Cowal Gold Mine E42 Modification
Socio-Economic Assessment

Prepared for

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EXECUTIVE SUMMARY

The Cowal Gold Mine (CGM) is located 38 kilometres (km) north-east of West Wyalong, New South Wales (NSW), within the Lachlan Statistical Sub-division (SSD). Barrick Australia Limited (Barrick) is proposing to modify the approved CGM by the E42 Modification which would result in the modified CGM. It is the incremental difference (between the approved CGM and the modified CGM) that was the subject of this economic assessment.

The main decision criterion for assessing the economic desirability of a project to society is its net benefit. Net benefit is the sum of the discounted benefits to society less the sum of the discounted costs. A positive net benefit indicates that it would be desirable from an economic perspective for society to allocate resources to a proposal, because the community as a whole would be better off.

In a simple framework, the benefits to society from mining relate to the net production benefits, while the economic costs to society relate to any environmental impacts.

The E42 Modification is estimated to have net production benefits to Australia in the order of $121 million (M). This is above the net production benefits of the approved CGM (i.e. it is a net production benefit specific to the E42 Modification). Because the potential incremental environmental impacts of the modification have not been valued, the net production benefit of $121M represents a threshold value.

This threshold value is the opportunity cost to society of not proceeding with the modification. Interpreted another way, any environmental impacts of the modification, after mitigation by Barrick, would need to be valued at greater than $121M to make the modification questionable from an economic efficiency perspective.

To put this into a regional context, this is equivalent to each household in the Lachlan SSD having a willingness to pay of over $5,800 to avoid any of the residual environmental impacts of the modification, after mitigation by Barrick.

The net production benefits of the modification are distributed between a range of stakeholders including Barrick and its shareholders in the form of net profits, the NSW government in the form of royalties and the Commonwealth Government in the form of company tax. The State Government also receives additional income by way of payroll tax while the Commonwealth Government would receive additional revenues in the form of income tax.

The modification would extend the period over which the approved CGM would provide a stimulus to the Lachlan SSD (or regional) economy. This extended stimulus would arise from purchases made in the regional economy by Barrick and those made by employees. The regional economic impacts associated with the peak year of the E42 Modification are estimated at up to:

- $292M in annual direct and indirect regional output or business turnover;
- $114M in annual direct and indirect regional value added;
- $59M in annual direct and indirect household income; and
- 868 direct and indirect jobs.

The relatively small additional population anticipated for the region as a result of the E42 Modification (i.e. between approximately 20 and 52 people) is unlikely to place any strain on existing community infrastructure. In contrast, extending the life of the approved CGM may help slow the decline of the regional population and hence slow any decline in the provision of community infrastructure and services to the region. At the same time, continued mining would help maintain a more diversified economy that is more resilient to individual shocks such as droughts and changes in agricultural commodity prices.

Conversely, cessation of the modified CGM would result in a contraction in regional economic activity. The significance of these cessation impacts would depend on:

- The degree to which any displaced workers and their families remain within the region, even if they remain unemployed. This is because continued expenditure by these people in the regional economy (even at reduced levels) contributes to final demand.
- The economic structure and trends in the regional economy at the time. For example, if cessation of the modified CGM takes place in a declining economy the impacts might be felt more greatly than if it takes place in a growing, diversified economy.
- Whether other mining developments or other opportunities in the region arise that allow employment of displaced workers.

H1 INTRODUCTION

The Cowal Gold Mine (CGM) is located 38 kilometres (km) north-east of West Wyalong, New South Wales (NSW), within the Lachlan Statistical Sub-division (SSD). Barrick Australia Limited (Barrick) is proposing to modify the approved CGM by the E42 Modification which would result in the modified CGM. The modified CGM is scheduled to commence in approximately Year 5 of CGM operations. The main changes to the approved CGM as a result of the E42 Modification would include those presented below:

- An increase to the operational mine life from 13 years to approximately 24 years.
- An increase in total production and maximum ore processing rate.
- An increase in gold production.
- An increase in the total surface area of the open pit, with final pit dimensions increased.
- An increase in the total volume of waste rock to be removed from the open pit.
- An increase in the height and surface area of the northern waste emplacement and southern waste emplacement.
- A reduction in the height of the perimeter waste emplacement in some places.
- An increase in the total surface area of low grade ore stockpiles.
- An increase in the total volume of tailings produced.
- An increase in the heights of the northern and southern tailings storage facilities.
- Extraction of saline water from a saline groundwater supply borefield located within Mining Lease 1535.
- Other associated minor changes to infrastructure, plant, equipment and activities.

An Environmental Assessment of the proposed modification is required in accordance with provisions of the NSW *Environmental Planning and Assessment Act, 1979*. A socio-economic assessment is considered necessary to meet the NSW Department of Planning Director-General's requirements to draw "*a conclusion justifying the proposal, taking into consideration the potential costs and benefits of the proposal*…".

H2 BACKGROUND

From a socio-economic perspective there are three important aspects of the E42 Modification:

- the economic efficiency of the E42 Modification (i.e. consideration of economic costs and benefits);
- the regional economic impacts of the E42 Modification (i.e. the economic stimulus that the modification would provide to the regional economy); and
- the distribution of impacts between stakeholder groups (i.e. the equity or social impact considerations).

The draft *Guideline for Economic Effects and Evaluation in EIA* (Planning NSW, 2002) identified economic efficiency as the key consideration of economic analysis. Benefit cost analysis (BCA) is the method used to consider the economic efficiency of proposals. The draft guidelines identified BCA as essential to undertaking a proper economic evaluation of proposed developments that are likely to have significant environmental impacts (Planning NSW, 2002).

The draft guidelines consider that regional economic impact assessment may provide additional information as an adjunct to the economic efficiency analysis. Economic stimulus to the local economy can be estimated using input-output modelling of the regional economy (regional economic impact assessment).

The draft guidelines also identify the need to consider the distribution of benefits and costs in terms of:

- intra-generational equity effects – the incidence of benefits and costs within the present generation; and
- inter-generational equity effects – the distribution of benefits and cost between present and future generations.

These social impacts are often considered in terms of the impacts on employment, population and community infrastructure. Each of these aspects is considered in this assessment.

In summary, this assessment report provides:

- an evaluation of the economic efficiency of the E42 Modification (Section H3);
- identification the distribution of impacts between stakeholder groups (Section H4);
- a regional economic impact assessment of the E42 Modification (Section H5);
- an employment, population and community infrastructure assessment (Section H6);
- consideration of the impacts of mine cessation (Section H7); and
- a conclusion, summarising the above (Section H8).

H3 ECONOMIC EFFICIENCY

The main decision criterion for assessing the economic desirability of a project to society is its net benefit. Net benefit is the sum of the discounted benefits to society less the sum of the discounted costs. A positive net benefit indicates that it would be desirable from an economic perspective for society to allocate resources to a proposal, because the community as a whole would be better off.

In a simple framework, the benefits to society from mining relate to the net production benefits, while the economic costs to society relate to any environmental impacts.

Net production benefits of the E42 Modification are a function of expected incremental gold production, sale price and costs of production over time associated “with” the E42 Modification compared to “without” the E42 Modification.

H3.1 Capital Costs

Incremental capital costs for the E42 Modification are associated with the purchase of additional mining fleet, progressive raising of the northern and southern tailings storage facilities, modification of the perimeter waste emplacement and other miscellaneous facilities. These incremental capital costs are estimated at in the order of $76 million (M).

H3.2 Operating Costs and Revenues

Incremental operating costs are associated with increased mining and ore processing from Year 5 to Year 18 (i.e. 2009 to 2022) and ore processing only from Year 19 to Year 24 (i.e. 2023 to 2028). These incremental operating costs average approximately $60M per annum over the life of the E42 Modification. Incremental revenues associated with the expected production profile average approximately $84M per annum over the operating life of the E42 Modification.

H3.3 Decommissioning Costs, Residual Land Value and Residual Capital Value

The modification extends the life of the approved CGM and hence the approximate $14M of decommissioning costs that would have been incurred in Year 14 (i.e. 2018) following cessation of the CGM are deferred until Year 25 (i.e. 2029). This is an economic benefit of the E42 Modification. However, $6M of residual land and capital value that would have been realised in Year 14 (i.e. 2018) would also be deferred until Year 25 (i.e. 2029), representing an additional cost of the E42 Modification.

H3.4 Threshold Value Analysis

At the NSW Treasury recommended central discount rate of 7%, the E42 Modification is estimated to have net production benefits to Australia of $121M. However, because the potential incremental environmental impacts of the modification have not been valued, the net production benefit of $121M represents a threshold value.

This threshold value is the opportunity cost to society of not proceeding with the E42 Modification. Interpreted another way, any environmental impacts from the E42 Modification, after mitigation by Barrick, would need to be valued at greater than $121M to make the E42 Modification questionable from an economic efficiency perspective.

To put this into a regional context, this is equivalent to each household in the Lachlan SSD having a willingness to pay of over $5,800 to avoid any of the residual environmental impacts of E42 Modification, after mitigation by Barrick. The equivalent figure for NSW households is $48. In the context of the economic valuation literature, these are very large threshold values.

H4 DISTRIBUTION OF IMPACTS

While Barrick would initially bear the production costs and receive the production benefits (revenue) of the E42 Modification, the net production benefits would be distributed between a number of stakeholders including Barrick and its shareholders in the form of net profits, the NSW government in the form of royalties and the Commonwealth Government in the form of company tax.

The State Government also receives additional income by way of payroll tax while the Commonwealth Government would receive additional revenues in the form of income tax.

H5 REGIONAL ECONOMIC IMPACTS

Regional economic impact assessment is concerned with the effect of an impacting agent on an economy in terms of a number of specific indicators, such as gross regional output, value-added, income and employment.

These indicators are defined as follows:

- ***Gross regional output*** - is the gross value of business turnover;
- ***Value-added*** – is the difference between the gross value of business turnover and the costs of the inputs of raw materials, components and services bought in to produce the gross regional output;
- ***Income*** – is the wages paid to employees including imputed wages for self employed and business owners; and
- ***Employment*** – is the number of people employed (including full-time and part-time).

The impacting agent for the E42 Modification is the additional expenditure in the regional economy as a result of an increase in production and employment levels and an extension in the life of the approved CGM by 11 years. The economy on which the impact is estimated in this report is the Lachlan SSD.

For this assessment, Gillespie Economics have applied Type 11A output, value-added, income and employment ratio multipliers reported for the Cadia Gold Mine on the Central West Statistical Division (Gillespie Economics, 2005) to the estimated direct output, value-added, income and employment impacts of the E42 Modification in the peak year of revenues and costs (i.e. Year 17 or 2021) (Table H-1).

There are well documented limitations with “borrowing” multipliers from other studies. However, in the absence of a primary study these multipliers could be considered to be upper bounds of likely regional effects. They are upper bounds as the Central West economy is larger than that of Lachlan SSD and hence multipliers are likely to also be larger.

Table H-1
Estimated Regional Economic Impacts of the E42 Modification (Peak Year 17)

	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	TOTAL EFFECT
OUTPUT ($M)	185	56	52	107	292
Type 11A Ratio	*1.00*	*0.30*	*0.28*	*0.58*	*1.58*
VALUE ADDED ($M)	104	3	7	10	114
Type 11A Ratio	*1.00*	*0.03*	*0.07*	*0.10*	*1.10*
INCOME ($M)	35	9	15	24	59
Type 11A Ratio	*1.00*	*0.26*	*0.43*	*0.69*	*1.69*
EMPLOYMENT (No.)	350	172	347	518	868
Type 11A Ratio	*1.00*	*0.49*	*0.99*	*1.48*	*2.48*

Based on this approach, the annual regional economic impacts associated with the peak year of the E42 Modification are estimated at up to:

- $292M in annual direct and indirect regional output or business turnover;
- $114M in annual direct and indirect regional value added;
- $59M in annual household income; and
- 868 direct and indirect jobs.

H6 COMMUNITY INFRASTRUCTURE ASSESSMENT

Changes in the workforce and population of a region may have implications in relation to access to community infrastructure and human services, which could include housing, health and education facilities. This may include the number of services that are available and the accessibility of the population to these services.

Employment that is directly generated by the construction and operation phase of a mine may be sourced from:

- the local region either from:
  - the unemployment pool; or
  - workers from other industries; and/or
- in-migration or commuters.

Sourcing labour from the local region has minimal direct impact on local community infrastructure and services since it results in no changes to the regional population and hence demand for services. It may, however, have an indirect impact on some local community infrastructure and services where changes in employment status or income result in changes in demand for some particular services (e.g. health services).

Whether local labour is sourced from the unemployment pool or from other industries, it can reduce unemployment levels - directly in the case of employing unemployed people and indirectly via the filter effect[1] where labour is sourced from other industries.

The impact of commuter workers will depend on the extent to which they integrate into the regional communities, however, is likely to be modest.

In-migration, resulting in population change is likely to have the greatest potential impact on demand for community services and infrastructure with this impact dependent on the new residential location of the migrating workforce and their families and the capacity of the local region to provide the services required.

[1] The filter effect refers to the situation where labour is sourced from other industries in the region making jobs available in those industries which are subsequently filled by people either from the unemployment pool or other industries with the latter making jobs available in that industry, etc.

As well as direct employment and population changes, mining projects may also generate indirect labour demand through expenditure by employees in the local region and expenditure by mines in the local region on other inputs to production. This induced demand for labour may also have consequences for population change and demand for community infrastructure and services.

While the modified CGM would continue to provide employment for approximately 320 personnel that work at the mine (370 in peak periods), it would also result in an average of 30 additional jobs (80 in peak periods). It is the 30 additional jobs (80 in peak periods) that have the potential to place strain on community infrastructure in the region.

However, Barrick estimate that the majority of these workers (90%) will come from the region, with 60% from the Bland Shire. Employment of existing residents of the region would have little impact on community infrastructure. Any impact would arise from the estimated 10% that would migrate into the region. Assuming normal household size for NSW (i.e. 2.6), the direct population change would be in the order of between 8 and 21 people.

Making the same assumptions for the additional indirect workforce generated by the E42 Modification would give an indirect population change of between 12 and 31 people.

This total population change of between 20 and 52 people can be considered within the context of recent population changes to the Lachlan (SSD) region and in particular the West Wyalong region (i.e. the Bland Statistical Local Area [SLA]). Table H-2 shows the population change from 1996 to 2006 for the Lachlan SSD and the Bland SLA.

Table H-2
Lachlan SSD and Bland SLA Population Change

Region		**1996**	**2001**	**2006**
Lachlan SSD	Population	55,284	53,907	52,399
	Population change		*-1,377*	*-1,508*
Bland SLA	Population	6,681	6,439	6,273
	Population change		*-242*	*-166*

Source: Australian Bureau of Statistics (2006)

This population increase is equivalent to between one and two years recent population losses from the Bland SLA and less than a fifth of a year's population loss from the wider Lachlan SSD. This recent decline is likely to have resulted in spare capacity in community infrastructure and services. Consequently, the additional population for the region as a result of the E42 Modification is unlikely to place any strain on existing community infrastructure.

In contrast, extending the life of the approved CGM may slow the decline of the regional population and hence slow any overall decline in the provision of community infrastructure and services to the region. At the same time continued mining would help maintain a more diversified economy that is more resilient to individual shocks such as droughts, changes in agricultural commodity prices, etc.

H7 MINE CESSATION

Cessation of the modified CGM in 2028 would lead to a reduction in economic activity in the Lachlan region. The significance of these cessation impacts would depend on:

- The degree to which any displaced workers and their families remain within the region, even if they remain unemployed. This is because continued expenditure by these people in the regional economy (even at reduced levels) contributes to final demand.
- The economic structure and trends in the regional economy at the time. For example, if cessation of the modified CGM takes place in a declining economy the impacts might be felt more greatly than if it takes place in a growing, diversified economy.
- Whether other mining developments or other opportunities in the region arise that allow employment of displaced workers.

Given these uncertainties it is not possible to foresee the likely circumstances within which cessation of the modified CGM would occur. It is therefore important for regional authorities and leaders to take every opportunity provided by the regional economic stimulus of the CGM, to strengthen and broaden the region's economic base.

H8 CONCLUSION

The E42 Modification is estimated to have net production benefits to Australia in the order of $121M. However, because the potential incremental environmental impacts of the E42 Modification have not been valued, the net production benefit of $121M represents a threshold value.

This threshold value is the opportunity cost to society of not proceeding with the E42 Modification. Interpreted another way, any environmental impacts of the E42 Modification, after mitigation by Barrick, would need to be valued at greater than $121M to make the E42 Modification questionable from an economic efficiency perspective.

To put this into a regional context, this is equivalent to each household in the Lachlan SSD having a willingness to pay of over $5,800 to avoid any of the residual environmental impacts of the E42 Modification, after mitigation by Barrick.

The net production benefits of the E42 Modification are distributed between a range of stakeholders including Barrick and its shareholders in the form of net profits, the NSW government in the form of royalties and the Commonwealth Government in the form of company tax. The State Government also receives additional income by way of payroll tax while the Commonwealth Government would receive additional revenues in the form of income tax.

The E42 Modification would extend the period over which the approved CGM would provide a stimulus to the Lachlan economy. This extended stimulus would arise from purchases made in the regional economy by Barrick and those made by employees. The regional economic impacts associated with the peak year of the E42 Modification are estimated at up to:

- $292M in annual direct and indirect regional output or business turnover;
- $114M in annual direct and indirect regional value added;

- $59M in annual household income; and
- 868 direct and indirect jobs.

The small additional population for the region as a result of the E42 Modification (i.e. between approximately 20 and 52 people) is unlikely to place any strain on existing community infrastructure. In contrast, extending the life of the approved CGM may help slow the decline of the regional population and hence slow any decline in the provision of community infrastructure and services to the region. At the same time, continued mining would help maintain a more diversified economy that is more resilient to individual shocks such as droughts and changes in agricultural commodity prices.

H9 REFERENCES

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