

ATTACHMENT 1
COWAL GOLD MINE
STATEMENT OF ENVIRONMENTAL EFFECTS
OF PROPOSED MODIFICATION



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TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1 BACKGROUND	1
2 PROPOSED AMENDMENTS TO THE DEVELOPMENT CONSENT	1
3 REASONS FOR THE MODIFICATION APPLICATION	4
4 DESCRIPTION OF THE PROPOSED MODIFICATION	5
5 ENVIRONMENTAL REVIEW	13
5.1 VISUAL CHARACTER	13
5.2 NOISE AND BLASTING	15
5.3 GROUNDWATER	18
5.4 SURFACE WATER	21
5.5 AIR QUALITY	23
5.6 LAND RESOURCES	25
5.7 FLORA	25
5.8 FAUNA	26
5.9 ABORIGINAL CULTURAL HERITAGE	29
5.10 NON-ABORIGINAL HERITAGE	29
5.11 ROAD TRANSPORT	30
5.12 SOCIO-ECONOMICS	30
5.13 HAZARD AND RISK	31
6 CONCLUSION	32
7 REFERENCES	33

LIST OF TABLES

Table 1	Comparison of Original, Approved and Modified CGM
Table 2	Potential Visual Impact Summary
Table 3	Comparison of the Existing Development Consent and EPL Noise Criteria
Table 4	NMP (INP) Based Intrusive $L_{Aeq(15\text{minute})}$ and Sleep Disturbance $L_{A1(1\text{minute})}$ Noise Criteria

LIST OF FIGURES

Figure 1	Regional Location
Figure 2	Original, Approved and Modified CGM

LIST OF ATTACHMENTS

Attachment A	Letter from Urbis Pty Ltd January 2009
Attachment B	Letter from Heggies Pty Ltd January 2009

1 BACKGROUND

The Cowal Gold Mine (CGM) was granted Development Consent by the New South Wales (NSW) Minister for Urban Affairs and Planning on 26 February 1999. The Development Consent has been modified on five occasions under Section 96 of the *Environmental Planning and Assessment Act, 1979* (EP&A Act) on 11 August 2003, 22 December 2003, 4 August 2004, 23 August 2006 and 12 March 2008. The CGM is located approximately 38 kilometres (km) north-east of West Wyalong in NSW (Figure 1).

Barrick Australia Limited (Barrick) has made an application to the Minister for Planning under Section 96(1A) of the EP&A Act to modify Condition 1.1 of the Development Consent (Modification Application). This document has been prepared in support of the Modification Application and sets out the details of the proposed modification which is sought, an assessment of the minimal environmental impacts of the proposed modification and evidence that the development would remain substantially the same as that for which consent was originally granted.

2 PROPOSED AMENDMENTS TO THE DEVELOPMENT CONSENT

Condition 1.1 of the Development Consent provides:

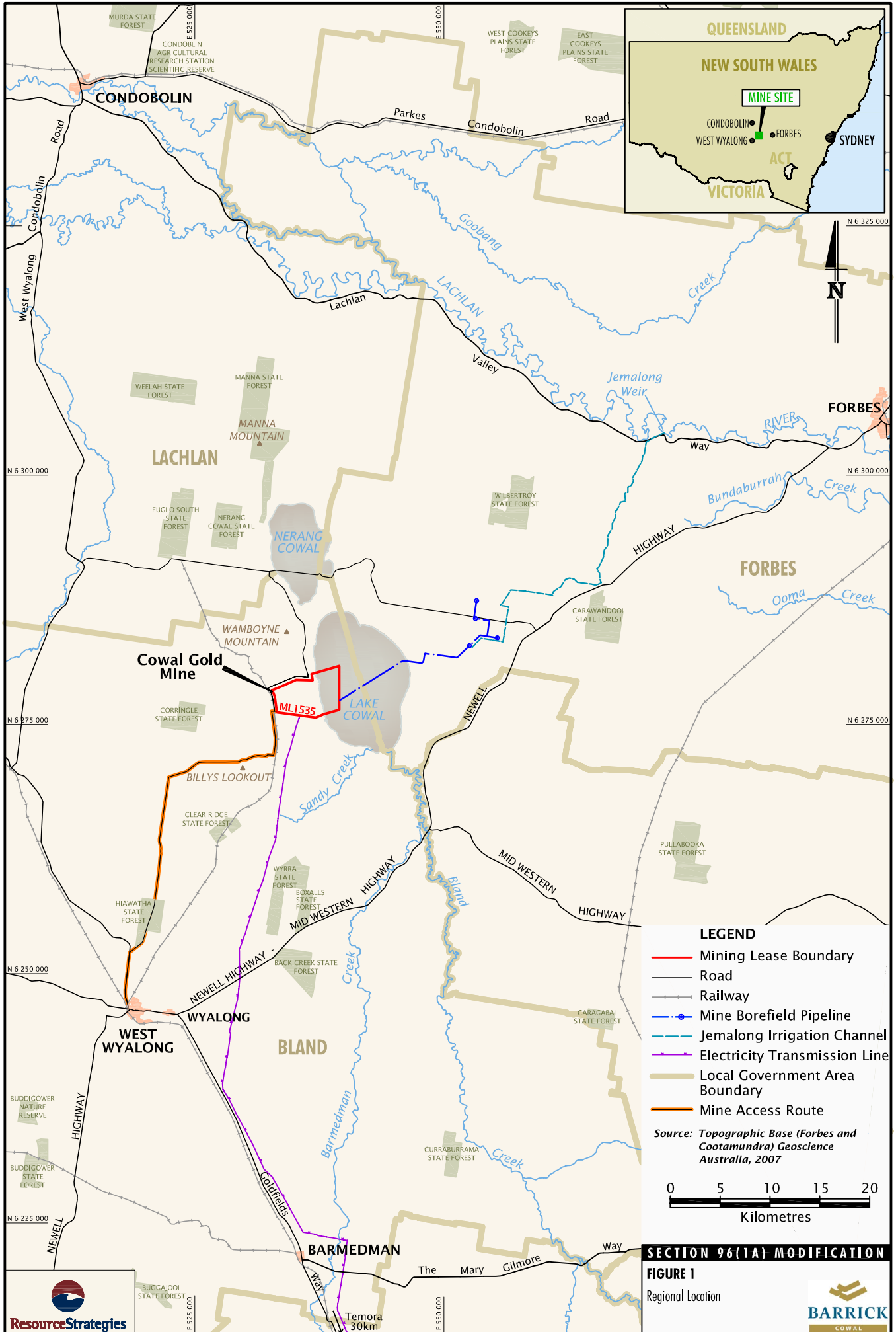
1.1 Adherence to terms of DA, EIS, SIS, etc.

- (a) *The Development is to be carried out generally in accordance with the:*
- (i) *EIS dated 13 March 1998, including the Statement of Intent by North Gold (WA) Ltd, and prepared by Resource Strategies, as amended by the plans in Appendix 2 of this consent;*
 - (ii) *other relevant documentation, including the Applicant's primary submission, and submission in reply to the Commission of Inquiry;*
 - (iii) *modification application submitted by Barrick Australia Limited, dated 20 June 2003;*
 - (iv) *modification application and supporting information submitted by Barrick Australia Limited, dated 13 November 2003;*
 - (v) *modification application and supporting information submitted by Barrick Australia Limited, dated 22 June 2004;*
 - (vi) *modification application and supporting documentation submitted by Barrick Australia Limited, dated 15 August 2006;*
 - (vii) *modification application and supporting documentation submitted by Barrick Australia Limited, dated 24 December 2007; and*
 - (viii) *conditions of this consent.*

Barrick seeks the following modification of Condition 1.1 of the Development Consent (as underlined):

1.1 Adherence to terms of DA, EIS, SIS, etc.

- (a) *The Development is to be carried out generally in accordance with the:*
- (i) *EIS dated 13 March 1998, including the Statement of Intent by North Gold (WA) Ltd, and prepared by Resource Strategies, as amended by the plans in Appendix 2 of this consent;*
 - (ii) *other relevant documentation, including the Applicant's primary submission, and submission in reply to the Commission of Inquiry;*
 - (iii) *modification application submitted by Barrick Australia Limited, dated 20 June 2003;*



- (iv) *modification application and supporting information submitted by Barrick Australia Limited, dated 13 November 2003;*
- (v) *modification application and supporting information submitted by Barrick Australia Limited, dated 22 June 2004;*
- (vi) *modification application and supporting documentation submitted by Barrick Australia Limited, dated 15 August 2006;*
- (vii) *modification application and supporting documentation submitted by Barrick Australia Limited, dated 24 December 2007;*
- (viii) *modification application and supporting documentation submitted by Barrick Australia Limited, dated 24 December 2008; and*
- (ix) *conditions of this consent.*

Condition 6.4 (a) of the Development Consent provides:

6.4 Noise Control

(a) *Noise levels - mine operations*

The Applicant shall ensure that the L_{A10} (15 minute) noise levels due to the normal operation of the mine, when measured or computed at any dwelling in the vicinity of the mine (other than one owned by a mining company), shall not exceed:-

- *during day time (7am-10pm), an L_{A10} (15 minute) noise levels of 35dB(A)*
- *during night time (10pm-7am), an L_{A10} (15 minute) noise levels of 33dB(A).*

These goals apply under prevailing meteorological conditions except during:

- *rain; and/or*
- *wind speeds greater than 3m/s, and/or*
- *temperature inversions.*

Noise impacts that may be enhanced by temperature inversions shall be addressed by:

- (i) *documenting noise complaints received to identify any higher level of impacts or patterns of temperature inversions; and*
- (ii) *where levels of noise complaints indicate a higher level of impact then actions to quantify and ameliorate any enhanced impacts under temperature inversion conditions should be detailed in the noise management plan.*

Barrick seeks the following modification of Condition 6.4 (a) of the Development Consent (as underlined):

6.4 Noise Control

(a) *Noise levels - mine operations*

The Applicant shall ensure that the L_{Aeq} (15 minute) noise levels due to the normal operation of the mine, when measured or computed at any dwelling in the vicinity of the mine (other than one owned by a mining company), shall not exceed:-

- *during day time (7am to 6pm), Monday to Friday, an L_{Aeq} (15 minute) noise level of 35dB(A)*
- *during evening (6pm to 10pm), Monday to Friday, an L_{Aeq} (15 minute) noise level of 35dB(A).*
- *at all other times, an L_{Aeq} (15 minute) noise level of 35dB(A), except as expressly provided by other approvals/licences granted by other agencies.*

These goals apply under prevailing meteorological conditions except during:

- *wind speeds up to 3m/s at 10 m about ground level, or*
- *temperature inversion conditions of up to 3°C/100 m and wind speed up to 2 m per second at 10 m above ground level.*

3 REASONS FOR THE MODIFICATION APPLICATION

The lodgement of this modification application by Barrick has been prompted by the commencement of legal proceedings in the Land and Environment Court of NSW which challenges the authority of the Minister for Planning to grant an approval under Section 75W of the EP&A Act to Barrick's E42 Modification to the CGM.

The application for the E42 Modification under Section 75W was lodged with the Minister for Planning in March 2008. An Environmental Assessment (EA) to accompany the application was lodged in August 2008. The EA was placed on public exhibition from 22 August to 22 September 2008.

The legal proceedings relevant to the E42 Modification were commenced in the NSW Land and Environment Court on 7 November 2008. Barrick has been informed that until the legal proceedings have been determined by the Court, the Minister for Planning will defer determination of Barrick's application under Section 75W for the E42 Modification.

One of the practical effects of the legal proceedings is that the approval process for the E42 Modification will be delayed. The E42 Modification involves, amongst other things, widening and deepening the open pit and an increase in the ore processing rate at CGM. The E42 Modification is required to establish more efficient ore recovery and hence a more efficient mining project. The requirement for the E42 Modification was identified in response to significant changes in market conditions and an increase in working knowledge of the orebody and mining conditions since the original development consent was issued in 1999. Without the E42 Modification, the efficiency of the CGM will be adversely affected. This proposed modification has been lodged in order to avoid the following potential adverse consequences:

- Excess ore would be generated above the required process plant rate and would be stockpiled. Stockpiling would result in ore being double-handled prior to being processed at a later date incurring additional costs. Additional areas would be required to be designed and cleared for stockpiling the excess ore that would be generated. This would likely require re-handling of existing low grade ore and waste emplacements to accommodate the excess ore.
- or
- The mining rate for the currently-approved pit area would need to be reduced to maintain the optimum rate of ore feed to the process plant. Decreasing the mining rate would result in equipment and personnel being idle because one less mining fleet would be required. This would result in a reduction in workforce.

The proposed modification proposes changes to the open pit to optimise the efficiency of the project whilst there is a material delay to the E42 Modification approval process. The proposed modification would not authorise an increase in the approved CGM disturbance area. The proposed modification does not propose an increase in ore processing rates or volumes or water demand.

In addition to the above, there is a current inconsistency between the CGM noise limits contained in the Development Consent and those in the CGM Environment Protection Licence (EPL). The EPL noise limits are based on contemporary Department of Environment and Climate Change (DECC) methodologies for developing project specific noise limits (i.e. in accordance with the NSW Industrial Noise Policy [INP] [EPA, 2000]). The Development Consent noise limits are based on superseded methodologies. To contemporise the Development Consent and for consistency with the EPL and INP, Barrick seeks the modification of Condition 6.4(a) of the Development Consent (as outlined in Section 2).

The proposed modification has been lodged in order that Barrick can better manage the adverse consequences of material delay to a successful approval process for the E42 Modification and to contemporise the Development Consent project specific noise limits.

4 DESCRIPTION OF THE PROPOSED MODIFICATION

This section describes the “development to which the consent as modified relates” (the modified CGM) and provides a comparison with the:

- “development for which the consent was originally granted” (as described and shown in the *Cowal Gold Project Environmental Impact Statement [EIS] [North Limited, 1998]*) (the original CGM); and
- original CGM as previously modified (the approved CGM).

Table 1 provides a comparison of the original CGM, the approved CGM and the modified CGM. The modified CGM includes the modifications described above and shown on Figure 2. Figure 2 shows the layout of the original CGM compared to the approved and modified CGM.

Table 1 demonstrates that the modified CGM would be substantially the same as the development for which the Development Consent was originally granted and before that consent as originally granted was modified.

**Table 1
Comparison of Original, Approved and Modified CGM**

Development Component	Original CGM¹	Approved CGM²	Modified CGM³
Tenement	Mining operations to be conducted within a proposed Mining Lease (ML) encompassing an area of approximately 2,650 hectares (ha).	No change (ML 1535 granted in June 2003).	No change.
Mining	Open pit mine producing a total of approximately 2.7 million ounces (Moz) of gold which is economically recoverable from some 76 million tonnes (Mt) of ore.	No change.	No change.
Life of Mine	13 year operational life composed of an eight year mining and processing phase followed by a five year mineral processing phase.	No change.	No change.
Ore Processing	Gold extracted from the ore using a conventional carbon-in-leach cyanide leaching circuit. Ore processing rate of up to 6.9 million tonnes per annum (Mtpa).	No change.	No change.
Disturbance Area	Disturbance area of approximately 940 ha, including an open pit of dimensions 1,000 m long, 850 m wide and 325 m deep.	Disturbance area of approximately 951 ha, including an open pit of dimensions 1,000 m, long, 850 m wide and 325 m deep.	No change (open pit dimensions would increase to 1,100 m long, 1,050 m wide and 325 m deep, however this increase would occur within the approved CGM disturbance area).
Lake Isolation System	The lake isolation system has been constructed to hydrologically isolate the open pit and Lake Cowal during mining and post-mining. The lake isolation system is comprised of a series of isolation embankments designed to prevent the inflow of water from Lake Cowal into the open pit development area during periods of high water levels. The lake isolation system includes the temporary isolation bund, lake protection bund and perimeter waste emplacement.	No change.	No change.
Geochemical Characteristics of Waste Rock	Oxide and primary waste rock types are non-acid forming, have high natural salinities (oxide waste) and some have the potential to develop high salinity/soluble salts (primary waste).	No change.	No change.
Mine Fleet	Type of mining equipment required to extract the ore and waste rock consists of hydraulic excavators, haul trucks, front end loaders, dozers (wheeled and tracked), graders and drill rigs.	No change.	No change.

**Table 1 (Continued)
Comparison of Original, Approved and Modified CGM**

Development Component	Original CGM¹	Approved CGM²	Modified CGM³
Blasting	Blast pattern consisting of five rows of 34 holes, designed to fragment approximately 51,000 cubic metres (m ³) of material and allows one blasthole per delay producing a maximum instantaneous charge (MIC) of 213 kilograms (kg). Generally limited to one blast per day.	No change.	No change.
Pit Dewatering Method	A staged pit dewatering program has been developed to manage potential surface water and groundwater inflows.	No change.	No change.
Waste Rock Quantity	Approximately 128 Mt of mined waste rock.	No change.	Increase of approximately 8.6 Mt of mined waste rock to a total of approximately 136.6 Mt. Annual quantity of waste rock mined would decrease more slowly in latter years of mining than for original CGM. Relocation of approximately 1.4 Mt of previously-mined waste rock from the perimeter waste emplacement to the northern and southern waste emplacements.
Waste Emplacements	Northern waste emplacement constructed to Relative Level (RL) 243 m Australian Height Datum (AHD) and area of approximately 160 ha.	No change.	Increase in the height of some areas of the northern waste emplacement to RL 253 m AHD. No change to the northern waste emplacement area.
	Southern waste emplacement constructed to RL 223 m AHD and area of approximately 120 ha.	No change.	Increase in the height of some areas of the southern waste emplacement to RL 238 m AHD. No change to the southern waste emplacement area.
	Perimeter waste emplacement constructed to RL 223 m AHD and area of approximately 60 ha.	No change.	No change to the maximum height of the perimeter waste emplacement. No change to the perimeter waste emplacement area.
Tailings Storage Facilities	Approximately 76 Mt of tailings produced over the life of the mine. Tailings stored in two tailings storage facilities located approximately 3.5 km west of the Lake Cowal shoreline.	No change.	No change.
	Northern and southern tailings storage facilities constructed to a RL 233.5 m AHD and RL 241.5 m AHD, respectively.	No change.	No change.
	The tailings storages cover an area of approximately 350 ha.	No change.	No change.
	Tailings storage facilities designed with sufficient freeboard to storage water from a 1 in 1,000 Annual Recurrence Interval (ARI) rainfall event.	No change.	No change.

Table 1 (Continued)
Comparison of Original, Approved and Modified CGM

Development Component	Original CGM¹	Approved CGM²	Modified CGM³
Tailings Storage Facility Water Management Processes	Tailings storage facility water management and processes including maximising water re-use through the under-drainage pipe network, decant towers and water return pipeline to the process water storage pond. Seepage control measures have been incorporated into the tailings storage facilities.	No change.	No change.
Cyanide Levels	Cyanide concentrations in the aqueous component of the tailings slurry stream not to exceed the following at the discharge point to the tailings storage facilities: <ul style="list-style-type: none"> • 20 milligrams per litre (mg/L) weak acid dissociable cyanide (CN_{WAD}) (90 percentile over six months); and • 30 mg/L CN_{WAD} (maximum permissible limit at any time). 	No change.	No change.
Cyanide Destruction	Cyanide destruction would be achieved using Caro's Acid.	No change.	No change.
Process Plant and Infrastructure	The process plant and associated infrastructure includes plant items such as ball mills and the leach circuit and covers an area of approximately 25 ha.	No change.	No change.
Run-of-mine (ROM) Pad	Situated immediately north of the process plant area, the ROM ore stockpile pad covers an area of approximately 5 ha.	No change.	No change.
Low Grade Ore Stockpile	The low grade ore stockpile adjoins the western side of the ROM pad, extending over an area of approximately 35 ha.	No change.	No change.
Soil Stockpiles	Soil stockpiles extending over an area of approximately 90 ha.	No change.	No change.
Power Supply	Electricity to the site via a 132 kilovolt (kV) transmission line from Temora, approximately 90 km south of the CGM.	No change.	No change.

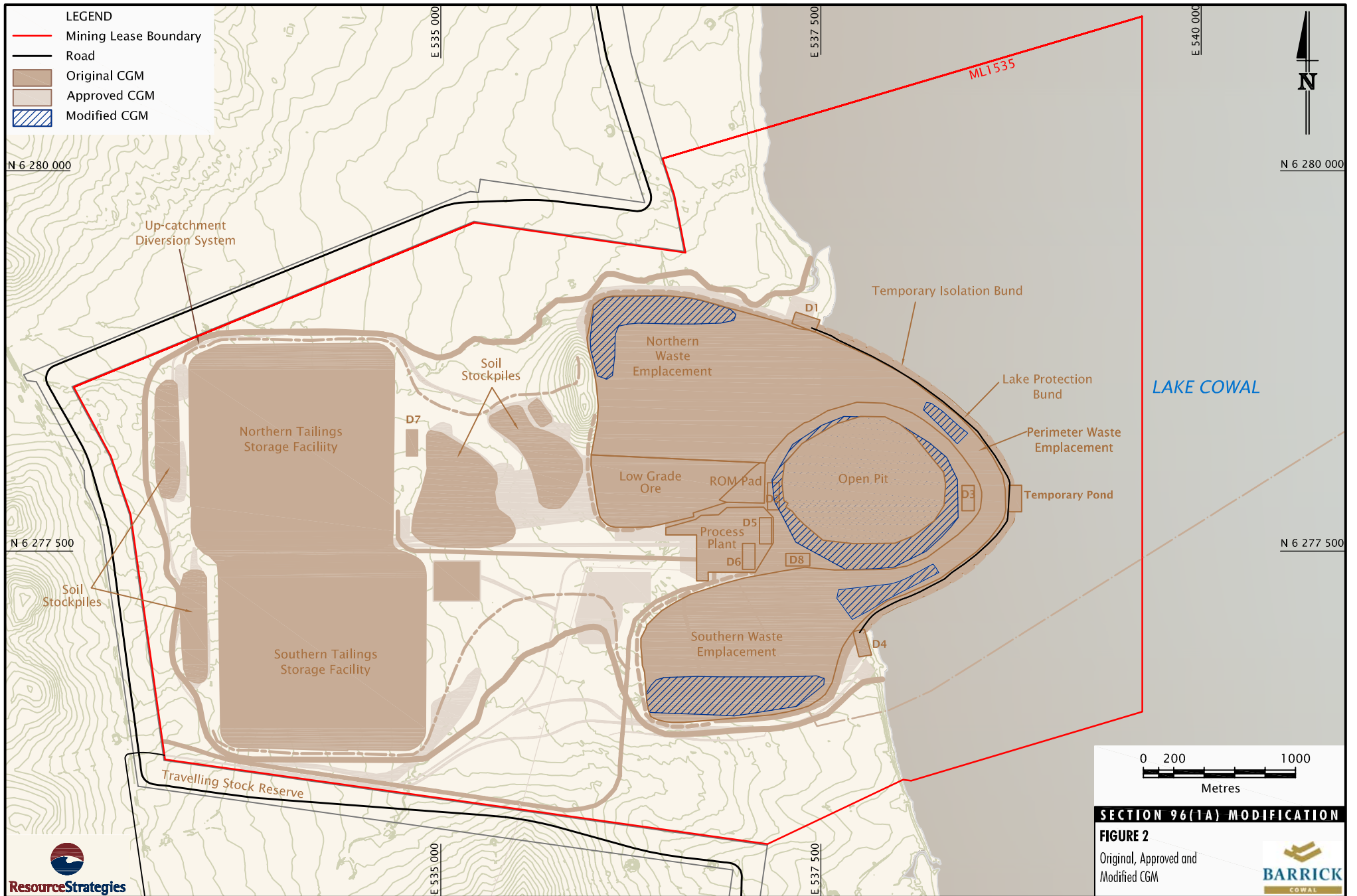
**Table 1 (Continued)
Comparison of Original, Approved and Modified CGM**

Development Component	Original CGM¹	Approved CGM²	Modified CGM³
Water Supply	<p>Water required for ore processing and related activities predominantly sourced from recycled process and site catchment water and pit dewatering. Make-up water requirements over the life of the mine, would be sourced by pipeline from the Bland Creek Palaeochannel borefield.</p> <p>CGM water requirements over the life of the mine supplied from the following sources:</p> <ul style="list-style-type: none"> • decant water from tailings storage facilities; • internal runoff collection; • open pit dewatering; and • Bland Creek Palaeochannel borefield. 	As per the Original CGM, with additional Lachlan River water entitlements supplied via the Jemalong irrigation channel.	No change.
Bland Creek Palaeochannel Borefield	<p>Maximum daily extraction of 15 megalitres per day (ML/day).</p> <p>Maximum annual extraction of 3,650 megalitres (ML) per annum.</p> <p>A total extraction of no more than 30,000 ML for the life of the mine.</p>	No change.	No change.
Surface Runoff Management	Up-catchment Diversion System (UCDS) to divert upper catchment runoff around the CGM.	Re-alignment to account for change to CGM landforms.	No change.
	Internal Catchment Drainage System (ICDS) to manage runoff collected within the internal catchment comprising a series of contained water storages, bunds and drains.	Changes to the number, location, layout and capacity of contained water storages to account for change to CGM landforms/catchment.	No change.
Site Access Road	Site access road following existing roads from West Wyalong to the CGM.	No change.	No change.
Employment	Approximately 200 personnel during the mining and processing phase.	Approximately 320 to 370 personnel during the mining and processing phase.	No change.
Hours of Operation	Mine operations 24 hours per day, seven days a week.	No change.	No change.

¹ Original CGM approved 26 February 1999.

² Modifications approved 11 August 2003, 22 December 2003, 4 August 2004, 23 August 2006 and 12 March 2008.

³ Proposed modification to the Approved CGM (which incorporates the Original CGM).



SECTION 96(1A) MODIFICATION

FIGURE 2

Original, Approved and Modified CGM



As identified in Table 1 above, the key aspects of the modified CGM would include:

- no change to total ore production;
- no change to water demand;
- no change to tailings production;
- no change in the disturbance area (open pit dimensions would increase to 1,100 m long, 1,050 m wide and 325 m deep, however this increase would occur within the approved CGM disturbance area)(Figure 2);
- an increase in the total volume of waste rock to be removed from the open pit from approximately 128 Mt to approximately 136.6 Mt with the increased volumes to be mined during the latter years at rates less than the original CGM annual maximum (i.e. 27.5 Mtpa);
- no change to the life of the original CGM;
- an increase of 10 to 15 m of the final height of some areas of the northern and southern waste emplacements (Figure 2);
- no change to the maximum height or area of the perimeter waste emplacement;
- relocation of approximately 1.4 Mt of previously-mined waste rock from the perimeter waste emplacement to the northern and southern waste emplacements;
- a 5 to 12.5 m reduction in the height of the perimeter waste emplacement in places (Figure 2);
- no change to the areas of the northern and southern waste emplacements; and
- other associated minor changes to infrastructure, plant, equipment and activities.

These changes are described further below.

Open Pit Design

As stated above, the proposed modification would authorise an increase to the open pit area within the approved CGM disturbance area, with no change to the depth of the original CGM open pit (i.e. 325 m deep).

The proposed modification does not propose an increase in the volume of ore to be removed from the open pit or an increase to the final depth of the open pit.

The widened open pit design would allow for factors of safety which are appropriate for operating pit conditions and the long-term stability of the lake protection bund. The berm widths and slope angles would continue to be reviewed and monitored through on-going geotechnical studies and data collection during mine development in accordance with current practice. This includes incorporating the findings of investigations into causal factors of instability (e.g. interim wall slips) undertaken during operations to date. The design configuration would be detailed in the Mining Operations Plan (MOP) which would be prepared in consultation with the NSW Department of Primary Industries – Mineral Resources (DPI-MR) and for DPI-MR approval.

No changes are proposed to the method of development of the open pit for the modified CGM.

Mining Operations

The proposed modification would minimise the need to stockpile and double-handle ore and waste rock at a later date. The proposed modification would maintain the optimum rate of ore feed to the process plant and keep the current mining fleet operational.

The proposed modification has been lodged in order that Barrick can better manage the adverse consequences of material delay to a successful approval process for the E42 Modification.

As stated above, the proposed modification would authorise an increase in the total volume of waste rock to be removed from the open pit from approximately 128 Mt to approximately 136.6 Mt (i.e. an increase of approximately 8.6 Mt of mined oxide waste rock). This increase in total waste rock would not increase the life of the original CGM. Total waste rock volumes during the latter years of mining would increase, but would be less than the original CGM maximum quantity of waste rock to be mined in any one year (i.e. 27.5 Mt).

Approximately 1.4 Mt of previously-mined waste rock would be relocated from the perimeter waste emplacement to the northern and southern waste emplacements.

The waste rock mining method used at the CGM is typical of open pit mining operations throughout Australia and the world. The waste rock (i.e. rock containing no commercial gold) is broken through a routine sequence of in-pit drilling and blasting. Broken rock is loaded into large rear dump trucks using hydraulic excavators and is then hauled from the pit to be placed within the dedicated waste emplacements. The currently operating mining fleet would remain unchanged for the modified CGM.

No changes to the CGM waste rock mining methods are proposed as part of this proposed modification.

The proposed modification would not change the existing water supply arrangements for the CGM, given that there would be no change to ore processing requirements.

Waste Emplacement Construction

The increase in total waste rock to be removed from the open pit would necessitate an increase to the height of some areas of the northern waste emplacement to an approximate final height of RL 253 m AHD (increased from RL 243 m AHD) (Figure 2) and an increase in the height of some areas of the southern waste emplacement to an approximate final height of RL 238 m AHD (increased from RL 223 m AHD) (Figure 2). The approved maximum areas of the northern and southern waste emplacements would not change.

The height of the perimeter waste emplacement would be reduced in places (Figure 2) to enable the expansion of the open pit, whilst meeting relevant geotechnical criteria. The approved maximum height and area of the perimeter waste emplacement would not increase.

Lake Isolation System

The CGM lake isolation system has been constructed to hydrologically isolate the open pit and Lake Cowal during mining and post-mining. The lake isolation system is comprised of a series of isolation embankments designed to prevent the inflow of water from Lake Cowal into the open pit development area during periods of high water levels. The lake isolation system includes the temporary isolation bund, lake protection bund and perimeter waste emplacement, which are shown on Figure 2. No change to the temporary isolation bund or lake protection bund is proposed as a result of the modification.

5 ENVIRONMENTAL REVIEW

5.1 VISUAL CHARACTER

A visual assessment for the modified CGM was conducted by Urbis Pty Ltd (Urbis) and is presented in Attachment A. The results of Urbis' assessment are summarised below.

Environmental Review

As outlined in the EIS, the location and final shape of the mine landforms were designed to integrate with local topographic features (North Limited, 1998). Further, all landforms were restricted in height to lie below that of local topographic highpoints, particularly the prominent ridgeline located immediately to the west of the CGM (North Limited, 1998).

The visual impact assessment undertaken by EDAW (1997) as part of the EIS identified the following sensitive areas which would potentially have views of the CGM. These were:

- Billy's Lookout (RL 368 m AHD);
- Wamboyne Mountain (RL 412 m AHD);
- Lake Cowal – from the surface and eastern edge of the lake;
- residences; and
- sections of the public road and travelling stock reserve to the northern, western and southern boundaries of the mine.

Other areas (i.e. areas not assessed as sensitive areas) assessed to have the potential views of the CGM included:

- areas of rural landscape within the visual catchment; and
- West Wyalong-Burcher Railway.

Views would also potentially be available from the Game Reserve which was relocated after Development Consent was issued for the original CGM to a location 3 km to the south-east of the mine site. However, as this location's primary purpose is the preservation of game species, the visual sensitivity of this area is considered low. Potential views of the ML from the Game Reserve are restricted by intervening screening vegetation (particularly along the south-western fringe of Lake Cowal) and flat topography.

With the exception of the abovementioned Game Reserve, in the local and sub-regional setting the number of sensitive viewpoints has not changed since the EIS was prepared.

Potential Impacts

A summary of the potential visual impacts of the original CGM compared to the modified CGM is presented in Table 2.

Table 2
Potential Visual Impact Summary

Viewpoint	Potential Visual Impacts	
	Original CGM*	Modified CGM
Public road within the travelling stock reserve		
– North of mine site	Moderate to high in short term, reducing in time due to screening by trees and landforms.	No change.
– West of mine site	Generally moderate to high on section within 200 m of new landform reducing to low to moderate on road side planting provides screening.	No change.
– South of mine site	Moderate in short term reducing to low as screening is provided by road side tree planting.	No change.
Railway	Freight trains only and infrequent use.	No change.
– West of mine site	Low due to screening by trees planted along eastern edge of realigned road.	No change.
Residences		
– North, west and south of mine site	Views generally screened by landforms and vegetation.	No change.
– East of mine site	Views some 8 km across Lake Cowal. Tops of new landforms below the tree covered prominent ridgeline located west of the CGM.	No change.
General landscape		
– North, south and west of mine site	Low to moderate due to screening by vegetation and landforms and affect of distance, reducing to low as slopes are rehabilitated.	No change.
– East of mine site	Moderate to low for 8-10 years while rehabilitation vegetation is established and then very low.	No change.
Surface of Lake Cowal	Moderate for 8-10 years while rehabilitation vegetation is established and then low.	No change.
Major Landforms		
– Billys Lookout	Very low due to distance and lookout not routinely accessed by or available to the public.	No change.
– Wamboyne Mountain	Low due to distance and not routinely accessed by or available to the public.	No change.

Source: Attachment A

* Source: EDAW (1997)

The modified CGM would not change the level of visual modification described in the EIS for each of the viewpoints listed in Table 2. In addition to the viewpoints in Table 2, views of the original CGM from the Game Reserve¹ would potentially be available, although those views would be restricted by intervening screening vegetation (particularly along the south-western fringe of Lake Cowal) and flat topography. This would not change as a result of the modified CGM (Attachment A). Further, the proposed modification would not change the number of public viewpoints assessed in the EIS (Attachment A).

For the modified CGM, the heights of the northern and southern waste emplacements (RL 253 m AHD and RL 238 m AHD, respectively) would remain below the elevation of Wamboyne Mountain (RL 412 m AHD) to the north of the CGM and below the elevation of the highest section of the prominent ridgeline immediately to the west of the CGM, which peaks at Billy's Lookout (RL 368 m AHD) to the south-west of the site, but slightly higher than Cowal West Hill (RL 223 m AHD), a low hill on ML 1535. The actual area subject to an increase in height is confined to a relatively small proportion (i.e. approximately 15 percent) of the overall footprint of the waste emplacements. This will limit the potential increase in visual massing (Attachment A).

¹ The Game Reserve was relocated as a requirement of the original CGM Development Consent. Its current location and views of the project were not assessed in the EIS.

Progressive restoration of the waste emplacements, as outlined in the EIS, would assist in the amelioration of visual impacts. That is, the level of visual impact would progressively reduce once vegetation cover begins to establish on the rehabilitated waste emplacements (Attachment A).

The proposed modification would vary the effects of existing night-lighting (i.e. visible from additional locations due to increased elevations of some light sources) over the life of the modified CGM. The nature of the night-lighting for the modified CGM would be of a similar intensity when compared to the existing night-lighting at the CGM. However, there is potential for the fixed lights to be visible from a wider area surrounding the ML due to the increased elevations of portions of the waste emplacements (Attachment A). Given that the actual area subject to an increase in height is confined to a relatively small proportion (i.e. approximately 15 percent) of the overall footprint of the waste emplacements, and the lighting strategies/control measures to minimise night-lighting impacts (refer below), the potential impact resulting from the increased elevations of portions of the waste emplacements would be minimal (Attachment A).

The potential change in visual impact resulting from the proposed modification would result in a minimal environmental impact (Attachment A).

Mitigation Measures and Management

The mitigation and management measures that have been implemented for the maintenance of visual amenity for the CGM are presented in the Landscape Management Plan (LSMP) (Barrick, 2003a). The LSMP includes lighting strategies/control measures to minimise night-lighting impacts (e.g. plan lighting layout to avoid potential for direct views of lights from the public road - i.e. direct lights inward towards the centre of the ML where practicable). The LSMP would be continued for the modified CGM.

Earth mounds have been constructed on sections of the western and northern boundaries of ML 1535 to break up continuous views from Lake Cowal Road. These earth mounds as well as vegetation screen areas surrounding the ML (including along Lake Cowal Road) have been planted with endemic plants that are compatible with the existing surrounding vegetation. Maintenance of the vegetation screens (e.g. addition and replacement of plants where required) would continue to be undertaken in these areas. An increase in screening effect over time as plants grow would continue as a result.

5.2 NOISE AND BLASTING

A noise assessment for the modified CGM was conducted by Heggies Pty Ltd (Heggies) and is presented in Attachment B. The results of Heggies' assessment are summarised below.

Environmental Review

Operating Noise

The CGM (Development Consent and EPL) intrusive noise criteria were generally based on the noise compliance requirements of the DECC's Environmental Noise Control Manual (ENCM) (Environment Protection Authority [EPA], 1994). More recently the DECC has amended the EPL to include references to the INP. A comparison of the existing Consent and EPL noise criteria and relevant associated meteorological conditions are summarised in Table 3.

Table 3
Comparison of the Existing Development Consent and EPL Noise Criteria

Parameters	Development Consent	EPL
Assessment Locations	Any dwelling (other than mine owned).	Any residence not owned by the licensee.
Noise Parameters	Daytime ¹ $L_{A10(15\text{minute})}$ 35 dBA.	Day ² $L_{Aeq(15\text{minute})}$ 35 dBA.
	Night-time ¹ $L_{A10(15\text{minute})}$ 33 dBA.	Evening ² $L_{Aeq(15\text{minute})}$ 35 dBA.
		All other times $L_{Aeq(15\text{minute})}$ 35 dBA.
Meteorological Conditions	Except during: <ul style="list-style-type: none"> rain; and/or wind speeds >3 m/s; and/or temperature inversions. 	Apply under: <ul style="list-style-type: none"> wind speeds 3 m/s at 10 m; or temperature inversions 30C/100 m and wind speeds 2 m/s at 10 m.

Source: Attachment B.

¹ Daytime defined 7.00 am to 10.00 pm, Night-time defined 10.00 pm to 7.00 am.

² Day defined 7.00 am to 6.00 pm Monday to Friday, Evening defined 6.00 pm to 10.00 pm Monday to Friday

L_{AN} Noise exceedances level.

dBA A-weighted decibel.

L_{Aeq} Equivalent continuous noise level.

m/s metres per second.

°C degrees Celsius.

In order to address inconsistencies between the Development Consent and EPL, the DECC previously requested that Barrick amend the Noise Management Plan (NMP) (Barrick, 2004) in accordance with the INP, including intrusive $L_{Aeq(15\text{minute})}$ project-specific noise levels that apply under a limited range of site-specific wind and temperature inversion conditions determined in accordance with the INP.

The NMP requires six-monthly noise monitoring and reporting to be conducted in January and July of each year. Operating noise criteria in accordance with the INP are nominated in the NMP and are reproduced in Table 4.

Table 4
NMP (INP) Based Intrusive $L_{Aeq(15\text{minute})}$ and Sleep Disturbance $L_{A1(1\text{minute})}$ Noise Criteria

NMP (INP) Based Intrusive $L_{Aeq(15\text{minute})}$ PSNLs			Sleep Disturbance Screening Criteria $L_{A1(1\text{minute})}$
Daytime (dBA)	Evening (dBA)	Night-time (dBA)	Nigh-time (dBA)
35	35	35	45

Source: Attachment B.

¹ Daytime defined 7.00 am to 6.00 pm, Evening 6.00 pm to 10.00 pm and Night-time 10.00 pm to 7.00 am.

The noise criteria presented in Table 4 apply under site-specific meteorological conditions as determined in accordance with the INP. As a result, the environmental noise performance of the CGM has generally been assessed against the NMP (INP) based noise criteria (and meteorological conditions) which also remain useful for the purposes of reviewing any potential noise impacts arising from the modified CGM.

The EIS assessment predicted compliance with the ENCM criteria at all the assessed locations. For comparison, a contemporary assessment of the CGM would be required to be undertaken in accordance with the current DECC noise assessment requirements of the INP. In this case, an assessment of the modified CGM has been undertaken generally in accordance with the INP (Attachment B).

The noise sources identified for the modified CGM include the same type of sources as those identified for the original CGM, including fixed processing plant and mobile equipment fleet (e.g. hydraulic excavators, haul trucks, front end loaders, dozers [wheeled and tracked], graders and drill rigs). The proposed modification does not involve any additional mobile equipment by comparison with the typical mobile equipment fleet currently in-use. Similarly, fixed plant remains unaltered by the modified CGM.

The proposed modification is not expected to change the maximum potential noise emissions from the CGM, given there would be no new significant noise sources and no change to the maximum quantity of waste rock or ore to be mined in any one year (Attachment B).

While the modified CGM involves an increase of 10 to 15 m of the final height of some areas of the northern and southern waste emplacements, there would be no increase in mine noise arising from the increasing elevation of waste emplacement areas at the CGM as the noise propagation path (and existing line-of-sight between noise sources and receivers) would remain relatively unaltered by the modified CGM at the nearest residential dwellings (Attachment B). Therefore existing mine emissions are unlikely to significantly change.

In summary, the original CGM noise modelling predicted that noise emissions would be below relevant noise criteria. All recently measured intrusive mine noise levels are below relevant noise criteria (Attachment B). The modified CGM is not anticipated to change CGM noise emission levels (Attachment B). Accordingly, it is reasonable to conclude that existing mine noise emissions are unlikely to significantly change and the proposed changes for the modified CGM would have minimal noise impact potential (Attachment B).

There is a current inconsistency between the CGM noise limits contained in the Development Consent and those in the EPL. The EPL noise limits are based on contemporary DECC methodologies for developing project specific noise limits (i.e. in accordance with the INP). The Development Consent noise limits are based on superseded methodologies. To contemporise the Development Consent and for consistency with the EPL and INP, Barrick seeks the modification of Condition 6.4(a) of the Development Consent (as outlined in Section 2).

Traffic Noise

The proposed modification would not change traffic movements to and from the CGM (i.e. no new traffic sources).

Blasting

The proposed modification would not change blasting emissions from the CGM (i.e. no change to average blast frequency or blast design parameters).

Mitigation Measures and Management

Noise monitoring would continue to be undertaken in accordance with the existing programme to assess compliance with noise criteria. Investigations into noise related complaints and exceedances of criteria would continue to be undertaken in accordance with the NMP.

The Traffic Noise Management Plan (TNMP) (Barrick, 2003c) has been implemented at the CGM. The TNMP includes monitoring requirements, noise management and ameliorative measures, complaint response and property acquisition processes.

Blast mitigation and management measures for the CGM are described in the Blast Management Plan (BLMP) (Barrick, 2003b). The mitigation and management measures (including monitoring) described in the BLMP would not change as a result of the proposed modification and would continue for the modified CGM.

5.3 GROUNDWATER

Environmental Review

Hydrogeological assessments (i.e. EIS and subsequent assessments) have characterised that groundwater resources within the region are generally associated with two geological formations (Coffey Geotechnics Pty Ltd, 2008):

- the Lachlan Formation (Bland Creek Palaeochannel), which comprises an aquifer of quartz gravel with groundwater of generally low salinity; and
- the Cowra Formation, which comprises aquifers of isolated sand and gravel lenses in predominantly silt and clay alluvial deposits, with perched groundwater of generally higher salinity.

The modified CGM would not change the original CGM limits on the extraction of water from the CGM Bland Creek Palaeochannel Borefield, or the approved CGM system for managing groundwater levels around the CGM Bland Creek Palaeochannel Borefield. Therefore, potential impacts from CGM Bland Creek Palaeochannel Borefield groundwater extraction are not considered in this section.

Groundwater Inflows to the Open Pit and Open Pit Dewatering

EIS modelling by Coffey Partners International indicated yields from open pit dewatering of 10 ML/day for the first three months with progressive decline over the subsequent 12 to 18 months to about 5 ML/day (North Limited, 1998).

Actual dewatering rates are significantly less than the EIS predictions. The average daily rate of water recovered from the open pit (via in-pit sumps) is approximated at 0.4 ML/day (Coffey Geotechnics Pty Ltd, 2008).

Current operations utilise 19 dewatering bores located on the periphery and within the approved CGM open pit (Coffey Geotechnics Pty Ltd, 2008). Each bore is screened in the local saline alluvial and fractured rock aquifers. In addition, in-pit horizontal drains have been installed on benches to drain areas where groundwater level monitoring had indicated that enhancement of dewatering was required to promote pit slope stability.

Barrick records of dewatering volumes for August 2005 to February 2008 indicate fairly consistent results from approximately August 2005. The average daily extraction rate for the open pit dewatering bores is approximately 0.6 ML/day (Coffey Geotechnics Pty Ltd, 2008).

The location (and potentially number) of bores within the open pit dewatering borefield (i.e. bores located on the periphery and within the approved CGM open pit) may change as the open pit is widened for the modified CGM. Any new dewatering bores required as a result of the widening of the open pit would be licensed under existing licences and entitlements. It is expected that dewatering volumes from the modified open pit would be similar in range as a result of the increased open pit area. As stated above, currently predicted dewatering rates are significantly less than those predicted in the EIS. The proposed modification would therefore result in a modified CGM which would experience dewatering rates significantly less than predicted in the EIS.

Measured Groundwater Level Drawdown

The EIS included an assessment of potential regional effects of drawdown from open pit dewatering on groundwater users outside ML 1535. This assessment was based on the EIS rates of dewatering that are significantly higher than both the current and expected rates. Coffey Partners International (1995) conducted modelling to determine the dewatering requirements and calculated the drawdown created in the shallow and deeper alluvium and fractured bedrock aquifers. The modelling results indicated that after several years of continuous pumping predicted drawdowns at potentially sensitive locations 10 km to the east would be less than 1 m in the shallow saline alluvium aquifers and 3 m in the fractured rock saline aquifer (North Limited, 1998).

The groundwater monitoring programme for the approved CGM is described in the Cowal Gold Project Surface Water, Groundwater, Meteorological and Biological Monitoring Programme – Mine Operations (SWGMBMP) (Barrick, 2005a). Bores located further than 700 m from the open pit generally displayed only minor standing water level changes (i.e. less than 20 centimetres [cm]) over the period July 2004 to December 2007. These variations are typical of natural effects and a muted response to rainfall trends (Coffey Geotechnics Pty Ltd, 2008). Based on the above and similar records from other bores further from the open pit, it would appear that there has not been any regional impact to date from open pit dewatering (*ibid.*).

The Lachlan Formation (Bland Creek Palaeochannel) is a substantial regional aquifer containing water of good quality which is widely used for irrigation (Coffey Geotechnics Pty Ltd, 2008). This aquifer occurs some 10 km east of the approved CGM and is hydraulically well separated from the open pit dewatering borefield (*ibid.*). Due to this separation and the relatively small rate of dewatering from the open pit (i.e. approximately 1 ML/day), no regional groundwater drawdown impacts on the Lachlan Formation (i.e. Bland Creek Palaeochannel) are anticipated as a result of the open pit dewatering for the proposed modification.

Hydrogeology Beneath the Tailings Storage Facilities

There would be no change to the volume of tailings or height or location of the tailings storage facilities as a result of the modified CGM and therefore no change to the hydrogeology beneath the tailings storage facilities.

Groundwater Quality

An assessment undertaken for the EIS by Coffey Partners International (1997) reported the following pre-mining groundwater salinity levels:

- Alluvial aquifers had very high salinity in the range of 19,000 to 72,000 microSiemens per centimetre ($\mu\text{S}/\text{cm}$) measured beneath the open pit and 6,000 $\mu\text{S}/\text{cm}$ to 44,400 $\mu\text{S}/\text{cm}$ beneath the tailings storage facilities area.
- In the fractured rock aquifer, the salinity ranged from 50,900 $\mu\text{S}/\text{cm}$ to 63,700 $\mu\text{S}/\text{cm}$.

Groundwater quality monitoring results reported in 2006 are consistent with the above and indicate that (Coffey Geotechnics Pty Ltd, 2008):

- Groundwater facies within ML 1535 are characterised by saline conditions (total dissolved solids [TDS] vary from 18,000 to 47,000 mg/L attributed to heterogeneous aquifer material, geochemistry and depth in the profile).
- Electrical conductivities are within a similar range to those observed pre-mining.
- Groundwater generally has a slightly alkaline to weakly acid pH range (6.0 to 7.5).

Whilst open pit dewatering is causing a localised reduction in groundwater levels, no changes in groundwater chemistry appear to be associated with this drawdown (Coffey Geotechnics Pty Ltd, 2008). The chemical groundwater data collected shows little variation for each bore and analysis has demonstrated good chemical correlation between data from the pre-mining and operational phases of the approved CGM (*ibid.*).

On the basis of information available, there is no evidence to suggest that the natural groundwater chemistry would alter significantly as a result of the proposed modification compared with the prediction set out in the EIS for the original CGM.

Hydraulic Relationship between Lake Cowal and Groundwater

Whilst the proposed modification would increase the area of the final void, it would not change the depth of the relatively impermeable clay that separates the Lake Cowal bed from the saline aquifer system.

Piezometric response in the saline alluvial aquifers has been small and localised, consistent with low vertical and horizontal permeability, and inflows to the open pit have been small compared with the inflows predicted in the EIS.

On this basis, the proposed modification would not change the disconnectivity between Lake Cowal and the open pit as described in the EIS for the original CGM.

Potential Effects of Mine Closure on Lake Cowal

The EIS assessed the potential for seepage from Lake Cowal to the final void as a result of open pit dewatering and the resultant potential for Lake Cowal water balance changes and final void balance characteristics. Modelling conducted by Kalf and Associates (1997) for the EIS indicated that seepage from Lake Cowal to the final void would be an insignificant component of overall seepage because of the very low permeability of the clay pan deposits that form the lake bed and isolate Lake Cowal from the underlying aquifers. Lake Cowal has not filled during the period that the approved CGM has been operational.

Kalf and Associates (1997) determined that once dewatering and open pit excavation commenced, the open pit would become a groundwater sink. Based on the results of Coffey Partners International (1995), Kalf and Associates (1997) presented groundwater flow directions towards the open pit. These flow directions were described to be fundamentally maintained during and post-mining, although the gradients and flow rates would decrease over time (*ibid.*).

At the completion of mining (and hence dewatering), the final void was described to be a permanent sink to local groundwater (Kalf and Associates, 1997) and would gradually fill with water from incident rainfall, runoff from adjacent mine areas and seepage from the intercepted aquifers. These flow directions would be fundamentally maintained during and post-mining, as the water level in the open pit recovered and reached an equilibrium level lower than the current potentiometric surface level at the open pit (Coffey Partners International, 1997). Mining has and would continue to create a sink for surrounding groundwater which flows toward the final void created by the mine.

The proposed modification would not change the above predictions. Characteristics of the final void water body are described in Section 5.4.

Mitigation Measures and Management

Existing management measures for CGM groundwater quality and quantity are documented in the Site Water Management Plan (SWMP) (Barrick, 2003a). Management measures for open pit groundwater inflows are presented along with monitoring requirements. These measures are based on EIS predictions and are therefore conservative as described above. The proposed modification would not affect the approved CGM to the extent that these measures would require changing.

The groundwater monitoring programme is described in the SWGMBMP. The groundwater monitoring component of the SWGMBMP would continue for the modified CGM.

5.4 SURFACE WATER

Environmental Review

As described in Table 1, the modified CGM would not include any new water supply sources or change the currently approved surface runoff management measures.

Internal Catchment Drainage System

The management of erosion and sedimentation is described in the existing Erosion and Sediment Control Management Plan (ESCMP) (Barrick, 2003e). The approved CGM surface water monitoring programme is described in the existing SWMP and SWGMBMP.

The approved CGM water management system has been designed such that the ecological integrity of the Cowal wetland system is not compromised (North Limited, 1998). Mine infrastructure and landforms have been constructed within the ICDS. The ICDS consists of contained water storages for CGM runoff (i.e. D1, D2, D3, D4, D5, D8A and D8B) and the internal catchment divide (i.e. a bund constructed on the outer bounds of the CGM catchment to direct runoff toward the contained water storages).

The ICDS combines with the lake isolation system (which comprises the temporary isolation bund and permanent lake protection bund) to isolate Lake Cowal from mine development activities. The lake protection bund comprises a large engineered embankment that provides a permanent barrier between Lake Cowal and the open pit. Runoff from areas upslope of the ICDS is diverted via an UCDS, around the mine area to the Lake Cowal.

The ICDS has remained isolated from Lake Cowal for approved CGM operations to date (Barrick, 2008).

All modification activity areas are proposed within existing approved disturbance areas (i.e. within the approved CGM ICDS).

Post-Closure Water Management

The post-closure water management strategy described for the original CGM (North Limited, 1998) included concepts for runoff minimisation from waste rock emplacements and tailings storage facilities, and the provision of stable drainage channels to drain site surface water to the final void. These concepts would remain for the modified CGM.

Up-catchment Diversion System

As described in Table 1, the proposed modification would not require any change to the currently approved UCDS.

Lake Interaction

As part of the original CGM, a model of Lake Cowal and its catchment was used to investigate the potential effects that the mine would have on the water balance dynamics of Lake Cowal, including changes to average water levels in the Lake and changes to the frequency and volume of spills from Lake Cowal to Nerang Cowal downstream.

The mine area is physically isolated from Lake Cowal by the lake isolation system. The outer face of the isolation system extends approximately 1 km into Lake Cowal and will form a new lake foreshore. The excursion of the lake isolation system into the Lake floor has the potential effect of reducing the overall capacity of the Lake.

The modified CGM would not change the lake isolation system (which was constructed during the approved CGM construction phase). Therefore, the predictions made regarding changes to lake volume and the potential effects on runoff water quality for the original CGM remain the same (*ibid.*).

Implications of Geochemical Characteristics of Waste Rock on Surface Water Quality

An assessment of the geochemistry of the tailings and waste rock associated with the E42 Modification was undertaken by Geo-Environmental Management Pty Ltd (2008). This assessment was based on geochemical characterisation tests on representative samples of waste rock recovered from a much larger modified open pit area (i.e. the E42 Modification open pit area), which included the area of the open pit subject to this proposed modification.

Based on the Geo-Environmental Management Pty Ltd (2008) E42 Modification findings, the geochemical characteristics of the modified CGM waste rock (primary and oxide), including pH, salinity, acid forming characteristics and element enrichment and solubility, are expected to be similar to the geochemical characteristics of the waste rock from the original CGM.

Accordingly, no modifications to the operational or long-term mine waste management or water management practices specifically relevant to waste rock geochemistry would be required as a result of the modified CGM.

Post-Closure Water Management

The potential impacts to surface water as a result of an increase in the volume of the final void were assessed by Gilbert and Associates (2008) for the much larger E42 Modification proposal. The proposed modified CGM would also increase the volume of the final void, although by a smaller extent. Nevertheless, the final void would be larger in area than the original CGM void. The change in the size of the final void would have an effect on the water balance during the filling phase and potentially to the longer term post-equilibrium water levels.

Groundwater inflows to the void were originally estimated based on results of predictive groundwater modelling. Groundwater inflow rates to the mine during the operational phase were predicted to be initially high and to reduce over time (North Limited, 1998). Experience during operations to date has shown that actual groundwater inflow rates to the mine are significantly lower than those that were originally predicted (partly reflecting the conservative assumptions applied to the original modelling) (Section 5.3).

When adopting the lower groundwater flows obtained from experience and recent groundwater assessments undertaken by Coffey Geotechnics Pty Ltd (2008), the average inflow rates during the void filling phase would initially be about 1 ML/day and would decline to low levels as the water level in the open pit approaches the original (pre-mine) groundwater table.

It would be expected that the void would fill slowly, ultimately reaching an equilibrium water level lower than the original CGM predictions due to the lower groundwater inflows and higher evaporation rates from the larger void surface area (Coffey Geotechnics Pty Ltd, 2008). Mining has and would continue to create a sink for surrounding groundwater which flows toward the final void created by the mine (*ibid.*).

The final void water quality would reflect the influence of the highly saline groundwater. Predictions of average final void salinity based on a solute balance between inflows and outflows confirm that salt concentrations in the final void would slowly increase. The lower groundwater inflow rates, however, mean that salinity would increase more slowly than was originally predicted. Salinity is predicted to continue to increase trending to hyper-salinity as was predicted for the original CGM.

Mitigation Measures and Management

Surface water management and mitigation measures for the CGM are described in the SWMP. The SWMP would continue for the modified CGM.

The surface water monitoring programme is described in the SWGMBMP. The approved surface water monitoring programme would be continued for the modified CGM.

5.5 AIR QUALITY

Environmental Review

Dust Deposition and Suspended Particulates

The EIS predicted dust deposition and total suspended particulates (TSP) generated by mining activities at sensitive receptors in the vicinity of the mine.

The EIS air quality assessment was prepared and guided by the relevant criteria at the time, which included:

- The DECC assessment criterion for maximum increase in deposited dust level of 2 grams per square metre per month ($\text{g/m}^2/\text{month}$) and maximum total deposited dust level of $4 \text{ g/m}^2/\text{month}$.
- National Health and Medical Research Council of Australia [NHMRC] guideline maximum permissible TSP criterion of 90 micrograms per cubic metre ($\mu\text{g/m}^3$).
- DECC mean annual particulate matter less than 10 microns in size (PM_{10}) concentration objective of $30 \mu\text{g/m}^3$ in residential environments.

The EIS assessment predicted compliance with the dust deposition criterion at all non-company owned residences, although noted that some areas of land may receive minor and temporary exceedences. With regard to the TSP criterion and objective, the EIS assessment predicted compliance at all non-company owned residences, although noted that some areas of land may on occasions exceed the NHMRC criterion.

A contemporary assessment of the CGM would be required to be undertaken in accordance with the current DECC air quality criteria. Assessment of the modified CGM has therefore been undertaken in accordance with the contemporary criteria, standards and goals:

- DECC assessment criterion for maximum increase in deposited dust level of $2 \text{ g/m}^2/\text{month}$ and maximum total deposited dust level of $4 \text{ g/m}^2/\text{month}$.
- The National Environment Protection Measure (NEPM) 24-hour reporting standard for PM_{10} of $50 \text{ }\mu\text{g/m}^3$ adopted by the DECC as assessment criterion (interpreted as the PM_{10} concentrations due to the project only).
- The DECC annual assessment criterion for PM_{10} of $30 \text{ }\mu\text{g/m}^3$ has been interpreted as a concentration that should be met within the region (interpreted as the PM_{10} concentrations due to the project and background).
- The NHMRC annual goal for TSP of $90 \text{ }\mu\text{g/m}^3$, adopted by the DECC as assessment criterion (interpreted as the TSP concentrations due to the project and background air quality).

Air quality monitoring has been carried out at nearby locations on a regular basis since the commencement of CGM construction, in accordance with the Dust Management Plan (DMP) (Barrick, 2003f) and is reported in the CGM Annual Environmental Management Report (Barrick, 2005b, 2006a, 2007a, 2008).

The monitoring results show that the area generally experiences, on average, dust deposition levels below the DECC total dust deposition (i.e. including background air quality) amenity criterion of $4 \text{ g/m}^2/\text{month}$ (temporal and spatial variation in monthly dust deposition has been large, as is generally the case in dust monitoring results [University of Sydney, 2008]).

Measured annual average TSP concentrations have been below the DECC assessment criterion of $90 \text{ }\mu\text{g/m}^3$ for all four years (i.e. between 24 and $43 \text{ }\mu\text{g/m}^3$), which is consistent with the EIS which predicted that annual average concentrations of TSP would remain well below $90 \text{ }\mu\text{g/m}^3$ at all non-company owned residences (North Limited, 1998).

The monitoring shows that the 24-hour average PM_{10} concentrations (inferred from the TSP concentrations) have been above the DECC's assessment criterion of $50 \text{ }\mu\text{g/m}^3$ on approximately seven days in the past four years. The highest PM_{10} concentration to date was approximately $151 \text{ }\mu\text{g/m}^3$, on 12 January 2008. Based on the mine location relative to the monitor, the mine is unlikely to have contributed to the exceedance on this day (Holmes Air Sciences, 2008).

The modified CGM does not involve any additional mobile equipment by comparison with the typical mobile equipment fleet currently in use. Similarly, fixed plant would remain unaltered by the modified CGM. While the modified CGM involves an increase of 10 to 15 m of the final height of some areas of the northern and southern waste emplacements, there would be no increase to the original CGM maximum quantity of waste rock or ore to be mined in any one year. Therefore, existing mine emissions are unlikely to significantly change and would remain relatively unaltered by the modified CGM at the nearest sensitive receptors.

It is reasonable to conclude that existing dust and TSP emissions would be unlikely to significantly change and the proposed changes for the modified CGM would therefore have minimal air quality impact potential.

Mitigation Measures and Management

The mitigation and management measures for wind blown and mine generated dust at the CGM are presented in the DMP. The mitigation and management measures (including the air quality monitoring programme) described in the DMP would continue to be implemented for the modified CGM.

5.6 LAND RESOURCES

Environmental Review

All activities required for the proposed modification would occur in approved CGM disturbance areas (Figure 2). Therefore, the modified CGM would not change the potential impacts to land resources described in the EIS for the original CGM.

Mitigation Measures and Management

Potential impacts to land resources are currently managed via implementation of measures included in the following:

- ESCMP;
- Bushfire Management Plan (BMP) (Barrick, 2003g);
- Land Management Plan (LMP) (Barrick, 2003h);
- Emergency Response Plan (ERP) (Barrick, 2005c); and
- Hazardous Waste and Chemical Management Plan (HWCMP) (Barrick, 2003i).

These measures would continue to be implemented where relevant for the modified CGM.

5.7 FLORA

Environmental Review

The EIS and Cowal Gold Project Species Impact Statement (SIS) (Resource Strategies, *et. al.*, 1997) for the original CGM assessed the short-term and long-term potential impacts of the original CGM on flora. The type of potential impacts resulting from the proposed modification would be the same as those identified in the EIS and SIS.

Vegetation Clearance

All activities required for the proposed modification would occur in approved CGM disturbance areas (Figure 2). Therefore, the modified CGM would not change the potential vegetation clearance impacts described in the EIS for the original CGM.

Vegetation and Dust

Given that the proposed modification would not change potential dust and suspended particulate emissions from the CGM (Section 5.5), the proposed modification would not change the potential dust impacts on vegetation described in the EIS for the original CGM.

Threatened Flora

All activities required for the proposed modification would occur in approved CGM disturbance areas (Figure 2). Therefore, the modified CGM would not change the potential impacts on any threatened flora described in the EIS for the original CGM.

Summary of Potential Impacts on Flora

Given the above, the proposed modification would not change the potential impacts on flora resources described in the EIS and SIS for the original CGM.

Mitigation Measures and Management

Potential impacts to flora are currently managed via implementation of measures included in the following:

- Flora and Fauna Management Plan (FFMP) (Barrick, 2003j), which includes the Vegetation Clearance Protocol (VCP);
- Implementation of the Threatened Species Management Protocol (TSMP) (Barrick, 2003k);
- Compensatory Wetland Management Plan (CWMP) (Barrick, 2003l);
- LMP;
- LSMP;
- BMP;
- DMP; and
- MOP (2007 – 2009) (Barrick, 2007b).

These measures would continue to be implemented where relevant for the modified CGM.

5.8 FAUNA

Environmental Review

The EIS and SIS for the original CGM assessed the short-term and long-term potential impacts from the original CGM on fauna. The type of potential impacts resulting from the proposed modification would be the same as identified in the EIS and SIS.

Habitat Removal/Modification

All activities required for the proposed modification would occur in approved CGM disturbance areas (Figure 2). Therefore, the modified CGM would not change the potential impacts associated with habitat removal/modification described in the EIS for the original CGM.

Fauna and Vehicular Traffic Movements

As stated in Section 5.11, the proposed modification would not change traffic movements to and from the CGM (i.e. no new traffic sources). Therefore, the modified CGM would not increase the incidence of fauna mortality via vehicle strike.

Fauna and Noise

Given the proposed modification would not change noise emissions from the CGM (Section 5.2), the proposed modification would not change the potential noise effects on fauna described in the EIS for the original CGM.

Fauna and Blasting

The *Cowal Gold Project 2005 Annual Environmental Management Report* (Barrick, 2006a) includes a summary of bird observations during the first ten blasts at the approved CGM. The observation was overseen by Dr Peter Gell from the Geographical and Environmental Studies Department of the University of Adelaide. Dr Peter Gell has been involved in monitoring and reporting on waterbird populations and breeding activities at Lake Cowal since 1992 and has completed over 45 surveys during that time. The four fauna specialists who conducted the monitoring found that *there was no abrupt change in the behaviour of any bird species to any blast. In fact, there was no evidence that any bird perceived any blast* (Gell, 2002-2005).

Given the proposed modification would not change blasting emissions from the CGM (Section 5.2), the proposed modification would not change the potential blasting effects on fauna described in the EIS for the original CGM.

Fauna and Artificial Lighting

Artificial lighting has the potential to affect the behavioural patterns of some fauna species. Some bird and bat species, for example, are attracted to insects around lights. As a consequence of this, they could become prey for larger predators (e.g. owls) which may lead to changes in population structure and community composition.

As discussed in Section 5.1, the nature of night-lighting for the modified CGM would be of a similar intensity when compared to the night-lighting for the original CGM. It is considered that this change to artificial lighting required for the modified CGM would result in minimal environmental impact on fauna.

Interaction of Fauna with the Tailings Storage Facilities

Given that there would be no increase in volume of ore (and therefore no change in the volume of tailings as a result of the modified CGM), there would be no change to the potential impacts associated with fauna interacting with the tailings storage facilities described in the EIS for the original CGM.

Movement of Dust to Lake Cowal

The approved CGM operates with a dust monitoring programme and a Lake Cowal monitoring programme. These programmes would continue for the modified CGM. Analysis of monitoring results indicates that the area generally experiences, on average, dust deposition levels below 4 g/m²/month (Holmes Air Sciences, 2008). No evidence of adverse impacts to fauna from dust has been identified to date (Barrick, 2005b, 2006a, 2007a, 2008).

Given that the proposed modification would not change potential dust and suspended particulate emissions from the CGM (Section 5.5), the proposed modification would not change the potential dust impacts on Lake Cowal described in the EIS for the original CGM.

Fauna and the Final Void

As discussed in Section 5.4, it is expected that the final void water quality would reflect the influence of the highly saline groundwater. Predictions of average final void salinity based on a solute balance between inflows and outflows confirm that salt concentrations in the final void would slowly increase. Therefore final void water quality would be more saline than predicted for the original CGM due to the reduced groundwater inflows and greater surface area. This would not change the original CGM assessment that salinity of void waters for the CGM is likely to be comparable with the ranges found in natural salt lakes and that the final void would support salt tolerant species of phytoplankton.

Given the above, the change in final void for the modified CGM would result in minimal environmental impact to fauna.

Threatened Fauna

All activities required for the proposed modification would occur in approved CGM disturbance areas (Figure 2). Therefore, the modified CGM would not change the potential impacts on any threatened fauna described in the EIS for the original CGM.

Summary of Potential Impacts on Fauna

Given the above, the proposed modification would not change the potential impacts on fauna described in the EIS and SIS for the original CGM.

Mitigation Measures and Management

Potential impacts to fauna are currently managed via implementation of measures included in the following:

- FFMP, which includes the VCP;
- TSMP;
- CWMP;
- LMP;
- LSMP;
- BMP;
- DMP;
- BLMP;
- NMP;
- SWGMBMP;
- Cyanide Management Plan (CMP) (Barrick, 2006b); and
- MOP (2007 to 2009).

These measures would continue to be implemented where relevant for the modified CGM.

5.9 ABORIGINAL CULTURAL HERITAGE

Environmental Review

Aboriginal heritage sites which occur within ML 1535 and have been registered with the DECC include sites P1, P2, LC1-LC4 and exposures A-N. These sites range from open scatters (e.g. site P1) to base camps (e.g. site LC2) to a scarred tree. The recorded artefacts associated with these sites include quartz flakes, backed blades and axes. The majority of registered sites within ML 1535 are open scatters with concentrations of quartz flakes. Summaries of the survey results and the registered Aboriginal sites identified in each management zone are outlined in the Indigenous and Aboriginal Cultural Heritage Management Plan (IACHMP) (Barrick, 2003m).

All activities required for the proposed modification would occur in approved disturbance areas within the ML 1535 (Figure 2). As such, the proposed modification would not change the potential impacts on Aboriginal heritage described in the EIS for the original CGM.

Mitigation Measures and Management

Notwithstanding, Barrick and its consultant archaeologists have obtained permits and consents under Section 87 and Section 90, respectively, pursuant to the *National Parks and Wildlife Act, 1974* for the management of Aboriginal heritage artefacts at the CGM. Activities for the CGM have been conducted in accordance with relevant permit and consent conditions and the IACHMP. All construction earthworks have been monitored and no non-compliances have been reported (Barrick, 2005b, 2006a, 2007a, 2008). Future works would continue to be undertaken in accordance with the permits and consents for the CGM. The IACHMP would be continued for the modified CGM.

5.10 NON-ABORIGINAL HERITAGE

Environmental Review

Subsequent to Development Consent being granted for the approved CGM, the Cowal West Homestead and Shearing (Wool) Shed were listed as heritage items under the *Bland Local Environmental Plan, 1993* (Bland LEP). The items were listed as an amendment to the Bland LEP which was gazetted in November 1999. The listed items are located at the Cowal West Homestead Complex (CWHC), which is situated immediately west of the approved CGM southern waste emplacement. The CWHC currently comprises the following buildings: Homestead; Shearing (Wool) Shed; and Hayshed. The listing recognises the local heritage significance of these buildings to the Bland Shire area. There are no other items listed on the Bland LEP located within ML 1535.

All activities required for the proposed modification would occur in approved disturbance areas within the ML 1535 (Figure 2). As such, the proposed modification would not change the potential impacts on non-Aboriginal heritage described in the EIS for the original CGM.

Mitigation Measures and Management

The Heritage Management Plan (HMP) (Barrick, 2003n) includes management measures for existing non-Aboriginal heritage items. The HMP would be continued for the modified CGM.

5.11 ROAD TRANSPORT

Environmental Review

The proposed modification would not change traffic movements to and from the CGM (i.e. no new traffic movements). Therefore, no impacts on the local road network would be expected as a result of the proposed modification.

Mitigation Measures and Management

Notwithstanding, Barrick would continue to encourage use of the existing employee shuttle bus service and car pooling, where practicable, to minimise traffic. The arrangements covering the transport of hazardous materials set out in the Transport of Hazardous Materials Study (THMS) (Barrick, 2005d) would be continued.

5.12 SOCIO-ECONOMICS

The proposed modification would increase the operating costs of the CGM in the latter years of mining when total waste rock volumes would increase, but would be less than the original CGM maximum quantity of waste rock to be mined in any one year.

However, as stated in Section 3, the proposed modification proposes changes to the open pit to optimise the efficiency of the project whilst there is a material delay to the E42 Modification approval process.

This proposed modification has been lodged in order to avoid the following potential adverse consequences:

- Excess ore would be generated above the required process plant rate and would be stockpiled. Stockpiling would result in ore being double-handled prior to being processed at a later date incurring additional costs. Additional areas would be required to be designed and cleared for stockpiling the excess ore that would be generated. This would likely require re-handling of existing low grade ore and waste emplacements to accommodate the excess ore.

or

- The mining rate for the currently-approved pit area would need to be reduced to maintain the optimum rate of ore feed to the process plant. Decreasing the mining rate would result in equipment and personnel being idle because one less mining fleet would be required. This would result in a reduction in workforce.

The increase in operating costs is considered to be minimal in terms of the socio-economic costs that would be incurred if there is a material delay to the E42 Modification approval process.

Population, Employment and Community Infrastructure

The proposed modification would maintain the mining rate and keep the current fleet operational, thereby maintaining employment for 24 full time employees that would otherwise be idle because one less mining fleet would be required.

5.13 HAZARD AND RISK

A Preliminary Hazard Analysis (PHA), THMS, HAZOP Study Report (HAZOP) (Pinnacle Risk Management, 2004a), Fire Safety Study (FSS) (Pinnacle Risk Management, 2005), HWCMP, Final Hazard Analysis (FHA) (Pinnacle Risk Management, 2004b), BMP, CMP, Safety Management System (SMS) and ERP have been completed and relevant measures implemented for the approved CGM.

Preliminary Hazard Analysis

The PHA conducted as part of the EIS analysed the off-site risks to the environment, public safety and public property of potential hazardous events. The study ranked the risks and reviewed the adequacy of the safeguards and recommended improvements where necessary. No hazardous events or incidents have occurred at the CGM since the commencement of operations that have changed the assumed consequence and likelihood ratings described in the PHA.

Final Hazard Analysis

The FHA was also conducted for the approved CGM and was designed to extend and update the analysis in the PHA. Overall, the FHA concluded that the approved CGM complied with the Hazardous Industry Planning Advisory Paper (HIPAP) No. 4 and HIPAP No. 6 Guidelines for tolerable fatality, injury, irritation and societal risk (Pinnacle Risk Management, 2004b). The FHA also concluded that the risks to the biophysical environment, the risk of propagation and the potential impact on cumulative risks in the area from releases were considered to be generally negligible (*ibid.*). Overall, the assessment concluded that the CGM would not pose any unacceptable levels of risk (*ibid.*). No hazardous events or incidents have occurred at the approved CGM since the commencement of operations that have changed the assumed consequence and likelihood ratings described in the FHA.

The proposed modification would not change the potential impact mechanisms to the environment, public and public property, and their associated consequences or likelihoods, to the extent that risk levels would change from those previously assessed in the PHA or FHA. Consequently, no change to the overall PHA or FHA risk assessment findings would result from the proposed modification.

Notwithstanding, a number of hazard prevention and mitigation measures are described in the PHA, THMS, HAZOP, FSS, HWCMP, FHA, BMP, CMP, SMS and ERP and would continue to be implemented for the modified CGM.

6 CONCLUSION

Based on Sections 2 to 5 of this document, the development to which the consent as modified relates is considered to be:

- of minimal environmental impact; and
- substantially the same development as the development for which the consent was originally granted and before that consent as originally granted was modified.

Minimal Environmental Impact

For the reasons set out below, it is concluded that the development to which the consent as modified relates is considered to be of minimal environmental impact.

- As described in Section 5, the proposed modification would not result in operational or material changes to the CGM that would alter the potential environmental impacts predicted in the EIS in regard to flora, fauna, land resources, Aboriginal heritage, non-Aboriginal heritage, surface water, groundwater, road transport, blasting, socio-economics, air quality or hazard and risk.
- As described in Section 5.2, the proposed modification would not result in operational or material changes to the CGM that would alter the potential environmental impacts predicted in the EIS in regard to noise, although the proposed modification includes a proposal to contemporise the relevant noise criteria. The original CGM noise modelling predicted that noise emissions would be below relevant noise criteria. All recently measured intrusive mine noise levels are below relevant noise criteria. The modified CGM is not anticipated to change CGM noise emission levels. Heggies (Attachment B) advise that, accordingly, it is reasonable to conclude that existing mine noise emissions are unlikely to significantly change, the ability to comply with relevant noise criteria would continue and the proposed changes for the modified CGM would have minimal noise impact potential.
- The modification proposes an increase in the height of a proportion of the northern and southern waste emplacements. As described in Section 5.1, Urbis (Attachment A) advise that the change in the level of visual modification resulting from the modified CGM would be minimal because: the modified CGM would not change the level of visual modification described in the EIS for each of the relevant viewpoints; the modification would not change the number of public viewpoints assessed in the EIS; the proposed waste emplacement elevations would remain well below surrounding existing prominent topographic high points; and the level of potential impact would be limited because the area subject to an increase in height is confined to a relatively small proportion of the overall footprint of the waste emplacements.

Substantially the Same Development

For the reasons set out below, it is concluded that the development to which the consent as modified relates is considered to be substantially the same development as the development for which the consent was originally granted and before that consent as originally granted was modified.

- As described in Table 1, the proposed modification would not change: the ML area; total ore production; life of the mine; mining methods; method of development of the open pit or final depth of the open pit; ore processing methods or maximum ore processing rates; disturbance area; lake isolation system; geochemical characteristics of the waste rock; type of mining equipment; blast design or frequency; pit dewatering method; tailings production; height or area of tailings storage facilities; tailings storage facility water management processes; cyanide levels; cyanide destruction method; areas of the perimeter, northern and southern waste emplacements; process plant infrastructure; ROM ore stockpile; low grade ore stockpile; soil stockpiles; power supply; water supply sources; water demand; Bland Creek Palaeochannel extraction limits; surface runoff management; site access road, employment; or hours of operation.

7 REFERENCES

- Barrick Australia Limited (2003a) *Cowal Gold Project Landscape Management Plan*.
- Barrick Australia Limited (2003b)
- Barrick Australia Limited (2003c) *Cowal Gold Project Traffic Noise Management Plan*.
- Barrick Australia Limited (2003d) *Cowal Gold Project Site Water Management Plan*.
- Barrick Australia Limited (2003e) *Cowal Gold Project Erosion and Sediment Control Management Plan*.
- Barrick Australia Limited (2003f) *Cowal Gold Project Dust Management Plan*.
- Barrick Australia Limited (2003g) *Cowal Gold Project Bushfire Management Plan*.
- Barrick Australia Limited (2003h) *Cowal Gold Project Land Management Plan*.
- Barrick Australia Limited (2003i) *Hazardous Waste and Chemical Management Plan*.
- Barrick Australia Limited (2003j) *Cowal Gold Project Flora and Fauna Management Plan*.
- Barrick Australia Limited (2003k) *Cowal Gold Project Implementation of the Threatened Species Management Protocol*.
- Barrick Australia Limited (2003l) *Cowal Gold Project Compensatory Wetland Management Plan*.
- Barrick Australia Limited (2003m) *Cowal Gold Project Indigenous Archaeology and Cultural Heritage Management Plan*.
- Barrick Australia Limited (2003n) *Cowal Gold Project Heritage Management Plan*.
- Barrick Australia Limited (2004) *Cowal Gold Project Noise Management Plan*.
- Barrick Australia Limited (2005a) *Cowal Gold Project Surface Water, Groundwater, Meteorological and Biological Monitoring Programme – Mine Operations*.
- Barrick Australia Limited (2005b) *Cowal Gold Project 2003-2004 Annual Environmental Management Report*.
- Barrick Australia Limited (2005c) *Cowal Gold Project Emergency Response Plan*.
- Barrick Australia Limited (2005d) *Cowal Gold Project Transport of Hazardous Materials Study*.
- Barrick Australia Limited (2006a) *Cowal Gold Project 2005 Annual Environmental Management Report*.
- Barrick Australia Limited (2006b) *Cowal Gold Project Cyanide Management Plan*.
- Barrick Australia Limited (2007a) *Cowal Gold Project 2006 Annual Environmental Management Report*.
- Barrick Australia Limited (2007b) *Cowal Gold Project Mining Operations Plan 2007 – 2009*.
- Barrick Australia Limited (2008) *Cowal Gold Project 2007 Annual Environmental Management Report*.
- Coffey Geotechnics Pty Ltd (2008) *Cowal Gold Mine E42 Modification Hydrogeological and Tailings Seepage Assessment*.

- Coffey Partners International Pty Ltd (1995) *Lake Cowal Project – Hydrogeological Modelling and Dewatering Study*.
- Coffey Partners International Pty Ltd (1997) *Groundwater Studies – Hydrogeological Assessment*.
- EDAW Australia (1997) *Visual Assessment for Cowal Gold Project*. Appendix M in North Limited (1998) *Cowal Gold Project Environmental Impact Statement*.
- Environment Protection Authority (1994) *Environmental Noise Control Manual*.
- Environment Protection Authority (2000) *NSW Industrial Noise Policy*.
- Gell, P.A. (2002-2005) *Lake Cowal Waterbird Monitoring Survey Progress Reports*. Reports produced for January, August and October monitoring events for each year (i.e. 2000-2005; 2007). Unpublished Reports.
- Geo-Environmental Management Pty Ltd (2008) *Cowal Gold Mine E42 Modification Tailings and Waste Rock Geochemical Assessment*.
- Gilbert and Associates Pty Ltd (2008) *Cowal Gold Mine E42 Modification Hydrological Assessment*.
- Kalf and Associates (1997) *Groundwater Studies – Pre-assessment Groundwater Issues*.
- North Limited (1998) *Cowal Gold Project Environmental Impact Statement*.
- Pinnacle Risk Management (2004a) *HAZOP Study Report, Cowal Gold Project*.
- Pinnacle Risk Management (2004b) *Final Hazard Analysis, Cowal Gold Project*.
- Pinnacle Risk Management (2005) *Fire Safety Study, Cowal Gold Project*.
- Resource Strategies Pty Ltd, CSIRO Wildlife and Ecology, Goldney, D and Greg Richards and Associates Pty Ltd (1997) *Cowal Gold Project Species Impact Statement*. Appendix A of North Limited (1998) *Cowal Gold Project Environmental Impact Statement*.
- Thompson, J.R., Mueller, P.W., Fluckiger, W. & Rutter, A.J. (1984) The Effect of Dust on Photosynthesis and Its Significance for Roadside Plants. *Environmental Pollution (Series A)* 34: 171-190.
- University of Sydney (2008), *Interpretation and Discussion of 2007 Air Quality Monitoring Results Cowal Gold Project*.

ATTACHMENT A
LETTER FROM URBIS PTY LTD
JANUARY 2009

27 January 2009

Mr. Andrew Bywater
Technical Services Manager
Barrick Australia Limited
PO Box 210,
West Wyalong
NSW 2671

Dear Andrew,

PRIVILEGED AND CONFIDENTIAL

Subject: Cowal Gold Mine – Section 96(1A) Modification – Visual Assessment

This report presents an assessment of the potential visual impacts associated with a proposed modification to the Cowal Gold Mine (CGM) (the modified CGM) and provides a comparison with the:

- “development for which the consent was originally granted” (as described and shown in the Cowal Gold Project Environmental Impact Statement [EIS] [North Limited, 1998]) - the original CGM; and
- original CGM as previously modified - the approved CGM.

Background

We have reviewed the documents provided to us in relation to the modified CGM, as well as the 1998 EIS. The key differences between the original CGM and the modified CGM from a potential visual impact perspective relate to increases in the heights of a proportion of the Northern and Southern Waste Emplacements. The actual area subject to an increase in height is confined to a relatively small proportion (i.e. approximately 15 percent) of the overall footprint of the Waste Emplacements. The locations of the footprints of the Northern and Southern Waste Emplacements would not change. Table 1 provides a comparison of the original CGM and the modified CGM. Figure A1 shows the modified CGM compared to the original CGM and approved CGM.

**Table 1
Comparison of Original and Modified CGM**

Feature	Original CGM		Modified CGM		Difference	
	Elevation	Area	Elevation	Area	Elevation	Area
Northern Waste Emplacement	mRL 243	160 ha	RL 253	160 ha	+ 10 m for a proportion of the waste emplacement only	No change
Southern Waste Emplacement	mRL 223	120 ha	RL 238	120 ha	+ 15 m for a proportion of the waste emplacement only	No change

Note: the approved CGM has the same elevations and areas as the original CGM.

RL = Relative Level.
ha = hectare.
m = metre.

As outlined in the EIS, the location and final shape of the mine landforms were designed to integrate with local topographic features (North Limited, 1998). Further, all landforms were restricted in height to lie below that of local topographic highpoints, particularly the prominent ridgeline located immediately to the west of the CGM (North Limited, 1998).

The visual impact assessment undertaken by EDAW (1997) as part of the EIS identified the following sensitive areas which would potentially have views of the CGM. These were:

- Billy's Lookout (mRL 368);
- Wamboyne Mountain (mRL 412);
- Lake Cowal – from the surface and eastern edge of the lake;
- residences; and
- sections of the Public Road and Travelling Stock Route to the northern, western and southern boundaries of the mine.

Other areas (i.e. areas not assessed as sensitive areas) assessed to have the potential views of the CGM included:

- areas of rural landscape within the visual catchment; and
- West Wyalong-Burcher Railway.

Views would also potentially be available from the Game Reserve which was relocated after Development Consent was issued for the original CGM to a location 3 kilometres (km) to the south-east of the mine site. However, as this location's primary purpose is the preservation of game species, the visual sensitivity of this area is considered low. Potential views of the mining lease (ML) from the Game Reserve are restricted by intervening screening vegetation (particularly along the south-western fringe of Lake Cowal) and flat topography.

With the exception of the abovementioned Game Reserve, in the local and sub-regional setting the number of sensitive viewpoints and the scenic quality at those viewpoints has not changed since the EIS was prepared.

Potential Impacts

A summary of the potential visual impacts of the original CGM compared to the modified CGM is presented in Table 2.

**Table 2
Potential Visual Impact Summary**

Viewpoint	Potential Visual Impacts	
	Original CGM*	Modified CGM
Public road within the travelling stock reserve		
North of mine site	Moderate to high in short term, reducing in time due to screening by trees and landforms.	No change.
West of mine site	Generally moderate to high on section within 200 m of new landform reducing to low to moderate on road side planting provides screening.	No change.
South of mine site	Moderate in short term reducing to low as screening is provided by road side tree planting.	No change.
Railway	Freight trains only and infrequent use.	No change.
West of mine site	Low due to screening by trees planted along eastern edge of realigned road.	No change.
Residences		
North, west and south of mine site	Views generally screened by landforms and vegetation.	No change.
East of mine site	Views some 8 km across Lake Cowal. Tops of new landforms below the tree covered prominent ridgeline located west of the CGM.	No change.
General landscape		
North, south and west of mine site	Low to moderate due to screening by vegetation and landforms and affect of distance, reducing to low as slopes are rehabilitated.	No change.
East of mine site	Moderate to low for 8-10 years while rehabilitation vegetation is established and then very low.	No change.
Surface of Lake Cowal	Moderate for 8-10 years while rehabilitation vegetation is established and then low.	No change.
Major Landforms		
Billys Lookout	Very low due to distance and lookout not routinely accessed by or available to the public.	No change.
Wamboyne Mountain	Low due to distance and not routinely accessed by or available to the public.	No change.

* Source: EDAW (1997)

The modified CGM would not change the level of visual modification described in the EIS for each of the viewpoints listed in Table 2. In addition to the viewpoints in Table 2, views of the original CGM from the Game Reserve¹ would potentially be available, although those views would be restricted by intervening screening vegetation (particularly along the south-western fringe of Lake Cowal) and flat topography. This would not change as a result of the modified CGM. Further, the proposed modification would not change the number of public viewpoints assessed in the EIS.

¹ The Game Reserve was relocated as a requirement of the original CGM Development Consent. Its current location and views of the project were not assessed in the EIS.

For the modified CGM, the heights of the Northern and Southern Waste Emplacements (mRL 253 and mRL 238, respectively) would remain below the elevation of Wamboyne Mountain (mRL 412) to the north of the CGM and below the elevation of the highest section of the prominent ridgeline immediately to the west of the CGM, which peaks at Billy's Lookout (mRL 368) to the south-west of the site, but slightly higher than Cowal West Hill (mRL 223), a low hill on ML 1535. The actual area subject to an increase in height is confined to a relatively small proportion (i.e. approximately 15 percent) of the overall footprint of the Waste Emplacements. This will limit the potential increase in visual massing.

Progressive restoration of the Waste Emplacements, as outlined in the EIS, would assist in the amelioration of visual impacts. That is, the level of visual impact would progressively reduce once vegetation cover begins to establish on the rehabilitated Waste Emplacements.

The proposed modification would vary the effects of existing night-lighting (i.e. visible from additional locations due to increased elevations of some light sources) over the life of the modified CGM. The nature of the night-lighting for the modified CGM would be of a similar intensity when compared to the existing night-lighting at the CGM. However, there is potential for the fixed lights to be visible from a wider area surrounding the ML due to the increased elevations of portions of the Waste Emplacements. Given that the actual area subject to an increase in height is confined to a relatively small proportion (i.e. approximately 15 percent) of the overall footprint of the Waste Emplacements, and the lighting strategies/control measures to minimise night-lighting impacts (refer below), the potential impact resulting from the increased elevations of proportions of the Waste Emplacements would be minimal.

Mitigation Measures and Management

The mitigation measures and management measures that have been implemented for the maintenance of visual amenity for the CGM are presented in the Landscape Management Plan (LSMP) (Barrick, 2003). The LSMP includes lighting strategies/control measures to minimise night-lighting impacts (e.g. plan lighting layout to avoid potential for direct views of lights from the public road - i.e. direct lights inward towards the centre of the ML where practicable). It is understood that the LSMP would be continued for the modified CGM.

Earth mounds have been constructed on sections of the western and northern boundaries of ML 1535 to break up continuous views from Lake Cowal Road. These earth mounds as well as vegetation screen areas surrounding the ML (including along Lake Cowal Road) have been planted with endemic plants that are compatible with the existing surrounding vegetation. We understand that maintenance of the vegetation screens (e.g. addition and replacement of plants where required) would continue to be undertaken in these areas. An increase in screening effect over time as plants grow, would continue as a result.

Conclusion

It is my professional opinion that the potential visual impact resulting from the proposed modification would result in a minimal environmental impact.

Should you have any queries relating to the above overview assessment, please do not hesitate calling me on (03) 8663 4888.

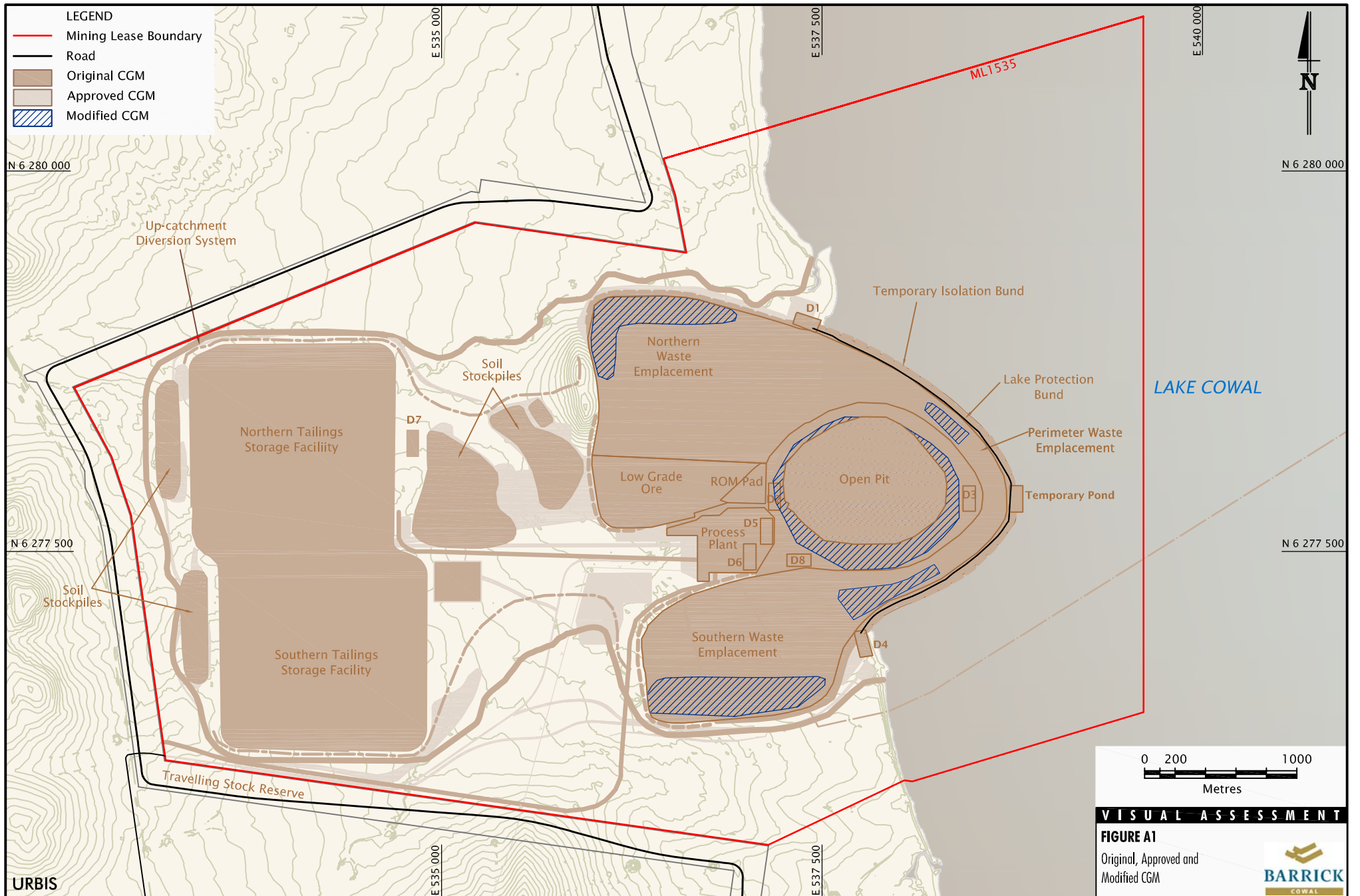


Yours sincerely,

A handwritten signature in black ink, appearing to read "P. Haack".

Peter Haack
Director
Urbis

Attachment: Figure A1 – Original, Approved and Modified CGM



URBIS

HAL-06-26 Section 96(1A) VA_101B

ATTACHMENT B
LETTER FROM HEGGIES PTY LTD
JANUARY 2009



27 January 2009

10-3405 30-300 Modification 20090127

Barrick Australia Limited
PO Box 210
WEST WYALONG NSW 2671

Attention: Mr Andrew Bywater, Technical Services Manager

Dear Andrew

Cowal Gold Mine Proposed Modification Review of Noise Impacts

1 Introduction

In January 1999 Development Consent was granted to develop the Cowal Gold Mine (CGM) as an open-cut gold mine utilising drill and blast, truck and shovel extractive methods with on-site processing to produce gold. The Mining Lease (ML) 1535 is located approximately 38 kilometres (km) north-east of West Wyalong, New South Wales (NSW).

This report presents an assessment of the potential noise impacts associated with a proposed modification to the CGM (the modified CGM) and provides a comparison with the:

- “development for which the consent was originally granted” (as described and shown in the Cowal Gold Project Environmental Impact Statement [CGM EIS] [North Limited, 1998]) - the original CGM; and
- the original CGM as previously modified - the approved CGM.

Heggies Pty Ltd (Heggies) has carried out a review of potential noise impacts arising from changes associated with the modified CGM. The key aspects of the modified CGM would include:

- No change to the total ore production.
- No change to total tailings production.
- No change in the disturbance area (open pit dimensions would increase to 1,100 m long, 1,050 m wide and 325 m deep, however this increase would occur within the approved CGM disturbance area).
- An increase in the total volume of waste rock to be removed from the open pit from approximately 128 million tonnes (Mt) to approximately 136.6 Mt with the increased volumes to be mined during the latter years at rates less than the original CGM annual maximum (i.e. 27.5 Mtpa).
- No change to the life of the original CGM.

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- An increase of 10 m to 15 m of the final height of a proportion of the northern and southern waste emplacements.
- Relocation of approximately 1.4 Mt of previously-mined waste rock from the perimeter waste emplacement to the northern and southern waste emplacements.
- No change to the maximum height or area of the perimeter waste emplacement.
- A 5 m to 12.5 m reduction in the height of the perimeter waste emplacement in places.
- No change to the areas of the northern and southern waste emplacements.
- Other associated minor changes to infrastructure, plant, equipment and activities.

The review of noise impacts considered the information contained in the following documents:

- CGM EIS (North Limited, 1998).
- Cowal Gold Project Noise Transportation and Blasting Impact Assessment (Appendix H of the EIS).
- Reports 10-4111-R1 to 10-4111-R8 Mine Operating Noise Monitoring - August 2005 to July 2008, prepared by Heggies.
- The description of the modified CGM provided to Heggies on 15 December 2008.

2 Noise Criteria

2.1 Original and Approved CGM

Barrick has consent to operate the CGM (with respect to noise and vibration emissions) in accordance with the CGM Development Consent (DA 14/98) and Environment Protection Licence (EPL) (No 11912), as shown on **Attachment A**.

The CGM (Development Consent and EPL) intrusive noise criteria were generally based on the noise compliance requirements of the NSW Department of Environment and Climate Change's (DECC's) Environmental Noise Control Manual (ENCM) 1994. More recently the DECC has amended the EPL to include references to the NSW Industrial Noise Policy (INP) (2000). A comparison of the existing Consent and EPL noise criteria and relevant associated meteorological conditions are summarised in **Table 1**.

Table 1 Comparison of the Existing Consent and EPL Noise Criteria and Meteorological Requirements

Parameters	Development Consent	EPL
Assessment Locations	Any dwelling (other than mine owned)	Any residence not owned by the licensee
Noise Parameters	Daytime ¹ LA10(15minute) 35 dBA	Day ² LAeq(15minute) 35 dBA
	Night-time ¹ LA10(15minute) 33 dBA	Evening ² LAeq(15minute) 35 dBA
		All other times LAeq(15minute) 35 dBA
Meteorological Conditions	Except during: <ul style="list-style-type: none"> • rain; and/or • wind speeds >3 m/s, and/or • temperature inversions 	Apply under: <ul style="list-style-type: none"> • wind speeds ≤3 m/s at 10 m; or • temperature inversions ≤3°C/100 m and wind speeds ≤2 m/s at 10 m

Note 1: Daytime defined 0700 hours to 2200 hours, Night-time defined 2200 hours to 0700 hours.

Note 2: Day defined 0700 to 1800 hours Monday to Friday, Evening defined 1800 to 2200 hours Monday to Friday.

LAN = noise exceedances level.

LAeq = equivalent continuous noise level.

dBA = A-weighted decibel.

°C = degrees Celsius.

m/s = metres per second.



2.2 Proposed Modified CGM

In order to address inconsistencies between the Development Consent and EPL, the DECC previously requested that Barrick amend the CGM Noise Management Plan (NMP) (November 2004) in accordance with the NSW INP, including intrusive LAeq(15minute) project-specific noise levels that apply under a limited range of site-specific wind and temperature inversion conditions determined in accordance with the NSW INP.

The NMP requires six-monthly noise monitoring and reporting to be conducted in January and July of each year. Operating noise criteria in accordance with the NSW INP are nominated in Section 3.2 Table 2 of the NMP (2004) and are reproduced in **Table 2**.

Table 2 NMP (INP) Based Intrusive LAeq(15minute) and Sleep Disturbance LA1(1minute) Noise Criteria

NMP (INP) Based Intrusive LAeq(15minute) PSNLs			Sleep Disturbance Screening Criteria LA1(1minute)
Daytime	Evening	Night-time	Night-time
35 dBA	35 dBA	35 dBA	45 dBA

Note 1: Daytime defined 0700 hours to 1800 hours, Evening 1800 hours to 2200 hours and Night-time 2200 hours to 0700 hours.

The noise criteria presented in **Table 2** apply under site-specific meteorological conditions as determined in accordance with the NSW INP. As a result, the environmental noise performance of the CGM has generally been assessed against the NMP (INP) based noise criteria (and meteorological conditions) which also remain useful for the purposes of reviewing any potential noise impacts arising from the modified CGM.

3 Modified CGM Overview

The key changes arising from the proposed modification are described in Section 1 and shown on the Mine Layout Plan shown as **Attachment B**.

The noise sources identified for the modified CGM include the same type of sources as those identified for the original CGM, including fixed processing plant and mobile equipment fleet (e.g. hydraulic excavators, haul trucks, front end loaders, dozers [wheeled and tracked], graders and drill rigs).

The proposed modification is not expected to change the maximum potential noise emissions from the CGM, given there would be no new significant noise sources and no change to the maximum quantity of waste rock or ore to be mined in any one year.

The proposed modification does not involve any additional mobile equipment by comparison with the typical mobile equipment fleet currently in-use. Similarly, fixed plant remains unaltered by the modified CGM.

4 EIS Predicted, Operating CGM and Modified CGM Noise Impacts

4.1 CGM EIS Predicted Noise Emissions

The EIS predicted LA10(15minute) intrusive mine operating noise at the nearest potentially affected receivers are presented in **Table 3**.



Table 3 CGM EIS Predicted LA10(15minute) Intrusive Noise (dBA re 20 µPa)

ID	Location	Neutral (calm)		ENCM Light Wind		ENCM Moderate Inversion	
		Year 3	Year 8	Year 3	Year 8	Year 3	Year 8
No 2	“Coniston”	11	21	26	31	22	27
No 5	“Gumbelah”	9	11	17	17	16	15
No 6	“Lake Cowal”	14	13	22	22	20	19
-	“Lakeside”	10	19	23	28	20	24

MPa = micro Pascals

As discussed in **Section 2**, the CGM EIS noise assessment was prepared and guided by the relevant noise impact procedures at the time (ie DECC’s ENCM). The EIS assessment predicted compliance with the ENCM criteria at all the assessed locations. For comparison, a contemporary assessment of the CGM would be required to be undertaken in accordance with the current DECC noise assessment requirements of the NSW INP. In this case, an assessment of the modified CGM has been undertaken generally in accordance with the NSW INP (Section 4.3).

4.2 Noise Monitoring Locations and Operating CGM Noise Emissions

The CGM currently monitors noise emissions at:

- non-Barrick-owned residential receivers;
- Barrick-owned residential receivers;
- bird breeding areas; and
- an on-site control point (i.e. site located within the ML 1535 boundary).

The above Noise Monitoring Locations are shown on **Attachment C**. The nearest non-Barrick-owned residential receivers and birding breeding area monitoring locations are presented in **Table 4**.

Table 4 Noise Assessment Locations

ID	Location	Receiver Type
NO2	“Coniston”	Private property
NO5	“Gumbelah”	Private property
NO7	“Westlea”	Private property
NO3	Bird Breeding Area (South)	Wildlife area
NO4	Bird Breeding Area (North)	Wildlife area

The measured LAeq(15minute) intrusive mine noise levels are presented in **Table 5**, **Table 6**, and **Table 7** based on the August 2005, February 2006, July 2006, January 2007, July 2007, September 2007 (Westlea), January 2008 and July 2008 monitoring results.



Table 5 Daytime Measured LAeq(15minute) Intrusive Mine Level (dBA re 20 µPa)¹

ID	Location	Aug 05	Feb 06	Jul 06	Jan 07	Jul 07	Sept 07	Jan 08	Jul 08
NO2	“Coniston”	n/a, <30	n/a	<30, <30	<30, <30	<30, <30	-	n/a, n/a	<30, <30
NO5	“Gumbelah”	n/a	n/a	<30	n/a	<30, <30	-	n/a, n/a	<30, <30
NO7	“Westlea”	-	-	-	-	-	38, <30, 38, 39	<30, <30	<30, <30
NO3	Bird Area (S)	n/a	n/a	<30, <30	<30, <30	<30, <30	-	n/a	-
NO4	Bird Area (N)	-	-	n/a, n/a	n/a, n/a	n/a, n/a	-	n/a	<30, <30

Note1: n/a - mine noise not discernible.

Measured daytime intrusive mine levels at all three residential locations (Nos 2, 5 and 7) are below 35 dBA, except at Westlea (No 7) in September 2007 where mine levels were up to 39 dBA. Early morning temporary tailings embankment lift works were subsequently modified and recent noise measurements show mine levels below 35 dBA.

Table 6 Evening Measured LAeq(15minute) Intrusive Mine Level (dBA re 20 µPa)¹

ID	Location	Aug 05	Feb 06	Jul 06	Jan 07	Jul 07	Sept 07	Jan 08	Jul 08
NO2	“Coniston”	-	<30	37	<30, <30	-	-	<30	<30, <30
NO5	“Gumbelah”	-	-	<30, <30	n/a, n/a	-	-	<30	-
NO7	“Westlea”	-	-	-	-	-	<30, <30	<30, <30	<30, <30
NO3	Bird Area (S)	-	n/a	-	<30, <30	-	-	-	-
NO4	Bird Area (N)	-	n/a	-	-	-	-	-	-

Note1: n/a - mine noise not discernible.

Measured evening intrusive mine levels at all three residential locations (Nos 2, 5 and 7) are below 35 dBA, except at Coniston (No 2) in July 2006 where mine levels were up to 37 dBA. More recent noise measurements show mine levels remain below 35 dBA.

Table 7 Night-time Measured LAeq(15minute) Intrusive Mine Level (dBA re 20 µPa)¹

ID	Location	Aug 05	Feb 06	Jul 06	Jan 07	Jul 07	Sept 07	Jan 08	Jul 08
NO2	“Coniston”	35	n/a	37, <30	<30, <30	35, 35	-	<30, 30	33, 30
NO5	“Gumbelah”	<30	n/a	-	<30, <30	<30, <30	-	<30, <30	30, 31
NO7	“Westlea”	-	-	-	-	-	<30, <30, 32	34, 31, n/a	<30, <30
NO3	Bird Area (S)	33	-	-	-	-	-	-	-
NO4	Bird Area (N)	<30	-	-	-	-	-	-	-

Note1: n/a - mine noise not discernible.

Measured night-time intrusive mine levels at all three residential locations (Nos 2, 5 & 7) are below 35 dBA.

4.3 Modified CGM Potential Noise Emissions

The modified CGM does not involve any additional mobile equipment by comparison with the typical mobile equipment fleet currently in-use. Similarly, fixed plant remains unaltered by the modified CGM.

While the modified CGM involves an increase of 10 m to 15 m of the final height of some areas of the northern and southern waste emplacements, there would be no increase in mine noise arising from the increasing elevation of waste emplacement areas at the CGM as the noise propagation path (and existing line-of-sight between noise sources and receivers) would remain relatively unaltered by the modified CGM at the nearest residential dwellings. Therefore existing mine emissions are unlikely to significantly change.



5 CGM Noise Mitigation and Management Measures

CGM Noise mitigation and management measures are described in the NMP. The NMP describes:

- Relevant noise standards.
- Potential noise sources and impacts.
- Noise management and mitigation measures.
- A noise monitoring programme.
- Provisions for the establishment of proactive and responsive noise management protocols.
- Provisions for the establishment of community consultation protocols.

It is understood that the NMP would be continued for the modified CGM.

6 Summary of Findings

The CGM EIS noise predictions were undertaken in accordance with the now superseded ENCM. An assessment of noise emission levels at relevant receiver locations based on the superseded ENCM would not provide relevant conclusions regarding the modified CGM's conformance with the DECC's current noise guidelines.

The current DECC methodology for establishing appropriate noise criteria for a project (i-e project-specific noise criteria) is described in the NSW INP. A contemporary NSW INP assessment would necessarily produce different project specific noise criteria in comparison to the CGM EIS as the INP contains different noise descriptors, meteorological conditions and assessment procedures. As a result, this review of the modified CGM assesses the potential noise impacts against existing CGM noise performance as well as INP based noise criteria.

The original CGM noise modelling predicted that noise emissions would be below relevant noise criteria. All recently measured intrusive mine noise levels are below relevant noise criteria. The modified CGM is not anticipated to change CGM noise emission levels. Accordingly, it is reasonable to conclude that existing mine noise emissions are unlikely to significantly change and the proposed changes for the modified CGM would have minimal noise impact potential.

Should you require any additional information or wish to discuss this matter further please contact undersigned.

Yours sincerely

GLENN THOMAS

EXISTING APPROVALS –DEVELOPMENT CONSENT and ENVIRONMENT PROTECTION LICENCE

Development Consent Conditions

The Development Consent nominates operating noise criteria in Condition 6.4 part (a) as follows:

6.4 *Noise Control*

(a) *Noise Levels - mine operations*

The Applicant shall ensure that the LA10(15minute) noise levels due to the normal operation of the mine, when measured or computed at any dwelling in the vicinity of the mine (other than one owned by a mining company), shall not exceed:-

- *during daytime (7am-10pm), an LA10(15minute) noise level of 35 dBA*
- *during night-time (10pm-7am), an LA10(15minute) noise level of 33 dBA.*

These goals apply under prevailing meteorological conditions except during:

- *rain; and/or*
- *wind speeds greater than 3 m/s, and/or*
- *temperature inversions.*

Noise impacts that may be enhanced by temperature inversions shall be addressed by:

- I. *documenting noise complaints received to identify any higher level of impacts or patterns of temperature inversions; and*
- II. *where levels of noise complaints indicate a higher level of impact then action to quantify and ameliorate any enhanced impacts under temperature inversion conditions should be detailed in the noise management plan.*

Environment Protection Licence (EPL)

The DEC's EPL No 11912 with review date 23 December 2011 nominates operating noise criteria under section L6 "Noise Limits" which are as follows:

L6 *Noise Limits*

L6.1 *Noise from the premises must not exceed:*

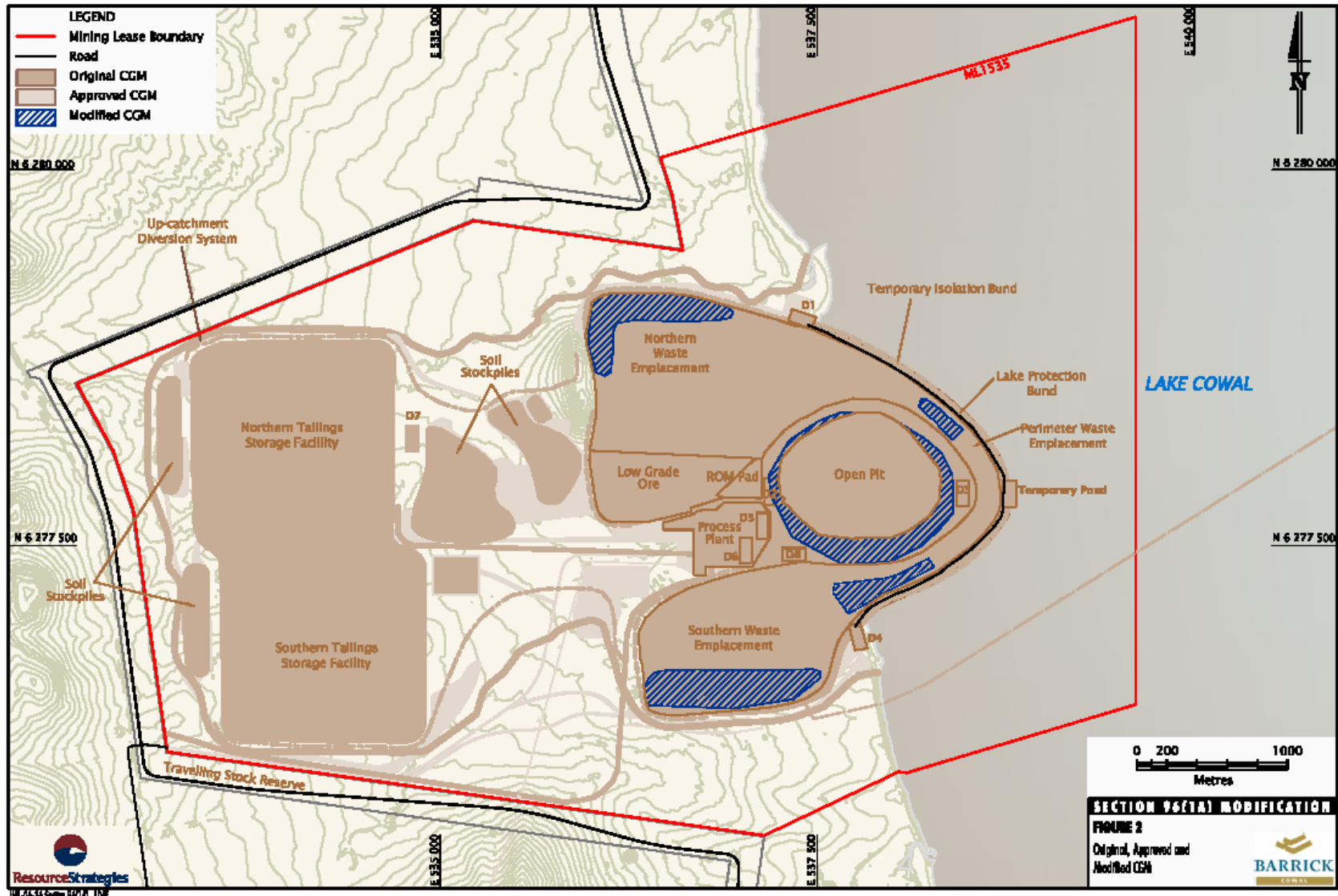
- (a) *35 dB(A) LAeq(15 minute) during the day (7am to 6pm) Monday to Friday; and*
- (b) *35 dB(A) LAeq(15 minute) during the evening (6pm to 10pm) Monday to Friday; and*
- (c) *at all other times 35 dB(A) LAeq(15 minute), except as expressly provided by this licence.*

Where LAeq means the equivalent continuous noise level - the level of noise equivalent to the energy-average of noise levels occurring over a measurement period.

L6.2 *The noise emission limits identified in condition L6.1 apply when measured at, or computed for, any residence not owned by the licensee. A modifying factor correction must be applied for tonal, impulsive or intermittent noise in accordance with the "Environmental Noise Management - NSW Industrial Noise Policy (January 2000)".*

L6.3 *The noise emission limits identified in condition L6.1 apply under meteorological conditions of:*

- *Wind speed up to 3 metres per second at 10 metres about ground level; or*
- *Temperature inversion conditions of up to 3°C/100 metres and wind speed up to 2 metres per second at 10 metres above ground level.*



ATTACHMENT B

