of significance of a social impact as negligible, marginal, moderate, major, or intolerable, and the assessment of the level of significance of a social benefit as minimal, minor, desirable, or highly desirable, based on a combination of likelihood and consequence. Both negative impacts and benefits have been assessed. The social risk assessment is informed by the primary and secondary data collected from the literature review, social baseline study, SIA field study, and findings of technical studies.

20.6 Impact assessment

The SIA provides an assessment of the unmitigated/mitigated and unenhanced/enhanced impacts and benefits on the local and regional communities as a consequence of the project. The affected parties, duration, and extent of the impact has been identified for each matter assessed as having a potential social impact. A summary of the potential social impacts and benefits of the project is provided in Table 20.6. Details of the assessment are identified in Appendix Q.

20.7 Commitments and management measures

It is proposed that a monitoring and management framework be developed to ensure that the identified positive and negative impacts identified above (Table 20.6) are monitored over time to measure the effectiveness or otherwise of the proposed management measures, including the changing conditions and trends in the Cobar region over the same period.

Risk rating methodology for SIA ®

SIA definitions	Positive Consequences (Benefits)				Negative Consequence (Impacts)					SIA definitions
Extent of the benefit (people & geography)	The local, regional and potentially the national economy will benefit significantly. Improvements on social services and/or social cohesion.	The local and regional economy will benefit. Improvements on social services.	The local economy will benefit. Improvements on social services.	Marginal improvements/ contribution to local economy. Marginal improvements/ contribution to social services and/or social cohesion.	No or negligible socioeconomic impact.	Socioeconomic impact that will take small effort to restore and does not threaten livelihood. No exogenous resources are required for the recovery.	Socioeconomic impact will require minimal additional external resources to recover.	Socioeconomic impact will depend on reasonable amount of external resources to recover.	Socioeconomic impact will depend on significant external resources to recover and may not be back to how it was before the impact.	**Level of impact**
Cumulative duration the benefit is experienced	Benefits will realise in the **short term** and will be permanent	Benefits will realise in the **short to medium term** and may or may not be permanent	Benefits will realise in the **medium to long term** and are not permanent	Benefits will realise in the **short term** and are not permanent	Short timeframe impact on livelihood or liveability.	Impacts on the livelihood or liveability are limited to the life of the project.	Impacts on livelihood and/or liveability will survive the life of the project.	Impacts on livelihood and liveability could survive long after the life of the project or can be permanent.	Impacts on livelihood and liveability survive long after the life of the project and are permanent.	**Cumulative duration the impact is experienced**

Note: Sections shaded in grey need to be customised for each discipline, currently these are for SIA.

		4	3	2	1	1	2	3	4	5
		Higly Desirable	Desirable	Minor	Minimal	Negligible	Marginal	Moderate	Major	Intolerable
Has occurred in the past in this project (or operation) or in similar project OR circumstances could cause it to happen during the project (or operation).	5 Almost certain	Significant (15)	Significant (12)	Moderate (8)	Limited (5)	Low (6)	Medium (8)	High (12)	Unacceptable (16)	Unacceptable (16)
Has occurred in the life of this project (or similar project*) or in the last few years of operations or circumstances could cause it to occur again in the short term.	4 Likely	Significant (14)	Significant (11)	Moderate (7)	Limited (4)	Negligible (4)	Low (7)	Medium (10)	High (14)	Unacceptable (16)
Has occurred at least once in this project or a similar project (or in the history of this operation).	3 Possible	Significant (13)	Significant (10)	Moderate (6)	Limited (3)	Negligible (3)	Low (6)	Medium (9)	High (13)	Unacceptable (16)
Has never occurred in this project (or operation) but has occurred at other similar projects (operations) with similar risk/benefit profile.	2 Unlikely	Significant (12)	Moderate (9)	Limited (5)	Limited (2)	Negligible (2)	Low (6)	Medium (8)	Medium (11)	Unacceptable (16)
Is possible, but has not occurred to date in this project or similar projects.	1 Rare	Significant (11)	Moderate (8)	Limited (4)	Limited (1)	Negligible (1)	Negligible (5)	Low (7)	Medium (10)	High (15)

Likelihood

Maximise benefit — **Aim** — Minimise impact

Benefit assessment and enhancement plan

Promote actions and /or design that realises the benefit with limited inputs. Investigate whether changes in the implementation/design can make the benefit 'moderate' or 'significant'	Limited (1-5)
Actively promote actions and/or design that realises the benefit. Investigate whether changes in the implementation/design can make the benefit 'significant'	Moderate (6-9)
Actively promote and prioritise actions and/or design that realises the residual benefit.	Significant (10-15)

Short term __ months/years
Medium term __ months/years
Long term __ month/years

Residual risk assessment and mitigations plan

No major concern - systems and processes managing risks are adequate	Negligible (1-5)	Low (6-7)
Periodic monitoring - improve controls or monitor risk to ensure residual rating does not increase	Medium (8-11)	
Continuous review - confirm adequacy of controls and continued monitoring to maintain or reduce risk	High (12-15)	
Active management - urgent treatment required to allow project to proceed	Unacceptable (16)	

Table 20.6 Summary of social impacts and benefits and mitigation and management strategies

Social Impact (negative) / Benefit (positive)	Matter	Affected parties	Unmitigated or unenhanced	Proposed mitigation and management	Mitigated or enhanced
Way of life – Impact	Drawdown of bore water affecting recreational use and amenity of rugby grounds	Cobar Rugby Club, local area and regional area residents (users of the rugby field on a regular basis) and wider area users (ie tournament participants)	High	PGM has committed to make good arrangements to supply supplementary water to the Cobar District Rugby Club to replace any reduction in pumping capacity that may occur due to the drawdown of the water table. This will be done in consultation with the Cobar District Rugby Club to achieve a solution that is in all parties' best interests. Development and implementation of a community and stakeholder engagement strategy which includes provisions for information distribution and feedback mechanisms related to the ongoing operation and state of the rugby grounds.	Low
Way of life – Impact	Noise and vibration from blasting causing amenity issues	Residents, businesses, and service providers of the local area (particularly those located on the Eastern side of the town)	Low	Development and implementation of a consistent blasting notification procedure as part of the community and stakeholder engagement strategy. Implementation of mitigation measures as outlined in the NVIA.	Negligible
Way of life – Impact	Surface water quality and amenity of the Newey Reservoir	Residents of the local area (particularly users of the Newey Reservoir)	Negligible	Continued implementation of the water management plan during operation of the project. Inclusion of information about water quality monitoring in any updates provided to the local community as part of the community and stakeholder engagement strategy.	Negligible
Way of life – Benefit	Livelihood benefits from ongoing employment and mining operation	Resident workers, FIFO/DIDO workers, and businesses comprising the supply chain	Moderate	Provision of training, apprenticeship and upskilling opportunities for the project workforce. Encourage and support further integration of the project workforce into the local community where possible	Significant
Community – Benefit	Social cohesion, capital and resilience benefits in the local community	Residents of the local area	Limited	Development of a strategy for the enhanced identification and implementation of shared value opportunities within the local area.	Significant

Table 20.6 Summary of social impacts and benefits and mitigation and management strategies

Social Impact (negative) / Benefit (positive)	Matter	Affected parties	Unmitigated or unenhanced	Proposed mitigation and management	Mitigated or enhanced
Health and wellbeing – Impact	Stress due to noise and vibration from blasting	Residents, businesses, and service providers of the local area (particularly those located on the Eastern side of the town)	High	Development and implementation of a consistent blasting notification procedure as part of the community and stakeholder engagement strategy. Implementation of mitigation measures as outlined in the NVIA.	Low
Health and wellbeing – Impact	Health issues due to dust and emissions	Residents of the local area (particularly residents located near the construction)	Negligible	PGM will continue to manage and monitor their community grievance mechanism (ie complaints register) and provide opportunities for community feedback related to air quality which may arise as a consequence of the project.	Negligible
Health and wellbeing – Impact	Physical health impacts from heavy metals	Residents of the local area	Negligible	Include information about heavy metals monitoring in any updates provided to the local community as part of their community and stakeholder engagement strategy.	Negligible
Health and wellbeing – Impact	Mental health impacts from perceived heavy metals	Residents of the local area	Medium	Include information about heavy metals monitoring in any updates provided to the local community as part of their community and stakeholder engagement strategy.	Negligible
Personal and property rights – Impact	Damage to housing and structures due to vibrations from blasting	Residents, businesses, and service providers of the local area (particularly those located on the Eastern side of the town)	Low	Development and implementation of a consistent blasting notification procedure as part of the community and stakeholder engagement strategy. Implementation of mitigation measures as outlined in the NVIA.	Negligible
Fears and aspirations – Impact/ Benefit	Community cohesion issues related to project workforce	Residents of the local area	Medium	The development and implementation of a community and stakeholder engagement strategy would also increase transparency and provide clear expectations by communicating the intention for PGM to hire locally where possible. Encourage and support further integration of the project workforce into the local community where possible. A commitment to local procurement of goods and services in the form of a local business and local industry procurement strategy specific to the project	Negligible (mitigated) Limited (enhanced)

Table 20.6 Summary of social impacts and benefits and mitigation and management strategies

Social Impact (negative) / Benefit (positive)	Matter	Affected parties	Unmitigated or unenhanced	Proposed mitigation and management	Mitigated or enhanced
Fears and aspirations – Impact/ Benefit	Continuity of mining operation in Cobar	Residents of the regional area and parties incorporated into mining supply chain	Medium	Continued operations at PGM and approval of this project. Development and implementation of a community and stakeholder engagement strategy which includes provision for consistent updates on the status and life of the project. Involvement of the local community in post-closure and rehabilitation strategy (including consideration for post-mining land use and post-mining employment opportunities for the project workforce).	Negligible (mitigated) Limited (enhanced)
Fears and aspirations – Impact	Subsidence (fear)	Residents of the local area	Medium	Inclusion of information about subsidence monitoring in any updates provided to the local community as part of the community and stakeholder engagement strategy.	Negligible

It is proposed that the monitoring and management framework identifies the following key aspects:

- track progress of mitigation and management strategies;
- assess actual project impacts against predicted impacts;
- identify how information will be captured for reporting to impacted stakeholders including landholders, communities and government on progress and achievements;
- key performance indicators, targets and outcomes;
- responsible parties; and
- mechanisms for ongoing adaption of management measures when and if required.

To ensure the effectiveness of the management measures for the identified positive and negative impacts, it is recommended that a continuous improvement approach be adopted allowing for the review and adaption of impacts, management measure and outcomes.

An approach that ensures stakeholders from various sections of the community are regularly informed and given the opportunity to participate and collaborate is recommended. This approach is used successfully to manage social impacts from mining operations in several other mining regions throughout Australia and around the world.

The community consultation strategy will consider all options and will apply the instruments that best fit the overall needs of the project. However, the approach will ensure that mechanisms for both information dissemination and feedback collection are incorporated.

A summary of the proposed social impact mitigation and management strategies is provided in Table 20.6. In addition, key potential stakeholder partners have been identified to participate in the monitoring and management of impacts.

20.8 Conclusion

The SIA provides an assessment of potential social impacts (negatives) and benefits (positives) associated with the project. It identifies the relevant social issues, social impacts and benefits, and associated mitigation and enhancement measures applicable to the design, construction, and operation of the project. The key potential social impacts and benefits identified were:

- way of life impacts: drawdown of bore water affecting use of the Cobar District Rugby Club grounds; noise and vibrations from blasting causing amenity issues; and livelihood benefits from ongoing employment and mining operation.
- community impacts: social cohesion, capital, and resilience benefits in the local community.
- health and wellbeing impacts: stress due to noise and vibration from blasting;
- fears and aspirations impacts: community cohesion issues related to mining workforce; and continuity of mining operation in Cobar.

Mitigation and management strategies have been proposed for each of the identified potential social impacts to minimise negative consequences and to maximise social benefits for the local community. Performance

indicators will be developed by PGM for each mitigation and enhancement measure in consultation with stakeholders and will be monitored throughout the project life span by PGM.

An adaptive approach will allow PGM to manage and respond to changing circumstances and new information over time through ongoing monitoring and periodic review of mitigation strategies; this will allow for modification if required and if appropriate. This adaptive approach will ensure that the management of social impacts identified in the SIA will result in effectively minimising negative social impacts and maximising social benefits for the local community.

21 Economics

21.1 Introduction

This chapter provides a summary of the economic impact assessment completed by AEC for the project, which is provided in full in Appendix R. The assessment was prepared in accordance with the Guidelines for Economic Assessment of Mining and Coal Seam Gas Proposals (DPE 2015). The economic assessment quantifies the expected beneficial and adverse economic impacts of the project on the regional and state economies. The report also recommends mitigation strategies to ensure regional economic values are enhanced or, as a minimum, maintained if the project proceeds.

21.2 Assessment requirements

The SEARs require an assessment of economic impacts of the project. The specific requirements relating to economics are provided in Table 21.1.

Table 21.1 Economic assessment requirements

Relevant authority and assessment requirement	Relevant section of this report
DPIE	
Economic – an assessment of the likely economic impacts of the development, paying particular attention to the: • costs and benefits of the development for the State; identifying whether the development as a whole would result in a net benefit to NSW, including consideration of fluctuation in commodity markets and exchange rates; and • demand for the provision of local infrastructure and services.	Section 21.4 and Appendix R

21.2.1 Methodology

In addition to the SEARs, the Guidelines for Economic Assessment of Mining and Coal Seam Gas Proposals (DPE 2015) have been used as a basis for the scope of assessment required for the economic assessment. These guidelines indicate the following works as being required:

- a local effects analysis (LEA) to assess the likely impacts of the development in the locality / region in which the project is located; and
- a cost benefit analysis (CBA) to assess the public interest by estimating the net present value (NPV) of the project to the NSW community.

In addition to the above, the following components are provided as part of this economic assessment:

- a profile of the existing economic environment of the local area to provide a basis for understanding the relative magnitude of local/regional impacts in the LEA; and
- development of appropriate mitigation strategies for identified economic impacts.

The method and a detailed summary of assessment for the projects against key policy requirements, is contained in the Economic Impact Assessment (Appendix R).

21.3 Existing environment

An existing economic profile of the project study area (being the LGAs of Cobar, Bogan, Warren, Gilgandra, Narromine, Cabonne, Parkes, Lachlan, Dubbo Regional and Orange) was developed to provide a baseline for assessment of the significance of potential impacts of the project. The study area, referred to as the catchment in the economic assessment, is an aggregation of ten local government areas (LGAs): Cobar, Bogan, Warren, Gilgandra, Narromine, Dubbo Regional, Cabonne, Orange, Parkes, and Lachlan. This catchment was chosen as it encompasses the anticipated key service centres for the project of Dubbo and Orange. Regional economic data was collected to develop economic models to inform the baseline scenario against which the project's potential impacts are assessed.

Key features of the economic profile of the catchment and more specifically Cobar LGA in which the project is located, are summarised below, and discussed in more detail in the economic assessment in Appendix R.

21.3.1 Population

The catchment has recorded consistently lower population growth than the State. With an estimated resident population of around 151,400 people in 2019, overall population growth in the catchment has increased at an average rate of 0.4% per annum since 2001; however, growth has been well below the NSW average. The majority of population growth has been within the catchment's key centres of Dubbo and Orange. While many small, rural areas in regional New South Wales have experienced negative net migration in recent years, the catchment recorded positive net migration in 2018, where 36.3% of the population change can be attributed to migration.

Population growth is anticipated to remain low in the catchment to 2041. While the catchment's resident population is expected to continue to increase, the annual growth rate is projected to remain lower than the State, averaging 0.3% per annum to reach approximately 162,700 people in 2041.

Cobar LGA's population has recorded an annual decline for over a decade, with this decline expected to continue to 2041. Cobar LGA's population steadily declined between 2001 and 2019, from around 5,100 residents in 2006 to around 4,660 in 2019, averaging a decline of 0.5% per annum. The declining population in Cobar LGA is consistent with the experience of many small, rural areas across NSW and Australia over the past few decades. Cobar LGA's population is projected to continue to decline by approximately 0.5% per annum through to 2041.

21.3.2 Economy

The catchment's economy is heavily influenced by fluctuations in mining and agricultural activity. In 2018-19, the catchment recorded GRP of approximately $11.2 billion in chain volume terms. Annual growth between 2006-07 and 2018-19 has been volatile, primarily influenced by fluctuations in the catchment's two largest contributing industries to GRP, mining and agriculture, which contributed to 16.8% and 8.7% of total sector Gross Value Added (GVA) activity, respectively, in 2018-19.

Cobar LGA's economy is heavily reliant on mining industry activity: In 2018-19, Cobar LGA accounted for 7.4% of the catchment's GRP. Cobar LGA's economy recorded significant fluctuations between 2006-07 to 2018-19 due to its high reliance on mining industry activity.

21.3.3 Employment

Employment in the catchment contracted between 2009-10 and 2014-15, but has since recovered to reach approximately 42,660 workers in 2019. The largest employing industry in the catchment is healthcare and social assistance, representing 16.5% of jobs in 2018-19, followed by agriculture, forestry, and fishing (11.3%) and retail trade (9.1%).

Mining directly employs more than 40% of jobs in Cobar LGA: Cobar LGA represented 5.7% of the catchment's total employment in 2018-19. The mining industry is the largest employer in Cobar LGA, directly employing 42.4% of jobs in the LGA in 2018-19. Mining jobs in Cobar LGA have increased from just over 900 jobs in 2006-07 to more than 1,000 jobs in 2018-19; however, over this same period employment in all other industries (in aggregate) has declined from 1,580 jobs to 1,390.

The unemployment rate in the catchment and Cobar LGA has trended well below that of the State. As of March 2020, the unemployment rate in the catchment equated to 2.8% (lower than the 4.6% recorded for NSW). Cobar LGA recorded an even smaller unemployment rate for this quarter, at 1.3%. Unemployment rates in the catchment and Cobar LGA have generally been well below NSW since June 2006, which is consistent with many regional and rural areas across NSW and Australia, in particular mining areas such as Cobar LGA. This is partly due to the importance of job prospects in attracting and retaining population in these regions, with many people leaving the region when jobs are unavailable.

The catchment is 94.7% self-sufficient, indicating that the majority of jobs in the local area are held by residents and there is an appropriate match between skillsets held by residents and the jobs that are available. This is largely due to the high number of healthcare and social assistance workers who live and work in the catchment, representing the service centre nature of the Orange and Dubbo Regional within the catchment. The catchment has a higher self-containment rate (96.6%), reflecting that the vast majority of residents of the catchment found suitable work in their region of residence, or relocated to the region for work purposes.

Cobar LGA is largely serviced by local labour. Within the catchment, approximately 2,344 people worked in Cobar. Of this, 2,056 people lived and worked in the area, whilst 288 people were classified as imported labour. Imported labour was particularly evident in the mining and agriculture, forestry, and fishing industries.

21.3.4 Housing

Residential approval volumes in the catchment have experienced a decline in recent years, by 3.1% on average per annum since 2012-13 (compared to growth of 1.5% for NSW). This contraction is indicative of reduced dwelling development in the region, which is reflective of low levels of population growth and demand for housing stock. Despite the reduced demand for residential dwellings, residential approval values have increased by 0.6% over the same period, though this still lags the growth recorded by the State (4.7%). Cobar LGA recorded a more significant decline in demand for residential dwellings over the 2012-13 to 2019-20 period, with residential approval volumes declining by 15.8% since 2012-13, whilst values declined by 13.9% (these percent changes are off small volumes and hence are not indicative of significant residential development activity). This is consistent with the steady population decline Cobar LGA has experienced in recent years.

Within the catchment, housing and rental market activity is primarily centred in Dubbo Regional and Orange LGAs. Since June 2017, the majority of house sales activity occurred in these key service centres, which averaged between 200 and 210 sales per quarter each. Comparatively, Cobar recorded fewer than 30 sales in each quarter over the same period. In the catchment, the number of sales per quarter has declined since

June 2017, however, sales prices have generally increased (with the exception of Cobar LGA and Dubbo Regional LGA). Property market activity prospects remain subdued.

Vacancy rates are significantly higher in Cobar LGA than New South Wales on average. Approximately 20.4% of Cobar LGA's housing stock is comprised of unoccupied private dwellings, compared to 11.4% for the catchment and 9.3% for the State.

21.4 Impact assessment

21.4.1 Local effects analysis

An LEA was completed using economic impact modelling results as well as baseline information to analyse, assess and discuss the economic impacts of the project. The LEA includes input and information from:

- Economic modelling using Input-Output (IO) modelling techniques. A description of IO modelling is provided in Appendix R.
- Interpretation of modelling output in the context of the regional and NSW economies, and analysis of other non-quantified changes to the economic environment.
- Evaluation of the significance of impacts in relation to economic resources.

The LEA describes the economic impacts specific to the project and provides a comparison with what would be anticipated if the project did not proceed.

Modelling results summarised in this section present direct impacts, being the initial economic stimulus from the project, and flow-on impacts, also referred to as production-induced impacts, which reflect the first round supply chain impacts as well as the second and subsequent round effects of increased purchases by suppliers in response to increased sales resulting from demand for goods and services from the mine. Household consumption induced flow-on impacts are excluded from the analysis to provide a more conservative estimate of impacts.

In interpreting results of the modelling, it is important to note that rather than tangibly changing the level of activity from existing levels, the project is primarily intended to extend the life of mining activity within the New Cobar Complex as well as processing activity within the Peak Complex. As such, the operations activity presented in this section reflects the level of ongoing economic activity that will continue to be supported in the catchment that otherwise would be lost (rather than an increase in activity compared to existing levels).

Impacts are described in detail in the economic assessment for each of the key phases of the project (construction, operation, decommissioning and rehabilitation) for each of the following aspects:

- contribution to the economy in the form of GRP and gross state product (GSP);
- contribution to employment and income;
- impacts to businesses;
- contribution to government revenues;
- impacts on local property market; and
- impacts on trade balance and exchange rates.

A summary of the beneficial and adverse of the project on these aspects is provided in the following sections.

i Beneficial impacts

Key beneficial impacts from the project are outlined in Table 21.2. Beneficial impacts are presented in comparison to what would otherwise occur if the project does not proceed. IO modelling was conducted for construction, operations and decommissioning/rehabilitation phase activities separately. In reporting impacts in Table 21.2, the following should be noted:

- construction phase impacts have been assessed and reported in aggregate over the four year construction phase, between 2022-23 to 2025-26;
- operations phase activities have been assessed and reported as an average annual impact between 2026-27 to 2032-33, reflecting the period in which the bulk of production activity will occur (with over 86% of mined ore extracted during this period); and
- decommissioning and rehabilitation phase impacts have been assessed and reported in aggregate over the entire decommissioning and rehabilitation phase, in 2034-35.

Table 21.2 Predicted beneficial economic impacts of the project

Impact	Description
Economic growth	The project will contribute to economic growth through increased GRP/GSP during all phases, compared to what would occur without the project, flowing from both direct and flow-on impacts. The project is estimated to support: • Over the four-year construction phase (2022-23 to 2025-26), approximately $32.8 million in GRP for the catchment and an additional $19.7 million in GSP in the rest of NSW, including direct and flow-on activity. • During peak production (2026-27 to 2032-33), an average of $73.4 million in GRP in the catchment per annum, and an additional $18.2 million in GSP per annum in the rest of NSW, including direct and flow-on activity. • For decommissioning / rehabilitation activities, approximately $3.3 million in GRP in the catchment in aggregate between 2023-24 and 2034-35, and an additional $0.2 million in GSP in the rest of NSW, including direct and flow-on activity.
Employment and incomes	The project will support jobs and incomes during all phases, compared to what would occur without the project, flowing from both direct and flow-on impacts. A total of $604 million in wages and salaries is estimated to be paid to workers in NSW either directly engaged by the project or engaged through flow-on activity between 2022-23 and 2034-35 across phases. Of this: • 84% ($507 million) of total wages and salaries will be paid in NSW for jobs within the catchment; and • 16% ($97 million) will be paid in the rest of NSW. Including both direct and flow-on (supply chain) activity, the project is estimated to support: • Over the four year construction phase (2022-23 to 2025-26), in total: – 159 FTE jobs for local residents in the catchment, paying a total $21.8 million in wages and salaries. – An additional 108 FTE jobs in the rest of NSW, paying a total of $12.7 million in wages and salaries. • During peak production (2026-27 to 2032-33), an average per year of: – 342 FTE jobs per annum in the catchment, paying a total $59.5 million in wages and salaries. – An additional 112 FTE jobs per annum in the rest of NSW, paying a total of $10.2 million in wages and salaries. • For decommissioning / rehabilitation activities, in total: – 19 FTE jobs in the catchment, paying a total $2.7 million in wages and salaries. – One additional FTE job in the rest of NSW, paying $0.1 million in wages and salaries.

Table 21.2 Predicted beneficial economic impacts of the project

Impact	Description
Impacts to businesses	**Support for upstream supply chain businesses** PGM has in place an extensive supply chain for their existing operations in the Peak and New Cobar complexes. The project will extend the mining and processing activities at these complexes and thereby enable continued support and opportunities for suppliers in the catchment and NSW that otherwise would be lost, providing additional security and longevity of business incomes (and employment). The project will also create opportunities to secure new contracts and increase sales to supply and service the needs of the project through flow-on impacts in the supply chain, during all phases of the project. The construction phase is estimated to support: • Revenues for local businesses within the catchment of approximately $58.8 million through direct and flow-on activity. • Revenues for businesses in the rest of NSW of $37.4 million through direct and flow-on activity. During operations, the project is estimated to support approximately $18.4 million in business revenues per annum on average in the catchment through flow-on activity during the peak period of production (2024-25 to 2030-31), with a further $39.5 million in revenues supported for businesses in the rest of NSW. **Support for Downstream Customers** The project will enable PGM to continue to supply metals (ie gold, silver, copper, lead and zinc) resources to meet the demands of their customers over the next decade. Without the project these customers would be required to source product from alternative suppliers (which may be expected to place upward pressure on input costs for these customers), or potentially reduce their own production where appropriate alternative supply is unable to be sourced. To this end the project can be seen as important for the longer-term security of supply of precious metals (gold and silver) for domestic production, while also supporting domestic transport and logistics business for the transport of doré and concentrates to customers and the supply of copper lead and zinc to overseas markets.
Government Revenue	The project will provide a lift in State and Australian government taxation revenues through a variety of taxes and duties. Overall, the project is estimated to deliver a total of: • $182.8 million in additional revenue to the Australian Government, through personal income tax, fringe benefits tax, company tax and GST, compared to what would occur without the project. • $59.7 million in additional revenue to the NSW Government compared to what would occur without the project, primarily through royalty payments. These additional revenues can be used by government to provide additional infrastructure and services to support business and households throughout Australia.
Property market	The project will not result in a material change in the operational workforce at the Peak and New Cobar complexes from existing levels, and existing accommodation arrangements for the workforce are anticipated to continue with no tangible impact on the local property market. The construction workforce will result in a small increase in demand for temporary accommodation compared to existing levels. Whilst the project will primarily be supported by a workforce from within the catchment, non-local workers will be employed where more specialised skillsets are required that the local workforce does not provide (eg for service decline and ventilation construction works). A peak of 22 construction workers sourced from outside the catchment is estimated in 2023-24. Due to the high vacancy levels apparent in Cobar (with unoccupied dwellings representing 20.4% of total housing stock) it is anticipated there will be sufficient accommodation available for these additional temporary workers. Overall, the project is not anticipated to have a significant impact on the local property market. In consideration of the existing high vacancy levels, the short-term increase in demand during construction may be considered to provide a small positive impact on demand and prices.
Trade balance and exchange rates	The project will primarily have an impact on NSW trade balance through the production of gold, silver, copper, zinc, and lead product, of which gold and silver exported from NSW to other States and Territories in Australia, and copper, lead and zinc overseas, for further refinement / processing. In total, the value of product extracted is estimated to be valued at approximately $1.25 billion, with a peak annual value of $182.4 million. Australia's

Table 21.2 Predicted beneficial economic impacts of the project

Impact	Description
	trade balance may then in turn be impacted by the export of refined / processed precious metals overseas, with the majority of Australia's precious metal production exported. Partially offsetting the anticipated lift in exports for NSW and Australia will be an increase in imports to supply the project (relative to what would otherwise occur without the project). In total, approximately $205 million in goods and services are estimated to be imported to NSW between 2022-23 and 2034-35 to directly support the project. Of this, $113 million is estimated to represent domestic imports from other States and Territories and $92 million imports from overseas. A modest amount of additional goods and services will also be imported through supply chain impacts. On average, the project is estimated to support less than $10 million in additional imports to Australia per annum. The average annual value of production between 2026-27 and 2032-33 (peak production) will be approximately $150 million, with the impact on domestic exports dependent on final markets for refined products from downstream refineries / processors. While the project is anticipated to result in a small increase in net exports for Australia, the value of imports and exports generated by the project are relatively small compared to existing annual imports and exports for Australia ($421.4 billion in in imports and $470.2 billion in exports 2018-19) (DFAT 2020). While the project will support economic growth and the value of the Australian dollar, in the context of Australia's overall economy and trade balance the impact of the project on factors such as exchange rates and the value of the Australian dollar is anticipated to be negligible.

In understanding the benefits delivered by the project it is important to understand the project will provide an extension of existing operations at the New Cobar and Peak complexes, with mining activity of the Great Cobar and Gladstone deposits ramping up as mining at other existing deposits winds down. The project is not expected to result in any significant change in labour for mining, processing and maintenance at the Peak and New Cobar complexes (combined) from existing levels.

The project thereby represents an important contributor to maintaining and extending activity and jobs supported by PGM's New Cobar and Peak complexes into the early 2030s. Where the project does not proceed, the economic contribution by PGM to the local and State economies would reduce considerably in the near future and the contribution to be delivered by the project would not be realised. The project will also deliver a boost to the economy through construction as well as decommissioning / rehabilitation activities.

ii Adverse impacts

While the project will provide opportunities for businesses within the mining supply and value chain, some businesses and industries may be adversely impacted by the project. For instance, mining projects typically compete with industries such as manufacturing and construction for labour as these industries have similar skill sets, which can drive up costs for labour in these industries. The project can also lead to increases in other costs of business as competition for goods and services drives input prices up.

The flow-on impacts of the project presented in the economic modelling do not account for potential adverse impacts on business and industry due to the above factors. However, given the project will primarily result in an extension of existing mining and supply chain activity, the impacts of the project in terms of demand for resources are expected to overwhelmingly be positive in nature and it is anticipated any adverse impacts of the project on other businesses will be unlikely to be noticeable in the context of existing market conditions.

The project will extend PGM's activities to provide an important retention of economic activity within the catchment and NSW economy over the next decade that would otherwise be lost without the project.

Economic impacts of the project are anticipated to be overwhelmingly positive, with minimal adverse economic impacts.

21.4.2 Cost benefit analysis

A CBA was completed in line with NSW and Australian Government guidelines, examining the stream of relevant economic, social and environmental costs and benefits anticipated from the project to assess the NPV of the project to the NSW community. The CBA examines the net or incremental impacts (benefits and costs) of the project compared to a 'base case' scenario of what would be expected to occur without the project. Additional details regarding the CBA assessment method used is provided in Appendix C of the economic assessment (Appendix R).

The analysis of the costs of the project has broadly taken into account:

- construction expenditure for developing the project, which is estimated at a total of $66.4M;
- annual operating costs and decommissioning and closure costs; and
- environmental costs, which have been estimated based on the predicted impacts of the project described in this EIS and supporting technical studies.

Benefits of the project have been quantified in terms of the value of production, which has simply been calculated as all profits from the project, and provision of income in the form of salaries and wages through employment. Further detail on the methods and assumptions is provided in the economic assessment in Appendix R.

The NPV of the project was estimated as the difference between the present value (PV) of future benefits and PV of future costs. The table below (Table 21.3) outlines the PV of the identified costs and benefits associated with the project, between the financial year ended June 2023 and financial year ended June 2035. Three different scenarios are modelled assuming discount rates of 4%, 7% and 10%. This is described in further detail in the economic assessment.

The CBA modelling for the project at the discount rate of 7% is economically desirable, with the following results:

- NPV of $281.4M over the assessment period with total PV benefits of approximately $756.6M compared to an aggregated PV costs of approximately $475.1M.
- A benefit cost ratio (BCR) of 1.59, highlighting that the project is estimated to return $1.59 for every dollar spent.

The CBA identifies that the project is economically desirable for NSW with the benefits outweighing the costs across all discount rates examined (4%, 7% and 10%). The CBA is insensitive to the discount rate used with minimal change in BCR across discount rates examined. The project has an internal rate of return of 61.1%.

Table 21.3 Summary of CBA results for NSW

Impact	Total Value ($M)	PV ($M) – 4% Discount Rate	PV ($M) – 7% Discount Rate	PV ($M) – 10% Discount Rate
Costs				

Table 21.3 Summary of CBA results for NSW

Impact	Total Value ($M)	PV ($M) – 4% Discount Rate	PV ($M) – 7% Discount Rate	PV ($M) – 10% Discount Rate
Construction Costs	$66.4	$58.4	$53.3	$48.7
Operating and Closure Costs	$725.1	$519.0	$409.5	$326.8
Value of Foregone Economic Activity		Negligible		
Air Quality Impacts		Negligible		
Greenhouse Gas Emissions	$7.8	$5.5	$4.3	$3.4
Noise and Vibration Impacts		Negligible		
Visual Amenity Impacts		Negligible		
Groundwater Impacts	$0.1	$0.1	$0.0	$0.0
Surface Water Impacts		Negligible		
Subsidence Impacts		Negligible		
Ecological Impacts		Negligible		
Traffic / Transport Impacts	$14.2	$10.1	$7.9	$6.3
Total Costs	***$813.6***	***$593.1***	***$475.1***	***$385.3***
Benefits				
Value of Production	$1,246.9	$885.2	$694.5	$551.0
Benefits to Labour	$111.4	$79.1	$62.1	$49.3
Total Benefits	***$1,358.3***	***$964.3***	***$756.6***	***$600.3***
Summary				
Net Present Value (NPV)	-	**$371.3**	**$281.4**	**$214.9**
Benefit Cost Ratio (BCR)	-	**1.63**	**1.59**	**1.56**

21.4.3 Sensitivity analysis

Sensitivity analysis has been undertaken using a Monte Carlo analysis. The sensitivity analysis applied for the 7% present value discount rate, shows that there is a 90% probability the project will provide an NPV of between $143.5M and $417.1M.

21.5 Commitments and management measures

Assessment of the economic impacts of the project identified the project will extend PGM's activities to provide an important retention of economic activity within the catchment and NSW economy over the next decade that would otherwise be lost without the project. Economic impacts of the project are anticipated to be overwhelmingly positive, with minimal adverse economic impacts.

While the potential adverse economic impacts from the project are minimal, strategies have been identified to maximise as far as practicable the benefits of the project to the catchment and NSW, and minimise any potential adverse impacts.

- To maximise local benefits derived from the project, and consistent with existing PGM policies, the proponent and contractors engaged by the proponent will be encouraged to source labour, including workforce and contractor labour, locally where possible and practical, and provide training opportunities where practical.

- PGM will continue to actively encourage workers to reside locally. More than half of the existing workforce at the Peak and New Cobar complexes reside within Cobar.

- PGM has long standing relationships with local business and an established supply chain for its existing activities in the region. To maximise local benefits derived from the project, PGM (and contractors engaged by PGM) will continue to support local business by utilising these established supply networks and providing sufficient opportunities and information for local business to secure new supply contracts.

- While the project is anticipated to have minimal impacts in terms of additional demand for accommodation / housing in the local area, PGM will monitor the local accommodation / housing market and demands placed on it by its workforce. If supply constraints are identified, PGM will work with Council to identify options for increasing supply as needed.

It should be recognised that these strategies form part of PGM's project planning, and modelling of impacts in this report has been based on these strategies being implemented.

21.6 Conclusion

The LEA and CBA both demonstrate that the project is expected to result in economic benefits to the region and the State. In particular the project will have the following benefits:

- contribution to regional and state economic growth through increased GRP and GSP;

- jobs and incomes from both direct and flow-on impacts – a total of $604M in wages and salaries is estimated to be paid to workers in NSW either directly engaged by the project or engaged through flow-on activity between 2020-21 and 2032-33 across all phases. Including:

    - a total of 159 FTE jobs construction phase and an additional 108 FTE jobs in the rest of NSW;

    - an average per year of 342 FTE jobs per annum in the catchment during operation, and an additional 112 FTE jobs per annum in the rest of NSW;

    - a total of 19 FTE jobs in the catchment during decommissioning/rehabilitation activities and one additional FTE job in the rest of NSW;

- an NPV of $281.4 M over the assessment period with total PV benefits of approximately $756.6 M compared to an aggregated PV costs of approximately $475.1 M.

- additional revenue to the Australian Government of $183.0M through personal income tax, fringe benefits tax, company tax and GST, compared to what would occur without the project; and

- additional revenue to the NSW Government of $59.8 M primarily through royalty payments.

Mitigation measures to minimise the potential for adverse economic effects focus on continued encouragement of local workforce and contractor labour hiring, continued support for local business by using established supply networks and providing sufficient opportunities and information for local business to secure new supply contracts; and ongoing monitoring of accommodation for the non-local workforce during construction to minimise impacts on the local property market.

22 Cumulative impacts

22.1 Introduction

This chapter provides an assessment of cumulative impacts relating to the project.

The objective of the cumulative impact assessment was to assess the potential for project impacts to have compounding interactions with similar impacts from other projects. Other projects included those proposed, under development or already in operation within the sphere of influence of the project.

22.2 Assessment requirements

The SEARS requires that the EIS "*undertake an assessment of the likely impacts of all stages of the development, including any cumulative impacts, taking into consideration any relevant legislation, environmental planning instruments, guidelines, policies, plans and industry codes of practice*".

In addition to the SEARS, the document Preparing an Environmental Impact Statement – Draft Environmental Impact Assessment Guidance Series (DPE 2017) guides proponents to include a summary of any cumulative impacts, including the project's relative contribution to those impacts.

22.3 Area of influence

The impacts of projects are often assessed by comparing the post-project situation to a pre-existing baseline. Where projects can be considered in isolation, this provides a good method of assessing a project's impact. However, in areas where baselines have already been affected, or where future development will continue to add to the impacts in an area or region, it is appropriate to consider the cumulative effects of development. This is similar to the concept of shifting baselines, which describes how the environmental baseline at a point in time may represent a significant change from the original state of the system. There are two levels of cumulative impacts considered:

- Project area localised cumulative impacts – these are the cumulative impacts that result from mining operations in the immediate vicinity of the project (ie PGM operations). Project area localised cumulative impacts include the cumulative effects from operations that are close enough to potentially cause additive effects on the environment or sensitive receivers.

- Regional cumulative impacts – regional cumulative impacts include the project's contribution to impacts that are caused by projects in the region. Each proposed development itself may not represent a substantial impact, however the cumulative effect of a region may warrant further consideration.

There are several concurrent development projects operating or intended to operate in and around the project. These projects may contribute cumulative impacts. A summary of potential cumulative impacts of nearby State significant development projects as identified through the NSW DPIE (2020) Major Projects website in construction and operational phases, as well as other relevant projects is given in Table 22.1.

Table 22.1 Concurrent development projects

LGA	Project name	Anticipated timeframe/ project life	Development type	Status	Determination date	Construction workforce	Current or expected operational workforce (FTE)
SSD projects							
Cobar Shire	New Cobar Complex Project[1]	12 years	Minerals Mining	Prepare EIS	-	-	40[1]
Cobar Shire	Peak Complex[1]	4 years	Minerals Mining	Operational	-	-	364[1]
Cobar Shire	Hera Mine[2]	4 years	Minerals Mining	Operational	July 2012	-	132[2]
Cobar Shire	Cobar BioHub	30 years	Waste collection, treatment and disposal	Prepare EIS	-	40	30
Cobar Shire	CSA Mine	10 years	Minerals Mining	Operational	-	-	300
Bogan Shire Cobar Shire Coonamble Shire Lachlan Shire Narrabri Shire Walgett Shire Warren Shire	Western Slopes Pipeline Project	12 months (construction) 40 years (operation)	Gas supply	Prepare EIS	-	250 – 350	4 – 5
Bogan Shire	Yarren Hut Solar Farm	50 years	Electricity Generation-Solar	Assessment	-	40	2
Bogan Shire	Nyngan Scandium Mine	21 years	Minerals Mining	Approved	November 2016	60	75
Other projects							
Cobar Shire	Peak Complex TSF lifts	6 months for waste rock movement and 12 months per lift stage	Minerals Mining	SoEE submitted		8-10	nil
Cobar Shire	Federation Project[2]		Minerals Mining	Scoping phase		20	132[2]
					TOTAL Workforce	520	948

1. PGM will continue to maintain operational control of the workforce across the Peak and New Cobar complexes, and workforce numbers will remain stable across PGM operations as a whole, but fluctuate between the two complexes.
2. Hera Resources will continue to maintain operational control of the workforce across the Hera Mine and Federation Project, and workforce numbers will remain stable across Hera Resources operations as a whole, but fluctuate between the two projects.

A total of ten development projects were identified within the area of influence, with the main development type consisting of mineral mining ventures which reflects the strong presence of the mining industry within the local area. Within Cobar Shire, five projects were identified; three projects are operational and all minerals mining developments and two are currently preparing an EIS. The remainder of the projects are located within the Bogan Shire, Coonamble Shire, Lachlan Shire, Narrabri Shire, Walgett Shire and Warren Shire and can be grouped as mining (minerals), and energy (gas supply and electricity generation (solar)) development types.

Not all projects in Table 22.1 will occur concurrently with the New Cobar Complex Project. Stage 5 of the Peak Complex TSF lifts (including movement of waste rock from Queen Bee Mine) is expected to be completed prior to the New Cobar Complex Project commencing.

22.4 Impact assessment

Project impacts related to subsidence, surface water, biodiversity, Aboriginal heritage, historical heritage, visual, hazards and waste will be discrete, and do not have any overlap with other projects, and as such are highly unlikely to have cumulative impacts. For the purposes of this cumulative impact assessment, they have not been assessed further.

22.4.1 Air quality and greenhouse gas

The project air quality assessment included atmospheric dispersion modelling, including an analysis of project-only and cumulative impacts accounting for baseline air quality. Modelling was completed for two scenarios: project-only (or incremental) which included all existing and additional emission sources, and cumulative (background air quality plus the project).

Cumulative TSP, PM_{10} and $PM_{2.5}$ concentrations and dust deposition rates at surrounding assessment locations were predicted. For the cumulative impact scenario, the predicted cumulative concentrations for all pollutants and averaging periods comply with the applicable NSW EPA assessment criterion for all privately owned residence assessment locations. One assessment location, R2, a PGM-owned residence, was estimated to exceed cumulative 24-hour average PM_{10}, 24-hour average $PM_{2.5}$ and annual average $PM_{2.5}$ criteria.

With regards to GHG, annual scope 1 and 2 GHG emissions generated by the project, accounting for existing and additional sources, represent approximately 0.058% of total GHG emissions for NSW and 0.013% of total GHG emissions for Australia, based on the National Greenhouse Gas Inventory for 2018. The changes to emissions associated with the project do not significantly alter annual GHG emissions from existing operations.

While the air quality and greenhouse gas assessments were cumulative, they did not consider future projects. The TSF lifts at the Peak Complex will have additional air quality emissions on sensitive receiver locations. The greatest cumulative impact will be experienced at location R2 (a PGM owned residence) which will include an additional annual average of 0.1 $\mu g/m^3$ of TSP, <0.1 $\mu g/m^3$ PM_{10}, and <0.1 $\mu g/m^3$ $PM_{2.5}$. The criteria at this location will be exceeded by a small margin as a result of the New Cobar Complex Project, however cumulative impacts will be negligible in comparison to impacts from background levels. Therefore, none of the identified projects will have significant cumulative air quality or greenhouse gas impacts.

22.4.2 Human health

The project HHRA involved an assessment of chemicals of potential concern, mainly metals within the dust potentially emitted by the project. The HHRA evaluated metals in dust emissions from three exposure scenarios:

- current operations (includes background);
- project increment (no background; only emissions from the project); and
- cumulative (background plus project).

For health risks relating to dust and metals/metalloids, the ALM and IEUBK modelling predicted negligible change to BPb concentrations for both adults and children as a result of the cumulative scenario, with predictions well below the target action level. All estimates were consistent with the range of blood lead levels reported for Australian children in communities not affected by point sources of lead.

Estimated exposure to the 12 other metals are all well below their respective health guidelines. There is also very low probability of additive effects between the metals. It is concluded the risk of exceeding health-based toxicity reference values as a result of the cumulative scenario is very low.

None of the identified projects are anticipated to have potentially compounding human health risks, therefore there are no cumulative impacts to human health predicted.

22.4.3 Noise, vibration and blasting

Project construction noise levels combined with noise from approved existing operations are predicted to satisfy the relevant PNTLs during the day and night periods at all assessment locations. When comparing modelled existing and predicted future site noise levels during noise-enhancing (ISO 9613) meteorological conditions for the day, evening and night periods, no material increase was predicted at all assessment locations during operations.

While the noise and vibration assessments were cumulative, they did not consider future projects. The TSF lifts at the Peak Complex will have additional noise impacts at sensitive receiver locations. The greatest cumulative impact will be experienced at location R2 (a PGM owned residence), however cumulative impacts will be negligible and will satisfy the relevant criteria for noise impacts at all sensitive receiver locations. Therefore, none of the identified future projects will have significant cumulative noise impacts.

22.4.4 Groundwater

The project groundwater impact assessment considered the potential cumulative impacts for all stages of the development. The surrounding operating mines nearby are the Peak Complex located around 10 km to the south (incorporated into the project's numerical model) and CSA mine, located around 20 km to the north. The predicted drawdown from this project was assessed and is shown to be localised, extending around 2 km from the active mining area. The location of the sensitive receivers in the vicinity of the mine and the distance to the other mining operations results in no cumulative impacts on sensitive receivers, therefore cumulative groundwater impacts are not anticipated as a result of the project.

22.4.5 Traffic and transport

The raising of the TSF bunding structures (upstream embankment raises or 'lifts') at the Peak Complex, to increase storage capacity of the structure to the end of mining (2035), is an important and necessary activity which complements the New Cobar Complex Project by providing additional tailings storage capacity for the extended life of mine. Three lifts (Stages 5, 6 and 7) will occur between 2021 and 2035 to accommodate additional tailings. Lifts will each take approximately 12 months to construct (36 months total). Rock for the lifts will be sourced from Queen Bee Mine which is an approved rehabilitation activity under PGMs Mining Operations Plan 2019-2022. A total of 23,000m^3 of waste rock (equivalent to approximately 57,000 tonnes) will be transported from the Queen Bee Mine to the following locations during day light hours over an approximately six-month period commencing early 2021:

- 20% to the Peak Complex as construction material for the proposed TSF lifts; and
- 80% to the existing WRE within the New Cobar Complex.

Consequently, as the haulage of waste rock from Queen Bee Mine will likely be completed by 2023, there will be no interaction between New Cobar Complex Project and TSF traffic for relocation of suitable material from Queen Bee Mine.

The rock at New Cobar Complex WRE will be held in reserve until required for later lifts with transportation of waste rock from the New Cobar Complex in Stages 6 and 7, to the Peak Complex following the approval of this project. Transportation of this waste rock will occur within the timeframe for the heavy vehicle movements for the project, however these movements will be included within the proposed maximum of 100 truck movements per day, therefore none of the identified projects will have significant cumulative impacts to traffic and transport.

22.4.6 Social

Interactions from other approved and proposed developments (concurrent projects) can produce concurrent or sequential socio-economic impacts, and the development of new projects may provide employment for construction workers and employment continuity once projects cease construction. As the top three occupations in the local area are technicians and trades workers, machinery operators and drivers, and professionals the concurrent projects may benefit local employment or place a strain depending on workforce availability.

The known construction workforce associated with the concurrent projects is an expected maximum of 520 FTEs (see Table 22.1). The potential of a non-resident workforce and increased construction workforce from the concurrent developments may contribute to the cumulative impacts for the local area. This will depend on how the various workforces and accommodation arrangements will be managed. Both these matters have the potential to exacerbate existing workforce and accommodation tensions within the local area. However, as the project is a continuation of current operations, the only construction associated with the project is the installation of a short powerline and compact substation, and an emergency egress winder at the fresh air intake, and winder house and a vent fan within an exhaust shaft (approximately 100 m) below ground level.

The project with the most significant construction workforce is the Western Slopes Pipeline Project, which is a proposed gas supply development that consists of a pipeline running through multiple LGAs including Cobar Shire. Based on the scoping report for the project, the construction workforce associated with the Western Slopes Pipeline Project will comprise approximately 250-350 non-resident personnel who will stay in construction camps close to the alignment, the nearest point of which is approximately 130 km to the east

of Cobar. Considering the magnitude of the required construction workforce it has the potential to contribute to the cumulative impacts on the local area.

Personnel required for the concurrent Stage 6 and 7 TSF lifts (the Stage 5 TSF lift will occur prior to commencement of the project) at the Peak Complex will be a construction contractor workforce of 8-10 personnel. Therefore, cumulative socio-economic impacts as a result of the TSF lifts at the Peak Complex will be negligible.

The maximum known workforce associated with the operational phases of the concurrent projects is 948 workers. The nature of the workforces for the concurrent developments has the potential to impact the local area. A predominantly non-resident workforce could place additional strain on community relations and accommodation within the local area. There are also opportunities for the local area as the local population is currently experiencing a decline. Therefore, there is the potential to benefit the local area through providing continued employment opportunities. Overall, contribution of the New Cobar Complex Project to the cumulative impacts will be minimal due to the nature of the project being a continuation of existing operations with no significant new construction requirements. Annual labour estimates for the New Cobar Complex range from 57 FTE in 2020/21 to a peak of 272 FTE in 2026/27. These however will not be new employees but will be part of the existing PGM workforce, and PGM will continue to maintain operational control across the complexes.

The implementation of mitigation measures to manage socio-economic impacts related to the project will also reduce the magnitude and likelihood of any potential cumulative impacts.

i Closure of mining developments

In the absence of continued mining, the closure of mining by PGM and concurrent mining developments within the local area has the potential to incur significant impacts on the local community and the compounding impacts of multiple mine closures can be significant for the local community as well as the local and regional economy. Cobar, as a mining township, heavily relies on the mining industry for economic development, employment, and training opportunities. When considering the working population in Cobar, the mining industry is the single largest employer. Community consultation reaffirmed community sentiment that Cobar is a 'mining town'.

Therefore, the closure of major mining sites has the potential to impact on the town, through social dislocation (from loss of employment) and regional economic loss, which could lead to residents and previous employees moving if there are no further employment opportunities within the local area. This has the potential to exacerbate the local area's declining population, which was a concern raised throughout consultations. Three existing mining operations are present within proximity of Cobar and the local area of influence (see Table 22.2).

Table 22.2 Existing major developments in the local area

Project Name	Development Type	Expected Closure[1]	Operational Workforce
CSA Mine	Minerals Mining	2029	300
Hera Gold Mine[2]	Minerals Mining	2023	132
Peak Gold Mine[2]	Minerals Mining	2023	364
		TOTAL	**796**

1. Based on current market assumptions
2. The workforce numbers at PGM and Hera are expected to ramp down as the New Cobar Complex Project and the Federation Project (respectively) ramp up. Therefore, it is unlikely that 'closure' of these projects will have an overall impact on their respective workforces as they will migrate to the new project.

All three mines employ a combined operational workforce of 796 personnel with expected closures between 2023 and 2029. Closures of the mines has the potential to impact the local community through job loss if further employment opportunities are not available within the local area. Therefore, it is important to take into consideration how the closure of the project has the potential to contribute to the impacts of mine closures within the local area.

22.4.7 Economics

In terms of cumulative economic impacts, the project contributes to an important export commodity in NSW. In FY17/18, non-coal royalty payments to the NSW Government were worth $138 M (DRM 2020). Therefore, a total royalty of $39.3 M payable to the NSW Government arising from the project is significant.

The project also represents an important contributor to maintaining and extending direct and indirect activity and jobs supported by PGM's New Cobar and Peak complexes into the early 2030s. If the project does not proceed, the economic contribution made by PGM to the local and state economies will reduce considerably in the near future and the contribution to be delivered by the project would not be realised. The project will also deliver a boost to the economy through decommissioning / rehabilitation activities.

22.5 Conclusion

The assessment of cumulative impacts has considered all relevant existing and proposed projects for which data was available.

Potential cumulative impacts on environmental aspects were considered of low significance.

Due to the nature of projects included in the assessment it is anticipated that this process of assessing potential cumulative impacts will occur for all projects. That is, each of projects will be required to mitigate and manage potential cumulative impacts to acceptable levels.

The key mitigation measures to reducing the potential cumulative impacts of the project identified within this chapter are presented within Chapter 23: Summary of management measures.

23 Summary of management measures

23.1 Introduction

This chapter provides a consolidated summary of the commitments made to manage, mitigate and/or monitor impacts during the construction and operation of the project.

23.2 Assessment requirements

This chapter also addresses the SEARS requirement for "*a consolidated summary of all the proposed environmental management and monitoring measures, identifying all commitments made in the EIS*".

23.3 Management measures and commitments

A summary of the proposed mitigation, management and monitoring measures for the project is presented in Table 23.1.

Table 23.1 Summary of management measures

Air quality

Ongoing air quality monitoring

- The existing monitoring network will continue to be maintained for the life of the project.
- The combination of continuous measurements of PM_{10} by the installed BAM and the PGM meteorological station will allow PGM to undertake detailed investigations into any potential criteria exceedances (ie identify regional exceedance events through the pairing of PM_{10} and wind speed/direction measurements).
- Daily and annual average TSP and PM_{10} concentrations and monthly average dust deposition results will continue to be recorded and reported in monthly and annual environmental management reports.
- Monitoring results will continue to be made available to the public through Aurelia Metal's website (https://www.aureliametals.com/).

Continuation of existing particulate matter control measures

- Existing particulate matter control measures adopted across the New Cobar Complex and Peak Complex include watering of material haulage routes and water sprays at the ROM stockpile and processing circuit, will continue to be implemented for the project.

Noise, vibration and blasting

Continuation of blast ground vibration measures

- Continue to implement mitigation measures currently in place at the New Cobar Complex to reduce the potential impact of blast ground vibration at nearby receivers.
- Continue use of vibration prediction model during the planning process for blasting programs. If vibration levels are predicted to be too high, the blast design will be altered to reduce impacts on surrounding residents.

Ongoing noise monitoring

- Continuation of monthly noise monitoring to ensure compliance limits set out in the EPL
- Monitoring results continue to be recorded in the AEMR and made available to the public on the Aurelia Metal's website

Complaints

- A 24-hour, 7-days per week complaints line is available to all stakeholders and the greater Cobar community. The details of the complaints line is advertised in the local newspaper, in accordance with Condition M5 of PGM's EPL.

Subsidence

Table 23.1 Summary of management measures

Update of Ground Control Management Plan

- The GCMP will be updated post-approval to reflect the mitigation and management measures recommended within the full geotechnical and subsidence assessment (Appendix H)

Ground support management

The following ground support management measures will be applied as appropriate:

- Resin bolts with fibrecrete or weld mesh for long term accesses;
- Friction bolts (or resin bolts) with fibrecrete or weld mesh for short term accesses;
- Cablebolting of all intersections, wide spans and stope brows, including temporary brows;
- Some stope hangingwalls may require cablebolting pending local ground conditions. Stope crowns below sill pillars may warrant cablebolting to reinforce the sill pillar and prevent potential unravelling of the sill pillar as this could result in significant dilution from rockfill in the previously mined stopes above;
- Dynamic ground support would generally not be required as damaging levels of seismicity would not be expected at the mining depths of the New Cobar Complex; and
- An observational approach with continuous evaluation of rockmass response to mining and iterative adjustment of the mine plan, if required, as mining continues and as additional geotechnical information becomes available.

Monitoring

- Present and future mining will be subjected to ongoing monitoring and stability assessments to ensure no subsidence occurs.

Stability and deformation management

- Review mining of any stopes near the top of fresh rock boundary. Any stopes planned close to the oxidised layers should be risk assessed and have a stable crown pillar. A crown pillar stability assessment will be performed during the detailed design phase.
- Ongoing stope stability assessment and observation of stope performance. Adjustment of stope design may be required, including stope dimensions should instability and overbreak be excessive.
- A thorough risk assessment will be completed prior to the commencement of mining. Consideration may need to include not mining particular stopes or reducing the height of the stopes to allow for a larger crown pillar to be left in place.

Great Cobar deposits

Stopes in the close out pillars are considered “higher” risk tonnes in terms of recovery and dilution. To address this risk:

- disciplined mining with careful geotechnical controls and monitoring will be adopted to maximise recovery;
- future mine scheduling will reflect more difficult mining conditions in these areas and reflect reduced productivity for the final stope on each level (ie the diminishing pillar); and
- the stope strike length will be adjusted so the final stope is smaller and less susceptible to overbreak and dilution.

PGM will manage hangingwall overbreak through means such as appropriate stope sizing using geotechnical assessment of local ground conditions, timely filling of nearby stopes, ground support and careful drill and blast.

Gladstone deposits

The two stopes closest to the top of fresh rock are short up hole stopes. As these stopes are up-hole stopes, backfilling of the stopes is not possible with rockfill. Potential for long term instability of these stopes is low, however to manage risk these stopes will be backfilled by either:

- developing an overcut drive and rock filling the stopes, including pushing up as much rockfill into the stopes as possible to minimise the unfilled void in the stope;
- if required, backfill with cemented hydraulic fill or another form of hydraulic fill via up-holes drilled from the access underground; and/or
- if required, backfill with cemented hydraulic fill or another form of hydraulic fill via down-holes from the surface.

New Cobar / Jubilee deposits

Table 23.1 Summary of management measures

It is generally advised not to mine stopes in or close to weak cover layers such as the oxidised zone at New Cobar due to the potential for stope chimneying. It is noted that stopes at other mines (not within the New Cobar or Peak Complexes) have chimneyed along faults and through the weak cover units to surface. Although the likelihood is low, these stopes have the potential to chimney to surface. PGM will undertake a detailed geotechnical assessment during the stope design stage, prior to mining these stopes. PGM will also undertake:

- crown pillar stability assessment;
- confirmation of the top of fresh rock boundary;
- backfilling of the stopes. The stopes in the current design are up-hole stopes, which makes tight filling from underground difficult. Downhole drilling from surface for backfilling with hydraulic fill or another form of fill will be performed as required.

Chesney deposits

During detailed design PGM will review the design and dimensions of rib pillars and sill pillars in the current mine design. Some rib pillars in the Chesney mine design are very narrow and have a greater risk of failure during stope production.

Groundwater

Groundwater level changes

- Make good arrangements will be made to supply supplementary water to replace any reduction in pumping capacity that may occur at the Cobar District Rugby Club bore (GW803422).
- A TARP is included in the WMP outlining corrective actions if greater than 2 m drawdown occurs.

Groundwater quality

PGM's management of waste rock and tailings is designed to prevent adverse groundwater quality impacts by:

- maintaining an inward groundwater gradient towards the Great Cobar void and limiting the pathways to the regional aquifer and any potential GDEs;
- appropriately managing seepage from surface waste stockpiles, including the New Cobar WRE and the Peak Complex TSF; and
- appropriately managing mine-impacted ('contact') water.

To prevent adverse impacts on groundwater quality from the New Cobar Complex WRE and other waste stockpile seepage, PGM will implement the following management measures:

- preferential usage of PAF waste rock as backfill in underground voids. If voids are unavailable, transportation of PAF waste rock to the surface and storage in the New Cobar Complex WRE will be undertaken. PAF material may also be used in the construction of the TSF dam raises (on internal TSF walls only); and
- NAF material will be used for capping and construction.

Continued implementation of Water Management Plan

- The WMP will provide a program for reviewing and updating the numerical groundwater model as more data and information become available during the operation of the mine and will outline the reporting requirements against each of the project approvals.

Water quality monitoring

- The groundwater monitoring network currently includes 23 monitoring locations across the New Cobar and Peak complexes and one existing / third-party bore. Details of monitoring analysis and frequency are outlined in the WMP. All water quality monitoring will be undertaken in accordance with the *Approved Methods for the Sampling and Analysis of Water Pollutant in NSW*. The suite of water quality analytes (ie constituents) to be sampled and the frequency of sampling will be reviewed and updated in the existing PGM WMP.

Groundwater model verification and review

- Future improvements to the numerical groundwater flow model will be undertaken as and when new data becomes available, particularly where there is a divergence of observed groundwater system response from that predicted. Groundwater monitoring data (including groundwater abstraction (sump pumping rates) and groundwater level observations), will be used to verify and validate the groundwater model predictions, with updated predictions re-forecasted if required.

Surface water quality

Table 23.1 Summary of management measures

Continued implementation of Water Management Plan

- Continue implementation of the existing WMP, which documents the proposed mitigation and management measures for approved activities, and includes the surface and groundwater monitoring program, reporting requirements, spill management and response, water quality trigger levels, corrective actions, contingencies, and responsibilities for management measures.
- The WMP will be updated in consultation with the relevant government agencies and the review will consider submissions raised during the exhibition and approvals process of the project.

Monitoring program

- Monitoring will continue to be undertaken in accordance with the *Approved Methods for the Sampling and Analysis of Water Pollutants in New South Wales*
- Sites will be monitored annually (with the exception of Spain's Dam and Young Australia 1 which is bi-annual and annually through EPL monitoring). Physico-chemical properties (pH, EC and temperature) will be measured either in-situ using a water quality meter or undertaken by a National Association of Testing Authorities (NATA) certified laboratory.
- Total suspended solids, oil, grease, major ions, nutrients and metals will be analysed by a NATA certified laboratory.
- PGM will continue metering water transfers; flow meters are proposed to be read on a weekly basis.

Surface disturbance

- The site will utilise an internal approval process prior to surface disturbance occurring (eg through a Permit to Disturb / Dig or similar process).
- Water management during construction of the power line, including erosion and sediment control, will be undertaken in accordance with *Managing Urban Stormwater: Soils and Construction: Volume 1 – Soils and construction* (Landcom 2004), *Managing Urban Stormwater: Soils and Construction – Volume 2E – mines and quarries* (DECC 2008) and PGM's ESCP (which is incorporated into the WMP) (PGM 2016).

Flooding

Measures to reduce potential flood risk

- Where practical, upstream diversion drains will be sized to convey flows resulting from the 5% AEP flood event as per *Managing Urban Stormwater: Soils and Construction – Volume 2E – mines and quarries*;
- The elevation of the fresh air intake and exhaust air rise will be constructed above the probable maximum flood level or flood protection bunds (within the existing disturbance footprint) put in place as required;
- Equipment will be stored outside of areas affected by substantial flooding, such as adjacent to Young Australia 2 and Young Australia 3; and
- Sufficient flood refuge will be maintained for the length of the proposed mine schedule.

Biodiversity

Micro-siting of surface infrastructure

- The exact alignment of the power line will be subject to detailed design after the EIS stage and refined to use already cleared areas and avoid the removal of native vegetation. Potential regrowth will be managed to ensure fire protection zones are maintained as appropriate.
- It is proposed that the location of power poles (the only works involving ground disturbance which would normally involve vegetation removal) and locating the subsequent power line corridor, will be micro-sited so as to avoid removal (power pole installation) or safety pruning (corridor) of any Mulga (*Acacia aneura*) and White Cypress Pine (*Callitris glaucophylla*).

Aboriginal heritage

Development and implementation of ACHMP

Table 23.1 Summary of management measures

- Prior to ground disturbance, an ACHMP must be developed by a heritage specialist in consultation with the RAPs to provide the post-approval framework for managing Aboriginal heritage within the project area.
- The ACHMP should include the following:
  - Processes, timing, and communication methods for maintaining Aboriginal community consultation and participation through the remainder of the project.
  - Descriptions, methods, personnel and timing of any additional investigative and/or mitigative archaeological actions that may be required prior to works commencing or during the project. These should include, but not be limited to, cultural monitoring and artefact collection for any areas where the surface impacts of the project intersect the identified Aboriginal objects and/or sites; and the undertaking of oral history with key knowledge-holders to further understand the cultural values and history of Aboriginal people who lived at Cornish Town.
  - Descriptions and methods of actions to avoid any direct or indirect impacts to the identified area of contemporary value during and following the proposed activity. This should include, but not be limited to, cultural inductions for personnel and subcontractors likely to encounter cultural items, outlining their location and significance, fencing and clear marking as a no-go zone, and any additional requirements identified by the Aboriginal community. A suitable regime of monitoring these activities should also be outlined, including locations, methods, personnel and timing.
  - Description and methods for undertaking further Aboriginal heritage assessment, investigation and mitigation of any areas of the project footprint that have changed following completion of the ACHA and/or during the final design and construction phases of the project.
  - Description and methods of post-excavation analysis and reporting of the archaeological investigations and activities implemented as part of the ACHMP.
  - Procedures for managing the unexpected discovery of Aboriginal objects, sites and/or human remains during the project.
  - Procedures for the curation and long-term management of cultural materials recovered as part of the works outlined in the ACHMP and any preceding stages associated with the project.
  - Processes for reviewing, monitoring, and updating the ACHMP as the project progresses.

Impacts to Aboriginal cultural objects and value

- Once determined, the proposed powerline easement and ancillary construction area will be identified on the ground (eg through flagging or pegging), and an opportunity provided for the Aboriginal stakeholders to inspect and recover any Aboriginal objects within this impact footprint. The Aboriginal stakeholders requested that the objects remain on country, and as such they would likely be relocated to an area immediately outside of the impact footprint.
- Development of an oral history to further understand the cultural values of the site to Aboriginal people should be undertaken. Consideration to implementing interpretation in suitable locations around the project area based on these results should be considered.

Consultation and reporting

- Consultation should be maintained with the RAPs during the finalisation of the assessment process and throughout the project.
- A copy of the ACHA should be lodged with AHIMS and provided to each of the RAPs.
- AHIMS Site Recording Forms for any newly identified Aboriginal objects and/or sites within the project area should be submitted to the AHIMS database.
- If any part of the project footprint is relocated outside the areas identified in this ACHA, or if any alteration is proposed that could result in additional impact to material culture, further assessment of these area(s) should be undertaken to identify and appropriately manage Aboriginal objects and/or sites that may be present.

Historical heritage

Development and implementation of Historical Heritage Management Plan

Table 23.1 Summary of management measures

The following management measures are proposed:

- preparation of an oral history of Cornish Town in conjunction with cultural mapping of the landscape of and around Cornish Town;
- updated signage at the Fort Bourke Hill lookout interpreting the history of Cobar and its landmarks, in consultation with RAPs and local stakeholders;
- continued vibration monitoring of the Great Cobar Heritage Centre (Cobar Pastoral and Mining Technology Museum 1910) for impacts from blasting, as well as remediation measures of damage detected;
- development of and adherence to an unanticipated finds protocol; and
- development of and adherence to an encountered human skeletal remains protocol.

Traffic and transport

Development and implementation of Traffic Management Plan

The TMP will identify and provide management strategies to manage the impacts to project related traffic, including:

- heavy vehicle loads departing site will be covered;
- haulage of materials to and from the PGM sites via Kidman Way;
- the management and coordination of construction and other staff vehicle movements to and from site, and measures employed to limit disruption to other motorists;
- strategies and measures employed to manage the risks of driver fatigue, road hazards and driver behaviour,
- an ore haulage Driver Code of Conduct; and
- additional warning signage requirements for truck traffic movements on Kidman Way during wet weather and/or other poor visibility conditions eg, dust storms.

Rehabilitation and closure

Rehabilitation

- Methods for rehabilitation will be confirmed at a later stage, but will take into account soil management, establishing vegetation, enhancement of fauna habitat, and erosion and sediment control.
- Refine and confirm rehabilitation criteria in the amended MOP and in the detailed closure plan as the project progresses towards closure.
- Rehabilitation monitoring will continue to be undertaken annually during operations and for five years following mine closure.
- Rehabilitation progress will be reported in the Annual Review.

Erosions and sediment control

- The highest risk area due to an existing erosion hazard for the project area is the WRE (approximately 14.9% slope on outer batters) however this was assessed as part of the New Cobar Open Cut approval (LDA99/00:022). There is some rill and gully erosion present on the northern and eastern slopes of the WRE where vegetation cover is low and some of the channel banks have breached. Runoff from this erosion is captured onsite in NC1, NC2 and NC3 limiting any potential impacts to the environment. NC1, NC2 and NC3 will be regularly maintained during the life of the project.
- PGM will undertake progressive rehabilitation of sections of the WRE not in use to achieve nominated stability and rehabilitation criteria. As part of this process, PGM will also undertake additional waste rock and soil characterisation, as well as erosion and landform evolution modelling during mining operations to inform the revised WRE batter stabilisation and rehabilitation approach.

Weeds

Weeds will be managed in accordance with the PGM Biodiversity and Land Management Plan which will be updated for the rehabilitation and closure phases if necessary. Weed management measures will include but will not be limited to:

- If machinery to be used for rehabilitation is brought to the site from another site, and if there is a risk of weed seeds having been transported on the machinery, it will be washed down in an approved wash down area before entry to the project area.
- Herbicide spraying or scalping weeds from soil stockpiles will be undertaken prior to soil re-use

Table 23.1 Summary of management measures

- Rehabilitation inspections to identify potential weed infestations will be undertaken within the complex on a regular basis, and prior to rehabilitation of any areas.
- Identifying and spraying existing weed populations together with ongoing weed spraying over the life of the project.

Hydrocarbons, chemicals and wastes

- To manage any potential contamination sources, waste management practices will be in accordance with the PGM environmental management system and will continue to be implemented during rehabilitation.

Visual amenity

New infrastructure

- The proposed emergency egress winder and headframe will be removed at the end of the project.

Rehabilitation of post closure landform

- The rehabilitation and landscape strategy identified that the batters of the WRE will undergo further revegetation with the planting mix analogous to pre-disturbance conditions.
- Progressive replanting to the batter slopes of the WRE will occur during the life of mine.
- The overriding objective of rehabilitation activities at the mine will be to return disturbed land to a condition that is safe, stable, and supports the proposed post-mining land use, which is primarily grazing on improved pasture. It is anticipated that the rehabilitated land will be incorporated back into land suitable for grazing:
  - remove all project-related infrastructure not required by the final land use;
  - restore to a safe and stable landform;
  - stabilise the WRE and other areas following removal of surface infrastructure; and
  - establish a landscape that permits the land use of livestock grazing on improved pasture.

Lighting

- Adhere to AS4282 Control of Obtrusive Effects of Outdoor Lighting for control of the obtrusive effects of outdoor lighting and recommended limits for relevant lighting levels.
- No movement of ore trucks outside of daylight hours (in accordance with proposed ore haulage truck conditions.
- A detailed assessment of potential light spill from the project will be undertaken if complaints are received, investigated, and found to be of substance. Lighting protocols derived from the assessment may include the following principles:
  - establish operational protocols for setting up of mobile lighting plant such that lighting is directed away from external private sensitive receivers (this may include altering the alignment of internal roads);
  - establish design and operational protocols such that lighting sources will be hooded and directed (directional treatments) below the horizontal to minimise potential light spill;
  - design light systems that minimise light spill;
  - screening of lighting where possible for viewers external to the project;
  - avoiding lighting of light-coloured surfaces which have greater reflectivity;
  - installation of timed and zonal illumination methods whereby a structure or area is only illuminated when activity is occurring in that area; and
  - additional landscape treatments in the form of planting to screen views.

Hazards, public safety and health

Infrastructure design

Due to vegetation hazard being in proximity to these structures, and in accordance with PBP 2019, it is recommended:

- a minimum 10 m APZ for the structures and associated buildings, and
- APZs must be maintained to the standard of an Inner Protection Area (IPA) for the life of the mine.

This includes the explosives magazine and diesel fuel tanks. It is noted that the existing explosives magazine currently has an APZ of approximately 30 m.

Storage and handling of hazardous materials

Table 23.1 Summary of management measures

- Adequate storage and handling requirements for potentially flammable and combustible substances at the surface infrastructure will be in accordance with AS 1940 The storage and handling of flammable and combustible liquids, AS 1596 The storage and handling of LP gas and Australian Standard 2187.1:1998 Explosives – Storage, Transport and Use – Storage.

Bushfire risk

- The proposed overhead power line should be designed and maintained so that it will not serve as a bushfire risk to surrounding bush, with no part of a tree being closer to a power line than the distance set out in ISSC3 Guideline for Managing Vegetation Near Power Lines.

Continued implementation of existing management plans and procedures

PGM has a portfolio of existing management plans and procedures relevant to the New Cobar Complex that will continue to be implemented and reviewed as part of the ongoing operation of the project. These include, but are not limited to:

- Emergency Management Plan (PLN-06-040);
- Emergency Preparedness Procedure (PRO-06-040-01);
- Emergency Response Procedure (PRO-06-040-04);
- Fire Prevention and Protection Procedure (PRO-06-040-02);
- Incident and Crisis Management Procedure (PRO-08-028);
- Fire and Explosion Control Plan; and
- Waste Rock Management Plan.

Waste management

Continuation of measures consistent with the existing Waste Management Plan

Measures include:

- waste streams will continue to be classified and managed in accordance with the Waste Classification Guidelines;
- waste streams will be appropriately segregated prior to reuse, recycling/composting or disposal;
- designated waste storage bins and areas will be appropriately sign posted and regularly inspected in accordance with the Waste Management Plan;
- volumes of wastes generated and disposed will be tracked and collated monthly;
- waste disposal off site will be conducted by relevant appropriately licenced contractors, depending on the waste type.

Continuation of principles in the Waste Rock Management Plan

To minimise the handling of PAF waste rock at the surface, implement the following:

- preferential deployment of PAF waste rock underground, rather than being transported to the surface for stockpiling;
- if necessary, transfer of PAF waste rock to the surface for storage within the existing WRE; and
- re use of NAF material on site where possible following characterisation in accordance with the WRMP.

Social

Social impacts to way of life

- PGM has committed to make good arrangements to supply supplementary water to the Cobar District Rugby Club to replace any reduction in pumping capacity that may occur due to the drawdown of the water table. This will be done in consultation with the Cobar District Rugby Club to achieve a solution that is in all parties' best interests.
- Development and implementation of a community and stakeholder engagement strategy which includes provisions for information distribution and feedback mechanisms related to the ongoing operation and state of the rugby ground.
- Continued implementation of the WMP during operation of the project.
- Inclusion of information about water quality monitoring in any updates provided to the local community as part of the community and stakeholder engagement strategy.

Maximising benefits

Table 23.1 Summary of management measures

- Provision of training, apprenticeship and upskilling opportunities for the project workforce.
- Encourage and support further integration of the project workforce into the local community where possible.
- Development of a strategy for the enhanced identification and implementation of shared value opportunities within the local area.
- The development and implementation of a community and stakeholder engagement strategy would also increase transparency and provide clear expectations by communicating the intention for PGM to hire locally where possible.
- Encourage and support further integration of the project workforce into the local community where possible. A commitment to local procurement of goods and services in the form of a local business and local industry procurement strategy specific to the project.

Health and community wellbeing

- Development and implementation of a consistent blasting notification procedure as part of the community and stakeholder engagement strategy.
- Continue to manage and monitor their community grievance mechanism (ie complaints register) and provide opportunities for community feedback related to air quality which may arise as a consequence of the project.
- Include information about heavy metals monitoring in any updates provided to the local community as part of their community and stakeholder engagement strategy.

Monitoring and management framework

Develop a monitoring and management framework to ensure that the identified impacts (positive and negative) are monitored over time.

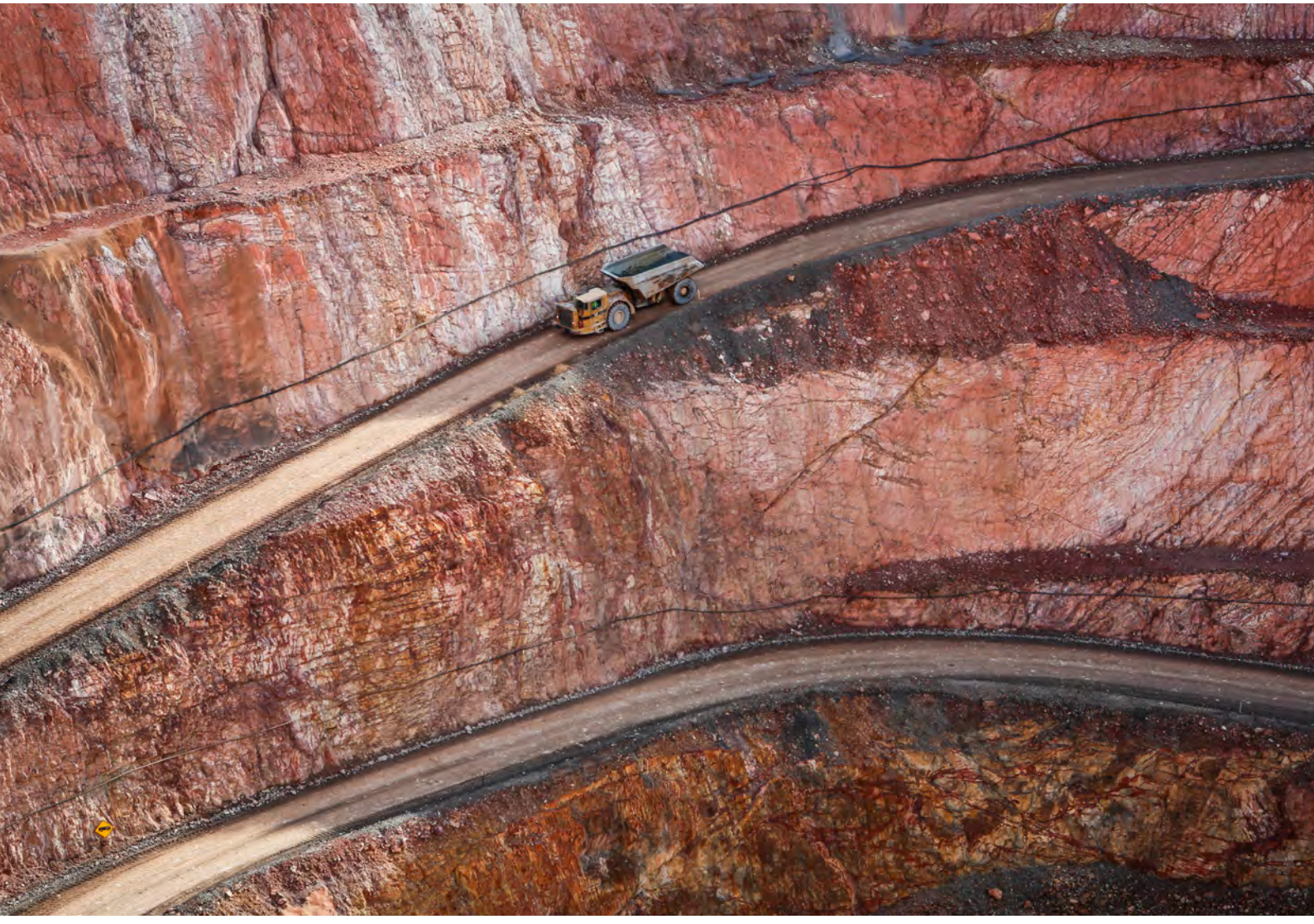
It is proposed that the monitoring and management framework identifies the following key aspects:

- track progress of mitigation and management strategies;
- assess actual project impacts against predicted impacts;
- identify how information will be captured for reporting to impacted stakeholders including landholders, communities and government on progress and achievements;
- key performance indicators, targets and outcomes;
- responsible parties; and
- mechanisms for ongoing adaption of management measures when and if required.

Economics

Maximising benefits of the project to the local community, local catchment and NSW, and minimising any potential adverse impacts

- To maximise local benefits derived from the project, and consistent with existing PGM policies, the proponent and contractors engaged by the proponent will be encouraged to source labour, including workforce and contractor labour, locally where possible and practical, and provide training opportunities where practical.
- PGM will continue to actively encourage workers to reside locally. More than half of the existing workforce at the Peak and New Cobar complexes reside within Cobar.
- PGM will monitor the local accommodation / housing market and demands placed on it by its workforce. If supply constraints are identified, PGM will work with Council to identify options for increasing supply as needed.



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