



COWAL



COWAL GOLD MINE EXTENSION MODIFICATION

Responses to Submissions

January 2014



1 INTRODUCTION

Barrick (Cowal) Limited (Barrick), a wholly owned subsidiary of Barrick (Australia Pacific) Limited, prepared the *Cowal Gold Mine Extension Modification Environmental Assessment* (EA) to modify the Development Consent (DA 14/98) for the currently approved the Cowal Gold Mine (CGM) under section 75W of the New South Wales (NSW) *Environmental Planning and Assessment Act, 1979* (the Modification).

The EA was placed on public exhibition by the NSW Department of Planning and Infrastructure (DP&I) from 26 September 2013 to 8 November 2013. During this period, government agencies, non-government organisations (NGOs), businesses and members of the public were invited to provide submissions on the EA to the DP&I.

A total of 91 submissions were received for the Modification, including:

- 71 submissions from members of the public, businesses and NGOs expressing support/providing comments for the Modification;
- 9 submissions from members of the public and NGOs objecting to the Modification; and
- 11 submissions from government agencies and councils.

Barrick's responses to submissions have been structured as follows:

- Part A – Responses to relevant submissions from members of the public, businesses and NGOs.
- Part B – Responses to submissions from councils and government agencies.

2 PART A – RESPONSES TO SUBMISSIONS FROM THE PUBLIC, BUSINESSES AND NGOS

Table A-1 provides the reconciliation of the submissions received from members of the public, businesses, and NGOs relative to the Modification. Responses to relevant submissions are addressed within Table A-2.

Table A-1
Reconciliation of Submissions from the Public, Businesses and NGOs

Submission ID No.	Name	Nature of Submission
<i>Submissions from the Public, Businesses and NGOs – Support/Comment</i>		
1	Peter Darmody	Support/Comment
2	stevehelenm@bigpond.com	Support/Comment
3	Simon Lendrum	Support/Comment
4	JE and SM Kelly (Kelly's Coaches)	Support/Comment
5	Garry Shaw	Support/Comment
6	Andrew Buttenshaw	Support/Comment
7	Anonymous	Support/Comment
8	Anonymous	Support/Comment
9	Brian Monaghan	Support/Comment
10	Neil Scott	Support/Comment
11	Jason Lister	Support/Comment
12	Karen Worthington	Support/Comment
13	Noel Corkery	Support/Comment
14	Michelle Bryson	Support/Comment
15	Daniel Clarke	Support/Comment
16	Maureen Wykes	Support/Comment
17	Gail Platz	Support/Comment
18	Pat Redmond	Support/Comment
19	Tayla Steele	Support/Comment
20	Anonymous	Support/Comment
21	Burcher Progress Association Company	Support/Comment
22	Anonymous	Support/Comment
23	Valerie Burgess	Support/Comment
24	Noel Pidgeon	Support/Comment
25	Brian Mogliotti	Support/Comment
26	Anonymous	Support/Comment
27	Stuart Barber	Support/Comment
28	Richard Biles	Support/Comment
29	Kerry Tait (West Wyalong Dry Cleaners)	Support/Comment
30	Anonymous	Support/Comment
31	Anonymous	Support/Comment
32	Paul Balind	Support/Comment
33	Anonymous	Support/Comment
34	Belinda Duncan (West Wyalong Public School P&C)	Support/Comment
35	Anonymous	Support/Comment
36	Anonymous	Support/Comment
37	Anonymous (Barrick)	Support/Comment
38	Rowan Fleming (Rock Australia)	Support/Comment
39	Jane Hooper	Support/Comment
40	Anonymous	Support/Comment

Table A-1 (Continued)
Reconciliation of Submissions from the Public, Businesses and NGOs

Submission ID No.	Name	Nature of Submission
<i>Submissions from the Public, Businesses and NGOs – Support/Comment (Continued)</i>		
41	David Sheil	Support/Comment
42	Tom Bentick	Support/Comment
43	Anonymous	Support/Comment
44	Shane Ellis	Support/Comment
45	Anonymous	Support/Comment
46	Ben Reid (Barrick)	Support/Comment
47	William Sellers	Support/Comment
48	Anonymous	Support/Comment
49	Condobolin RSL Pipe Band Company	Support/Comment
50	Jenny Kuemmel (Ardlethan Cultural Development Centre)	Support/Comment
51	Anthony Hutcheon (West Wyalong Men's Shed)	Support/Comment
52	Anthony Hutcheon (Lions Club)	Support/Comment
53	Anonymous	Support/Comment
54	James Dean	Support/Comment
55	Kenneth Jeffers	Support/Comment
56	Andrew Job	Support/Comment
57	Christopher Blake (Country Hope)	Support/Comment
58	Anonymous	Support/Comment
59	Todd Pereira	Support/Comment
60	Peter O'Brien	Support/Comment
61	Anonymous	Support/Comment
62	Peter Burgess	Support/Comment
63	Michael Johnston	Support/Comment
64	Anonymous	Support/Comment
65	Anonymous	Support/Comment
66	Nigel Johnston	Support/Comment
67	Anonymous	Support/Comment
68	Anonymous	Support/Comment
69	Anonymous	Support/Comment
70	Phil Lawler	Support/Comment
71	Bruce Dent	Support/Comment
<i>Submissions from the Public, Businesses and NGOs - Objection</i>		
72	Neville Williams	Objection
73	The Davies	Objection
74	Beila Wordsworth	Objection
75	Colin Armstrong	Objection
76	John Alexander	Objection
77	Steven Alexander	Objection
78	Scott Alexander	Objection
79	Anonymous	Objection
80	Northern Inland Commercial Fisherman's Association	Objection

Table A-2
Responses to Submissions from the Public, Businesses and NGOs

NEVILLE WILLIAMS (Submission ID 72)	
UN Declaration of the Rights of Indigenous People	
<i>Although the Federal government has acknowledged it, and it is based on a number of international human rights covenants to which Australia is a signatory, Australian governments, including the New South Wales Government, ignore the UN Declaration on the Rights of Indigenous Peoples.</i> <i>The Environmental Assessment (EA) does not take the Declaration and other international human rights law into account. It is conceded that Barrick does have "Indigenous policies" and consults Aboriginal people on some aspects of the mine and its operations, but the Declaration and its clauses are not mentioned anywhere in the EA. Our concerns are that the wider Wiradjuri were never given the opportunity for free, prior and informed consent to veto the mine although there were many Wiradjuri signatories to a petition run against it.</i> <i>We are not given the opportunity for free, prior and informed consent either about what happens about, and at, the mine apart from being able to put in submissions like this and sometimes taking part in archaeological meetings and surveys, which we know are only window dressing.</i> <i>Our cultural heritage is priceless but we, the Wiradjuri who care about it, have had no say.</i>	The EA has been prepared by Barrick for the specific purpose of supporting a request to modify the CGM Development Consent (DA 14/98). The contents of the EA satisfy the requirements specified by the NSW Department of Planning & Infrastructure (see Attachment 2 to the EA) and imposed under the provisions of the NSW <i>Environmental Planning and Assessment Act, 1979</i>. Consultation undertaken with the registered Aboriginal parties regarding the Modification is described in Section 2 of Appendix G of the EA, and has been undertaken in consideration of a number of guidelines/codes including the <i>Aboriginal cultural heritage consultation requirements for proponents 2010</i> (NSW Department of Environment, Climate Change and Water [DECCW], 2010a) (the Consultation Guidelines), the <i>Guide to investigating, assessing and reporting on Aboriginal cultural heritage in New South Wales</i> (NSW Office of Environment and Heritage [OEH], 2011), and the <i>Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW</i> (DECCW, 2010b). The consultation undertaken is considered to be consistent with the guiding principles presented in Section 1.3 of the Consultation Guidelines which state: <i>In recognising the rights and interests of Aboriginal people in their cultural heritage, all parties concerned with identifying, conserving and managing cultural heritage should acknowledge, accept and act on the principles that Aboriginal people:</i> <i>are the primary source of information about the value of their heritage and how this is best protected and conserved</i> <i>must have an active role in any Aboriginal cultural heritage planning process</i> <i>must have early input into the assessment of the cultural significance of their heritage and its management so they can continue to fulfil their obligations towards their heritage</i> <i>must control the way in which cultural knowledge and other information relating specifically to their heritage is used, as this may be an integral aspect of its heritage value.</i> Registered Aboriginal parties were encouraged to provide feedback and input into the assessment process at any time during the preparation of the assessment including feedback prior to or during the Project Information Session, feedback on the Proposed Methodology, feedback/comments during and following the site inspection/survey and feedback on the draft Aboriginal Cultural Heritage Assessment.
<i>The government and the mining company struck a secret deal with a small minority of Wiradjuri who sold out our past and our future heritage without authority.</i>	Barrick has an Agreement with the five named applicants (the Claim Group) who successfully registered a Native Title Claim with the National Native Title Tribunal following a comprehensive Native Title process that concluded in 2003. The Wiradjuri Condobolin Corporation (WCC) was established by the Claim Group as the body responsible for implementing the agreement on their behalf. Barrick has operated, and continues to operate, the CGM in accordance with its requirements under the Agreement and the Indigenous and Archaeology Cultural Heritage Management Plan (IACHMP).

NEVILLE WILLIAMS (Submission ID 72)	
<i>The consultation process with most of us on archaeology is limited and recently, as a concession, after many years of asking, some of us were allowed to view artefacts – made by our ancestors – that are held in a shipping container onsite at the mine.</i>	Comment noted. As discussed above, Aboriginal community consultation for the Modification was undertaken in accordance with the Consultation Guidelines and Clause 80C of the NSW <i>National Parks and Wildlife Regulation 2009</i>. The Keeping Place at the CGM is controlled by the WCC, and Barrick does not have the right or authority to open it without authorisation from the WCC. Notwithstanding, following a request by one of the registered Aboriginal parties during the field surveys for the Modification, the WCC offered any interested person the opportunity to inspect the Keeping Place and the material salvaged to date. This inspection was undertaken in May 2013 by all attending Aboriginal representatives, including Mr Williams.
<i>It is heartbreaking to know that the proposed extension to 2024 will continue the damage and destruction of irreplaceable Aboriginal cultural heritage at Lake Cowal that has been carried out since mining exploration began in ML 1535 and beyond for the electricity transmission line, bores and water pipeline.</i>	As described in Section 4.4.2 of the EA, the Modification layout has been designed to avoid and minimise potential impacts to Aboriginal cultural heritage where possible, including: • The soil stockpile in the north of Mining Lease (ML) 1535 has been designed to avoid Wamboyne Back Plains Site 2 and the creek line immediately north of the northern tailings storage facility. • The expansions of the tailings storage facilities and the southern waste rock emplacement have been designed to maintain their existing surface disturbance footprints, and as such, avoid potential impacts to Aboriginal heritage sites. • The eastern pump station (and associated access track) has been designed to be located as close as possible to the eastern side of Lake Cowal, while avoiding disturbance to the lunette associated with Lake Cowal, which is considered to be culturally significant (i.e. due to the potential for Aboriginal burials) (Appendix G of the EA). The eastern pump station would instead be located within a cultivated paddock in an area subject to previous surface disturbance. • The northern waste rock emplacement expansion has been designed to remain within the northern up-catchment diversion drain, and as such, avoid additional potential impacts to the Wamboyne Back Plains Site 2. As described in Section 4.4.3 of the EA, additional mitigation and management measures (i.e. in addition to existing management currently employed at the CGM as described in the IACHMP, which would continue for the Modification) have been developed in consultation with the registered Aboriginal parties for potential residual impacts associated with the Modification, including: • The collection and storage (in the Temporary Keeping Place) of the large weathered flake north-east of Wamboyne Back Plains Site 2. • Any items collected would be analysed consistent with current requirements and protocols. These include measurement of the artefacts to describe the nature and variation of the lithic items.

NEVILLE WILLIAMS (Submission ID 72)	
Aboriginal Cultural Heritage	
<i>While an Aboriginal Cultural Heritage survey for the expansion was carried out in May 2013 and some of us were “consulted”, the mining company only advertised for expressions of interest in the survey from Aboriginal people in local newspapers, not in the Aboriginal media as I have suggested many times. Aboriginal people are more likely to read The Koori Mail, The Indigenous Times and Tracker, to listen to Aboriginal radio stations and to watch television stations that show Aboriginal news such as the ABC, SBS and NITV. This means that Wiradjuri people with bloodlines and connection to Country, who might have wanted to register for the May 2013 survey, could have missed out, even though we try ourselves to let people know when these types of “consultation” come up.</i>	As detailed in Table 2 of Appendix G of the EA, public notices for the Modification Aboriginal Cultural Heritage Assessment consultation process were placed in six local newspapers including the Condobolin Argus, Forbes Advocate, West Wyalong Advocate, Wagga Daily Advertiser, Daily Liberal and the Griffith Area News (Section 2.2 of Appendix G of the EA) in accordance with Clause 80C(2)(c) of the <i>National Parks and Wildlife Regulation, 2009</i> and Section 4.1.3 of the Consultation Guidelines. The publication of public notices in six newspapers is considered to exceed the requirements under the Consultation Guidelines. In addition, all Aboriginal groups and individuals that have previously been involved in the CGM were individually notified of the Modification.
<i>They [archaeologists] also highlight “archaeological and scientific significance” and play down what really matters – the significance of the whole of Lake Cowal and the surrounding Country to us as the sacred heartland of the Wiradjuri Nation.</i>	Requirement 11 of the <i>Code of Practice of Archaeological Investigation of Aboriginal Objects in New South Wales</i> (DECCW, 2010b) requires the preparation and inclusion of a scientific values and significance assessment. Section 3 of the <i>Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW</i> (OEH, 2011) requires the preparation of a cultural heritage values and statement of significance. Section 9 of Appendix G of the EA provides an assessment of the cultural and archaeological significance of sites and values within the Modification disturbance area. This assessment has been prepared in accordance with the requirements outlined in the above mentioned guidelines, with cultural significance solely determined by the Aboriginal community. As detailed in Table 2 of Appendix G of the EA, the Aboriginal Cultural Heritage Assessment determines the significance of identified sites and proposes suitable management recommendations, developed in consultation with the Aboriginal community. Comments regarding the significance of the Modification area, CGM and surrounds have been considered in Table 2, Section 2.9.2 and 9 of Appendix G of the EA. Further, the level of cultural significance associated with the CGM area and sites is considered in Section 9.1.2 of Appendix G of the EA.
<i>Although some areas where Aboriginal sites are located, or places that are potential burial sites will be “avoided” in the new expansion, it is inevitable that more Aboriginal artefacts and possibly scarred trees will be damaged or destroyed. We can do nothing to stop any of this as the mining company and the supervising archaeologist have a Section 87 and a Section 90 permit and consent to destroy under the National Parks and Wildlife Act.</i> <i>Once Aboriginal heritage is gone, it is gone forever. The expansion will only make this worse, as it is inevitable that more Aboriginal sites and artefact will be disturbed and destroyed.</i>	Barrick and its heritage advisors obtained permits and consents under the then Section 87 and Section 90 of the <i>National Parks and Wildlife Act, 1974</i> for the management of Aboriginal heritage artefacts at the CGM including Permit 1468, Consent 1467, Permit 1681 and Consent 1680 (refer to Section 1.1 of Appendix G of the EA for further detail). As detailed in Section 4.4.2 of the EA, the existing permits and consents allow for the disturbance of sites within ML 1535 and associated with the operation of the water supply pipeline. Disturbance associated with the Modification is wholly within ML 1535 and the water supply pipeline alignment. Site survey and inspection methods are described in Section 7 of Appendix G of the EA. In accordance with best practice, existing registered sites within the Modification areas were re-inspected. A small drainage line located within the Modification area was assessed on foot following standard practice to ensure effective coverage. The ground survey identified features and objects on the surface along the margins of the drainage line to a distance of approximately 25 metres (m) (Appendix G of the EA).

NEVILLE WILLIAMS (Submission ID 72)	
(Continued)	As a result of comments received from the representatives regarding the likelihood of culturally modified trees being present in the Modification area (Section 2.9.2 of Appendix G of the EA), all mature trees of an age sufficient to bear evidence of traditional practices were examined. The location of all previously unrecorded Aboriginal objects found during the course of the survey were recorded using a hand held Global Positioning System (GPS). No scarred trees were identified within the proposed Modification areas, however several items and three scarred trees were identified along the lunette on the eastern shoreline of Lake Cowal outside of the water pipeline alignment (Section 8.2.5 of Appendix G of the EA). The items and trees were documented for information purposes at the request of the registered Aboriginal parties. The scarred trees are located outside of the Modification areas, which have been designed to avoid disturbance to the lunette, and to the south of the existing water supply pipeline. Section 4.4.2 of the EA concludes that that there is very little potential for physical damage to individual <i>in situ</i> lithic artefacts not associated with the existing registered sites (i.e. artefacts that are part of the background distribution) (Appendix G of the EA). Although the land is proposed to be disturbed, the topsoil would be stripped and stored for later rehabilitation. The unsalvaged individual artefacts would remain in the soil material and, therefore, would be replaced on the final landforms (Appendix G of the EA). The IACHMP is an existing document that sets out the salvage, excavation, monitoring and management measures for archaeological sites and other Aboriginal objects located at the CGM, in accordance with the existing permits and consents. Should the Modification be approved, the IACHMP would be updated to incorporate the recommendations proposed in the Aboriginal Cultural Heritage Assessment (Appendix G of the EA).
Health Issues	
<i>Physical harm may also occur to Wiradjuri and other workers at the mine from accidents, dust build up in the cabins of trucks and possible pitwall collapses to name a few possible causes. The expansion can only add to these possibilities.</i>	As detailed in Section 4.10.6 of the EA, a Safety Management System has been developed for the approved CGM in accordance with Hazardous Industry Planning Advisory Paper (HIPAP) No. 9 <i>Guidelines for the Development of Safety Management Systems</i> (DUAP, 1998). The Safety Management System sets out a comprehensive safety management system that covers all on-site operations and associated transport activities involving hazardous materials. The Safety Management System describes all safety related procedures, responsibilities and policies, and identifies mechanisms designed to assist in adherence to procedures. The existing Safety Management System would continue for the Modification.

NEVILLE WILLIAMS (Submission ID 72)	
Animals and Plants	
<i>To our knowledge no Aboriginal people have ever been involved in any of the animal and plant studies at or near Lake Cowal referred to in the EA. Although there have been many studies of animals and plants at and around Lake Cowal, the EA focuses mainly on threatened species. While it is expected and appropriate that threatened species should be studied for the EA, it does not address, apart from scarred trees, the cultural significance of animals and plants at the lake or in the region to the Wiradjuri people and the effects on the Wiradjuri of damage and destruction of animal and plant species. There are still plants at and near Lake Cowal that Wiradjuri use even today for ceremonies and medicines as well as scarred trees, some of which have been identified and a few protected as part of the archaeological surveys for the mine.</i> <i>Nor does the EA address the effects of the mine and the proposed extension on all protected species in the Lake Cowal area/region. For example, while emus, goannas, kangaroos and wallabies are protected, they are not considered threatened in the region but are all very important to us. We have witnessed a big decline in some species near the lake such as large goannas (Lace Monitors) since the Game Reserve (now part of the pit void) has been destroyed.</i>	As noted above, the EA has been prepared in accordance with the requirements specified by the NSW Department of Planning & Infrastructure and imposed under the provisions of the NSW <i>Environmental Planning and Assessment Act, 1979</i>. The Threatened Species Assessment (Appendix D of the EA) prepared for the Modification was conducted in accordance with the <i>Draft Guidelines for Threatened Species Assessment</i> (NSW Department of Environment and Conservation and NSW Department of Primary Industries [DPI], 2005). A copy of the Threatened Species Assessment prepared for the Modification (Resource Strategies, 2013) (Appendix D of the EA) was recently on public exhibition. Copies of previous flora and fauna assessments undertaken at the CGM are publicly available via the DP&I website and the Barrick Gold Corporation website. Comments regarding the presence of traditional food sources in the CGM area and surrounds have been considered in Section 2.9.2 of Appendix G of the EA. Section 4 of Appendix G of the EA provides a consideration of Aboriginal life in a historical context, including consideration of daily life and resources (i.e. plant and animal resources).
<i>We don't believe in 'offset areas' as they do not replace areas of habitat destroyed to make way for the mine and expansions of it, as they may involve the planting of new trees and shrubs that could take many years to grow and/or be subject to conditions such as they do not grow at all.</i> ... <i>'Offset areas' do not make up for what has already been lost and what will be lost as a result of the expansion.</i>	As detailed in Section 8.2 of Appendix D of the EA, the biodiversity offset strategy proposed for the Modification aims to address residual impacts to biodiversity from the Modification that cannot be avoided or mitigated. The objective of the offset proposal is to maintain or improve biodiversity values (including flora and fauna habitat) in the region in the medium to long-term, through the conservation, management and improvement of land near the CGM. A justification of the proposed biodiversity offset strategy is provided in Section 8.2.3 of Appendix D of the EA, including a reconciliation against the <i>NSW Offset Principles for Major Projects (State Significant Development and State Significant Infrastructure)</i> (OEH, 2013).
<i>...we witnessed many thousands of seedlings, that the mining company had planted, die in the most recent drought owing to lack of water and perhaps because of saline soils.</i>	The Rehabilitation Proposal prepared for the Modification (Appendix I of the EA) provides a detailed description of the rehabilitation undertaken at the CGM to date, including results of rehabilitation investigations and field trials on various CGM landforms (including different slopes and aspects) to determine the effectiveness of various surface treatments in stabilising landform slopes and supporting long-term vegetation growth. Rehabilitation performance indicators and completion criteria have been developed (based on monitoring data obtained from relevant reference sites) to assess rehabilitation performance at the approved CGM, and these performance indicators and completion criteria would apply to the Modification. The performance indicators and completion criteria have been based on landform establishment, growth medium development and ecosystem establishment, development and sustainability. As described in Section 5.7 of the EA, rehabilitation performance for the Modification would only be considered satisfactory when monitoring data indicates the completion criteria have been met.

NEVILLE WILLIAMS (Submission ID 72)	
<i>... what happens to animals and birds displaced from the habitat destroyed?</i> ... <i>There were goannas and other smaller lizards as well as birds and other animals and plants present on the former Game Reserve before mining exploration and operations began at Lake Cowal. We have no idea if there was any program, such as capturing and removing any species to safety, conducted by the mine and/or the NSW Government to protect animals and plants on the Game Reserve before it became a part of the pit void.</i>	In accordance with Condition 3.4(a)(ix) of Development Consent (DA 14/98) Barrick implements the Flora and Fauna Management Plan, which includes the Vegetation Clearance Protocol (VCP) and Threatened Species Management Protocol (TSMP). Vegetation clearance for areas that are approved to be cleared within ML 1535 is undertaken in accordance with the VCP which requires Barrick to identify any habitat features present within approved clearance areas. If habitat features are present, a secondary habitat assessment is conducted, which involves further pre-clearance surveys of areas deemed as containing fauna habitat (e.g. trees with hollows and/or bat presence). The identification of threatened species during the preclearance surveys (i.e. undertaken as per the VCP) triggers the implementation of the TSMP. The TSMP was developed to minimise potential impacts of the approved CGM on threatened flora and fauna species known and/or considered to possibly occur in the disturbance area and/or immediate surrounds. The TSMP includes provisions for targeted searches prior to clearance activities, and proposed mitigation measures where threatened flora or fauna species are found. The TSMP also includes threatened species management strategies prepared for threatened species which have been recorded in the course of targeted surveys or for which habitat resources typically associated with the lifecycle components of a threatened species have been identified. These existing management measures would continue for the Modification.
<i>But over the years since the mine began operations, we have seen emus inside fences and getting through fences, close to the tailings ponds. I have personally witnessed also, from the air, birds on the tailings ponds.</i>	In accordance with Development Consent (DA 14/98) condition 3.4(a)(v) effective mechanisms have been developed to minimise the potential for fauna and avifauna accessing the tailings storage facilities. As detailed in Section 3 of the Fauna and Flora Management Plan, the mechanisms have been developed in consultation with NPWS and include: • minimising the area of open water in the tailings dams; • fencing to prevent both medium and large fauna, terrestrial and amphibian, from entering the area; • making the area non-conductive to the establishment of wildlife habitats, as far as possible; • use of netting, where practicable; and • use of current best practice methods for avifauna deterrence. In addition, the cyanide concentration limits for the aqueous component of the tailings slurry specified in Development Consent (DA 14/98) have been developed to reduce cyanide levels in tailings water to levels that are considered non-toxic to birdlife. The Modification would not change the existing mechanisms to minimise the potential for fauna and avifauna accessing the tailings storage facilities, or the existing cyanide concentration limits for the aqueous component of the tailings slurry. As described in Appendix D to the EA, no cyanide related animal deaths associated with the tailings storage facilities at the CGM have been identified based on monitoring undertaken to 2013.

NEVILLE WILLIAMS (Submission ID 72)	
<i>Despite many requests for reports on animal and bird injuries and deaths inside the MLA and near the mine, the mining company has never provided us with any of this information, even through animals and plants are part of our cultural heritage and very important to us.</i> ... <i>Despite many requests for more information such as reports on animal and plant surveys conducted in recent years at Lake Cowal, none have been provided to us.</i>	In accordance with Development Consent (DA 14/98) conditions, Barrick conducts ongoing environmental monitoring, including fauna monitoring. In accordance with Condition 3.4(a) of Development Consent (DA 14/98), Barrick has developed a protocol for the reporting of native fauna deaths or other incidents involving native fauna on the mining lease to relevant regulatory authorities, including the DPI (Fisheries) and the Environmental Protection Authority (EPA). The ongoing fauna monitoring, and reporting of fauna deaths or other incidents involving native fauna to relevant authorities, would continue for the Modification.
<i>Over recent years there have been fish and yabbie deaths at Lake Cowal. The most recently reported yabbie deaths this year being officially put down to infection with a type of flatworm. Although the Department of Primary Industries issued media releases about the yabbie deaths, requests for further information about the cause of these deaths and reports on the water quality in Lake Cowal have not been successful.</i>	The DPI (Fisheries) and the EPA investigated concerns of yabby illness in Lake Cowal. Barrick has not been party to these investigations other than receiving advice from representatives of the DPI (Fisheries) and the EPA that yabby illness was not related to the activities of the CGM. For further information regarding this matter, it is suggested that enquiries are directed to the DPI (Fisheries) and the EPA.
Climate Change	
<i>The EA for this modification, previous modifications and the Environmental Impact Statement for the mine have not addressed the potential impacts of climate change, other than for greenhouse gases. The EA does not address the potential of increasing extreme weather events at the mine site, Lake Cowal and the surrounding area.</i> <i>The proposed expansion only adds to the potential effects on the environment and local landholders the mine might have in the event of a catastrophe caused by extreme weather events such as fires, floods, dust storms or earthquakes...</i> <i>The EA does not address how climate change and extreme weather conditions could potentially increase the possibility of floods of massive proportions in Central New South Wales that could affect Lake Cowal.</i>	There is no increase in waste rock or ore production rates, or ore processing rates, associated with the Modification. Accordingly, annual greenhouse gas (GHG) emissions are considered unlikely to increase comparative to the existing CGM operations (Appendix F of the EA). Section B5.5 of the Hydrological Assessment (Appendix B of the EA) (Gilbert & Associates, 2013) provides a consideration of the potential effects of climate change. Gilbert & Associates conclude that the implications of climate change predictions on water management are unlikely to be significant over the mine life because they are small compared to the natural climatic variability (Section B5.6 of Appendix B of the EA). Barrick's management practices, including the presence of an Emergency Response Team, improve the local capacity to respond to extreme weather events.
Dust	
<i>Although there is a dust suppression plan, dust from the mine still affects workers, the local environment, including the lake, and properties.</i> ... <i>There is always the potential for dust from the mine to end up in one of these dust storms that can affect towns and cities far away, even Bass Strait and the Tasman Sea. The proposed expansion can only add to the burden of dust in the atmosphere with potential to affect widespread areas around and away from the mine.</i>	The Air Quality Impact Assessment prepared for the Modification (Appendix F of the EA) provides an assessment of the potential dust impacts associated with the Modification. Pacific Environment Limited concluded that the Modification would comply with relevant annual average and 24-hour average PM_{2.5}, PM₁₀, TSP and dust dispersion assessment criteria/advisory standards at all nearby private residential properties and that no additional potential 24-hour impacts are expected during the life of the Modification (Appendix F of the EA). Section 8 of Appendix F of the EA describes the air quality management and mitigation measures are currently implemented at the CGM in accordance with the Cowal Gold Project Dust Management Plan, to control windblown and mine generated dust. These management measures would continue to be implemented for the Modification.

NEVILLE WILLIAMS (Submission ID 72)	
Earthquakes	
<i>The Cowl Gold Mine is located in a moderate earthquake zone but the EA does not address this or any possibility that an earthquake could occur in the Lake Cowl region and affect the mine. The risk assessments for the mine date back to the 1990s and have not, to our knowledge, been updated since then, despite new earthquakes occurring in the Central West area since 2005. The proposed expansion adds to the potential for a catastrophe to occur at Lake Cowl should even a medium earthquake occur in the region – the pit void would be larger, the waste rock emplacements higher and the sides of the tailings ponds also higher.</i>	Detailed engineering design of the construction of the tailings storage facilities, waste rock emplacements and open pit has considered the potential for earthquakes with regard to appropriate geotechnical factors of safety and hydrological design.
Mine Safety	
<i>After discovering a pitwall collapse during a flyover of the Cowl Gold Mine in 2008, a FOI request revealed that up to that time there had been 20 pitwall collapses, however the public did not know about them. Although the mine wall was rebuilt and supposedly strengthened after the 2008 incident, we continue to be concerned about safety at the mine for workers and the area as a whole. The proposed expansion, which involved an extension of the pit void, only adds to a potential calamity should another major pitwall collapse happen, a major flood occur, or an earthquake hit the Lake Cowl area in the future.</i>	As described in Section 3.3 of the EA, the design configuration for the modified open pit would be detailed in a revised Mining Operations Plan (MOP) for the CGM, which would be prepared in consultation with and subject to approval by the NSW Department of Trade and Investment Regional Infrastructure Services (DTIRIS) – Division of Resources and Energy (DRE).
Water Systems	
<i>We were told on good authority some years ago that it is inevitable that cyanide and other toxic substances will leak into the water systems near the mine and eventually migrate to ground and surface water systems. This may happen soon or could take many years. No-one really knows what the long-term impacts of the mine might be, but what is certain is that whatever they are, they will be on future generations and the ecology of the Central West and parts of the Murray-Darling Basin. The expansion of the mine can only add to the potential effects that the mine will have in the future. The Precautionary Principle should be followed but was thrown out the window when the mine was given the go ahead. The expansion only adds to the dangers to water systems, particularly once the pit void is filled with toxic, saline water.</i>	As detailed in Section 4.1.2 of the EA, an assessment of potential impacts to groundwater quality due to seepage from the tailings storage facilities was undertaken using an analytical particle tracking approach (Appendix A of the EA). Consistent with the findings of previous assessments for the approved CGM, seepage from the tailings storage facilities to the underlying aquifers was predicted to slowly migrate towards the open pit (Appendix A of the EA). Therefore, solutes associated with potential seepage from the tailings storage facilities are expected to remain within groundwaters between the tailings storage facilities and the final void over the long-term. The final void water level is expected to reach equilibrium well below spill level (Appendix B of the EA). As described above, no change to the quality of seepage from tailings storage facilities is expected due to the Modification. Therefore, no additional impacts to groundwater quality associated with seepage from the tailings storage facilities are expected due to the Modification (Appendix A). Further, no additional impacts to groundwater quality in the aquifers surrounding the CGM are predicted due to groundwater inflow to the open pit or seepage from the tailings storage facilities for the CGM incorporating the Modification (Appendix A of the EA). Section 6.2.2 of the EA gives consideration to Ecologically Sustainable Development, including the application of the Precautionary Principle relevant to the Modification.

NEVILLE WILLIAMS (Submission ID 72)	
Landholding	
<i>After Barrick acquired the Cowl Gold Mine, the company began buying up local agricultural properties. This is concentrating 'ownership' of land at and around Lake Cowl into international hands.</i>	In accordance with Condition 3.10 of Development Consent (DA 14/98), Barrick-owned land surrounding the CGM is managed in accordance with the management practices described in the Land Management Plan (LMP). The LMP includes a description of pasture management, remnant vegetation management, weed and feral animal control ongoing reporting requirements. The management measures described in the LMP for Barrick-owned land surrounding the CGM would continue for the Modification.
Potential Sale of Cowl Gold Mine	
<i>The Socio-economic Assessment in the EA states that the expansion will not provide any more jobs at the mine.</i>	The Modification would result in an additional 5 years of workforce employment for up to approximately 385 personnel. In addition, there may be some additional flow-on employment in the region as a result of the increased operational expenditure of the CGM in the region (Appendix H of the EA).
<i>The Cowl Gold Mine has not benefited many of our people at all. And those it has benefited could have received the same kinds of training, jobs and scholarships through normal government channels.</i>	Section 1.5 of the EA details Barrick's community initiatives and involvement. Barrick's overall commitment to the communities where operations are located, and to society as a whole, is defined in Barrick's Corporate Social Responsibility Charter. Barrick has established a number of community initiatives and consultation programmes which are ongoing at the CGM and are described below. Barrick's ongoing community involvement is documented each year in the Annual Environmental Management Report, and includes: • CGM site visits and community open days. • Lake Cowl Foundation. • Cowl Partnering Programme. • Barrick Buddies Program. • Community Scholarships. • Community Committees and Organisations. The Wiradjuri people are recognised as the Traditional Owners of the Lake Cowl area. Barrick has worked collaboratively with the Wiradjuri Council of Elders and the Registered Native Title applicants to negotiate an equitable Native Title Agreement (the Agreement) and Indigenous Archaeology and Cultural Heritage Management Plan. Under the terms of the Agreement, signed in 2004, Barrick has agreed to support the Wiradjuri community in the areas of environmental and cultural heritage, employment, training and education and business development. This includes annual contributions to the Wiradjuri Study Centre located in Condobolin.

THE DAVIES (Submission ID 73)	
Visual Impact	
<i>We have enclosed a photo of the view of the mine from our property. We as landholders used to have a view of the Lake Cowal now this is obstructed by a massive large wall and this will profoundly get worse, as this mine will extend its life as much as possible.</i>	An assessment of potential visual impacts associated with the modified CGM landforms was conducted for the Westlea dwelling and is presented in Section 4.8 of the EA. Figures 4-17a and 4-17b of the EA show the existing view from the Westlea dwelling, and visual simulations incorporating the modified CGM landforms over the life of the Modification. The photograph of the existing view from the Westlea dwelling was taken in consultation with the owner of the property. The visual assessment considered potential impacts from the Westlea dwelling, as viewer sensitivity at dwelling locations (i.e. the sensitivity to changes the visual landscape) is considered to be greater than at other locations in the broader setting (e.g. locations from which individuals travel or work) (Section 4.8 of the EA). The photo provided by the Davies in their submission does not appear to be taken from a location proximal to the Westlea dwelling. As described in Section 4.8 and shown on Figure 4-17a, views of the existing CGM from this residence are mostly obscured by intervening vegetation and undulating topography, and relate to a small proportion of the overall viewscape. The potential visual modification associated with the Modification would be confined to the upper batters of the southern waste rock emplacement during its progressive expansion and prior to its progressive rehabilitation. Given the low level of visual modification coupled with the moderate to high visual sensitivity at the “Westlea” dwelling, a moderate to low level of visual impact is expected (Section 4.8 of the EA). The level of visual impact would progressively reduce once vegetation cover begins to establish on the rehabilitated waste rock emplacements (Figure 4-17b of the EA).
Fire Management Methodology	
<i>As is noted in our enclosed letter we are concerned about the 4.5 kilometres of fire risk beside our property being Barrick’s Native Revegetation Area, with no fire management control methods in place and it would only take a mistake of one person travelling along the major thoroughfare or a lightning strike our homestead is in direct line of fire; and everyone has seen in the last few weeks the devastation that a fire can cause to our country and our livelihoods.</i>	Barrick implements fire risk management practices at the CGM (e.g. fire breaks) in accordance with the Bushfire Management Plan, as required in accordance with Condition 3.8 of the Development Consent. Furthermore, the continued presence of the CGM locally also ensures the continued presence of the Barrick Emergency Response Team and their fire fighting equipment. It should be noted that Barrick has previously conducted mutual aid operations in instances of fire (unrelated to the operation of the CGM) in the local district. The NSW Rural Fire Service has provided Barrick with recommendations (letter dated 6 November 2008) in regard to controlling fire risk at the CGM. The NSW Rural Fire Service described there is no real threat or hazard associated with the native revegetation area referred to in the Davies’ submission, with no further work required by the NSW Rural Fire Service. The existing fire risk management practices would continue for the Modification.
Noise	
<i>I have personally purchased a Digitech Sound Level Meter, Level range 30-130 dB with an accuracy or +/- 0.5 dB; Class 2. I calibrated this with a company SLR Clerance Terraz. On this monitor I have recorded readings above 42dB numerous times within the last six (6) months.</i>	Attended noise monitoring is conducted by SLR Consulting at the Westlea property in accordance with the existing Noise Management Plan, and in accordance with the requirements of Development Consent (DA 14/98). As described in the Noise and Blasting Impact Assessment, measured daytime, evening and night-time intrusive noise levels from the CGM for the period 2010 to 2013 were below the relevant residential receiver noise limits in the CGM Development Consent at all measurement locations, except at Westlea where the measured daytime (morning) intrusive mine levels were above the noise limit of 41 decibels (A-weighted) (dBA) by up to 2 dBA on two occasions and 1 dBA on two occasions. However, according to Section 11.1.3 of the INP, monitored noise levels within 2 dBA of the statutory noise limit would not generally be considered a non-compliance.

THE DAVIES (Submission ID 73)	
(Continued)	Furthermore, on both occasions the measured intrusive mine level of 43 dBA coincided with a wind speed of 4 m/s which is outside the INP assessable weather conditions for the CGM. As such, these monitored noise levels at Westlea above 41 dBA are not considered to represent non-compliances of the Development Consent noise limit for Westlea. Predictive noise modelling was conducted for the Modification to determine potential noise impacts at the Westlea dwelling (Appendix E to the EA). It was predicted that noise levels associated with the CGM incorporating the Modification would be approximately 2 dBA below the existing Development Consent (DA 14/98) noise limits at the Westlea dwelling (i.e. predicted noise levels for the Modification are lower than those predicted in previous assessment for the Westlea dwelling). Barrick does not question that the accuracy of the Davies' noise monitor, however, it should be noted that in accordance with the INP, the noise monitoring conducted by SLR Consulting at the Westlea property considers noise associated with the operational activities of the CGM only and does not consider background (i.e. non-mining related noise), and reports this noise on a $L_{Aeq,15minute}$ basis. It is unclear if the noise monitoring conducted by the Davies' considers background noise, or whether the monitored noise levels have been determined on a $L_{Aeq,15minute}$ basis.
<i>We have been monitoring machine movement over the last five (5) years to show that when noise monitoring periods eg January/July are scheduled for our property that the machinery is moved to the farthest point away from any noise monitoring sites. These records should be accessible in the Freedom of Information Act. Because it doesn't hold any threat of past information of machinery movements to the mining operation of Barrick Cowal.</i>	Barrick does not alter its operations to coincide with attended noise monitoring. Furthermore, Barrick has previously provided vehicle movement records to the EPA for the periods immediately prior to, during and after scheduled noise monitoring in July 2012 (which coincided with the construction of an embankment lift on the southern tailings storage facility). There was no indication that vehicles had been moved or decommissioned in the manner suggested by Mr Davies, and no further enquiries were received from the EPA. Barrick would continue to conduct attended noise monitoring at the Westlea property in accordance with the Noise Management Plan.
<i>We note once again that our home is the closest owner occupied residence to the mine site, being less than two (2) kilometres from the Cowal Gold Mine site. We have probably been more impacted from the Cowal Gold Mine than any other land holder.</i>	The CGM has operated such that Barrick has not been required to acquire the Westlea property upon request of the owners in accordance with the conditions of Development Consent (DA 14/98). Notwithstanding, in response to comments from the Davies (owners of the Westlea property) that they would consider selling their property, Barrick has previously entered into negotiations for the acquisition of the Westlea property (letter dated 24 September 2008) (despite Barrick not having a requirement to purchase the property). Barrick and the Davies obtained independent land valuations of the property, and based on these, a proposal for consideration was presented by Barrick. Acquisition of the property was not pursued by the Davies under the general terms proposed by Barrick. As described above, predicted noise levels for the Modification are lower than those predicted in previous assessment for the Westlea dwelling and a moderate to low level of visual impact is expected, with the level of visual impact expected to progressively reduce once vegetation cover begins to establish on the rehabilitated waste rock emplacements.

BRUCE DENT (Submission ID 71)	
Visual Character	
<i>Visual Character (CGM Extension Modification, Volume 1 Sec. 4.8)</i> <i>This section states that visual impact at Gumbelah is low. I disagree with this opinion. Photographs Fig.4.15a do not give a true indication of the actual view from the eastern side of the lake. I have included my own photographs which give a more realistic view of what we actually see.</i> <i>When the Northern & Southern waste emplacements reach maximum height they will most certainly impact on the view of the lake & surrounds including the view from Gumbelah. It is not only the height of the waste emplacements but also the fact that large machinery must travel up & down these mounds regularly. Intermittent noise & light has always been a problem & will remain so while ever plant & mining machinery is in operation.</i>	Figures 4-15a and 4-15b of the EA show the existing view from the Gumbelah dwelling, and visual simulations incorporating the modified CGM landforms over the life of the Modification. The photograph of the existing view from the Gumbelah dwelling (Figure 4-15a of the EA) was taken following consultation with the owner of the property. Figure 4-15a of the EA is representative of the existing view of the CGM and surrounding landscape from the Gumbelah dwelling, which is located more than 5 kilometres (km) from the eastern boundary of ML 1535. The photographs provided with the submission show the CGM, however, they do not show the landscape surrounding the CGM that is also visible from a distance of more than 5 km away. As described in Section 4.8 of the EA, potential visual impacts of the Modification were assessed by evaluating the level of visual modification associated with the development of the CGM (incorporating the Modification), in the context of the visual sensitivity of relevant surrounding land use areas from which the CGM (incorporating the Modification) may be visible. The Gumbelah dwelling is located more than 5 km from the eastern boundary of ML 1535, and accordingly, the visual sensitivity at the Gumbelah dwelling was assessed as low as distance is considered to attenuate visual impacts in accordance with the assessment methodology employed by the United States Department of Agriculture – Forestry Service (1974) and techniques employed by EDAW (2006) (Section 4.8.2 of the EA). The potential visual modification at the Gumbelah dwelling would occur as the heights of the northern and southern waste rock emplacements increase (i.e. above their currently approved heights), however, the visual modification in comparison to the existing viewscape (which includes the currently approved CGM) associated with the Modification is expected to be low. Given the low level of visual modification (i.e. in comparison to the existing viewscape, which includes the currently approved CGM) and the low visual sensitivity at the Gumbelah dwelling (i.e. due to the distance to the CGM), a low level of visual impact is expected.
Mine Rehabilitation	
<i>After Mine Closure takes place rehabilitation of the site will take several decades to have any effect.</i>	As detailed in Section 5.8 of the EA, upon the cessation of mining operations, tenure of ML 1535 would be maintained by Barrick until such a time when lease relinquishment criteria have been met and rehabilitation is to the satisfaction of relevant regulatory authorities including the DRE and the DP&I.
Noise	
<i>Noise mitigation is an option but will certainly create lifestyle changes & effectiveness is unknown until in place. Previously we have not needed to lock ourselves in our house with reverse cycle air conditioning, it is not the sort of thing people living in rural areas should need to do.</i>	A Noise Mitigation Deed with the owners of the Gumbelah dwelling was formally executed on 9 December 2013 in accordance with Development Consent Condition 6.4(f). The predicted noise level at the Gumbelah dwelling for the CGM incorporating the Modification is 36 dBA $L_{Aeq,15minute}$ under adverse weather conditions (i.e. G class temperature inversions). This is a marginal (i.e. 1 dB) exceedance of the project specific noise level of 35 dBA $L_{Aeq,15minute}$, and below the existing Development Consent (DA 14/98) noise level of 39 dBA $L_{Aeq,15minute}$ at this property. As shown in Appendix E to the EA, attended noise monitoring conducted at the Gumbelah dwelling between June 2010 and February 2013 indicates that noise from the CGM has been inaudible or below 30 dBA $L_{Aeq,15minute}$ during all monitoring periods, with the exception of May 2012 (where the CGM was audible and in compliance with Development Consent [DA 14/98] noise limits).

BRUCE DENT (Submission ID 71)	
Blasting	
<i>Although Blasting levels generally conform with approved Government standards, there has been a number of occasions when these standards have been exceeded causing concerns over structural damage.</i> <i>Coinciding with two excessive blasts, cracks appeared in a concrete floor which had withstood the test of time for some forty years, while several cracks also opened up in the ceiling of the house.</i>	A blast monitor (BM01) is located at the Gumbelah property to monitor potential blasting impacts from the CGM. As described in Appendix E of the EA, the <i>Cowal Gold Mine Independent Environmental Audit</i> (dated April 2013) summarises blast monitoring results for the period 2010 to 2013. It concluded that, based on the results of blast monitoring, blast overpressure and ground vibration levels were compliant with relevant residential receiver ground vibration and airblast limits. One blast overpressure level of 123 dBL (i.e. 3dBL above the 120dBL criteria) occurred on 5 July 2011 at monitoring site BM01 (located some 8.3 km from the blast). However, as a peak overpressure level of 107.5 dBL was recorded at the near field monitoring site BM05 (located some 1.1 km from the blast) it was concluded that the blast overpressure level of 123 dBL at BM01 was due to a localised anomaly associated with elevated background overpressure levels. Notwithstanding, Barrick has previously received complaints in regard to cracking at the Gumbelah dwelling and, despite the monitoring demonstrating compliance with Development Consent (DA 14/98) blast limits and the dwelling being located more than 2 km from the active mining area (refer to Development Consent Condition 6.3 [d]), Barrick arranged at its own cost for structural engineers to undertake a dilapidation survey at the property. The survey report found no connection between blasting activities at the CGM and the damage reported at the Gumbelah dwelling, rather the engineers suggested other potential causes of the reported cracking. The structural engineers report was provided to the Dents in 2012.
Property Acquisition	
<i>It is my submission that if the proposed extension is to go ahead, then all properties adjacent to or affected by CGM should be offered Acquisition on Request for their property.</i>	It is expected that privately-owned receivers predicted to be in the Noise Affection Zone for the CGM incorporating the Modification (i.e. predicted noise levels greater than 5 dB above the project specific noise level of 35 dBA $L_{Aeq,15minute}$) would be given the right to acquisition upon request in any modified Development Consent for the Modification.

BEILA WORDSWORTH (Submission ID 74)	
Visual Character	
<i>The increase in size and volume of the contaminated mine site. Some of the formations created by the proposed extension are to be over 300 metres high.</i> Northern Waste Rock stock pile 266 m AHD to 308 m AHD Southern Waste Rock stock pile 250 m AHD to 283 m AHD	The Modification has been designed to remain entirely within the existing ML 1535 and currently approved CGM water supply pipeline corridor. The Modification is seeking approval to increase the heights of the northern and southern waste rock emplacement to 308 and 283 m Australian Height Datum (AHD), respectively. Accordingly, potential impacts associated with the increased waste rock emplacement heights (e.g. potential visual impacts and potential noise/air quality propagation) are described and assessed in Section 4 of the Modification EA. The northern waste rock emplacement is proposed to reach an elevation of up to approximately 308 m AHD. The northern waste rock emplacement would not, however, be 300 m high in comparison to the surround landscape, as the natural surface elevation of the landscape immediately surrounding the northern waste rock emplacement is approximately 210 m AHD.
Groundwater and Surface Water	
<i>Increased risk to the Bland Creek Palaeochannel through aquifer collapse and subsidence and potential contamination from the toxic waste water in the pit. The voltaics and hydrology in and around the mine site are complex and variable and not fully understood. Words like “assumed” and “potential impacts” are used. Nothing is certain it would seem. Lack of modeling is commented upon in the Peer Review Section. When the lake is full or empty, when there are dry or wet times or a major rainfall event etc. modeling showing results would be helpful.</i>	As described in Section 4.1.2 of the EA, there would be no change to the existing daily or annual extraction limits for pumping of groundwater from the Bland Creek Palaeochannel, and no change to the existing Groundwater Contingency Strategy (i.e. agreed trigger levels) for the ongoing management of groundwater use in the Bland Creek Palaeochannel. Accordingly, Coffey Geotechnics (2013) predicted that the Modification would not result in additional impacts to other groundwater users or to groundwater quality in the Bland Creek Palaeochannel. The Bland Creek Palaeochannel is hydraulically separated from the CGM open pit, and as such, groundwater inflow to the open pit from the saline aquifers surrounding the CGM would not impact the Blank Creek Palaeochannel. The groundwater modelling conducted for the Modification considers both lake-full and lake-empty conditions, and the groundwater modelling results for both these scenarios are described and presented in Appendix A to the EA. Historic rainfall records over the period 1976 to 2003 were used to determine a representative groundwater recharge rate associated with rainfall.
<i>Increased use of water from all sources including BCPB. “Barrick would therefore seek to remove the 30,000 ML life of mine extraction limit as part of the modification. Barrick has been given approval for another dam to hold approximately 1,500 ML. of water. It certainly looks like a “water grab”.</i>	As detailed in Section 3.8 of the EA, the Modification would not change existing annual water supply requirements, or sources of internal and external water supply for the approved CGM. It is noted in Section 3 of the EA and there would be no change to the approved daily and annual extraction limits for the Bland Creek Palaeochannel Borefield. Some additional water supply infrastructure would be required for the Modification (i.e. the 1,500 megalitre [ML] capacity D10 dam) to improve the CGM's water security while maintaining the approved annual and daily extraction limits of the existing external water supply sources (Section 3.8 of the EA). In addition, there would be no change to the existing Groundwater Contingency Strategy (i.e. agreed trigger levels) for the ongoing management of groundwater use in the Bland Creek Palaeochannel. The NSW Office of Water (NOW) in its submission for the Modification (refer to Part 3 of this Responses to Submissions document) stated: <i>Management of extraction from the Bland Ck Paleochannel borefield is currently administered by licences and approvals under the Water Management Act 2000 and a Groundwater Contingency Strategy within the existing Site Water Management Plan. These set a combination of daily and annual extraction limits in addition to trigger levels for the implementation of contingency measures to manage impacts on existing water users. The NSW Office of Water considers these arrangements are adequate to manage the extraction from the Bland Creek Palaeochannel.</i>

BEILA WORDSWORTH (Submission ID 74)	
<i>The Up-catchment Diversion System was designed to put water into Lake Cowal, not to be used as a drain for the mine's operation.</i>	As detailed in Section 2.7.2 of the EA, the Up-catchment Diversion System (UCDS) conveys upper catchment surface runoff around the western edge of the CGM and into the existing drainage line to the north and south of the CGM. As detailed in Section 2.7.3 of the EA, the function of the Internal Catchment Drainage System (ICDS) is to separate surface runoff external to the CGM from contained waters generated within the CGM disturbance area. Section 3.7 of the EA describes that the UCDS would continue to divert up-catchment runoff around the CGM and the ICDS would continue to control runoff from within the active mining areas, for the life of the Modification.
<i>The water in Lake Cowal as at 1996 was considered good quality. What has happened in the meantime?</i>	Data collected prior to the commencement of the CGM, and during mining operations (i.e. during the recent lake-fill event) analysed by Gilbert & Associates (2013) supports that there is no evidence that the existing CGM has resulted in changes to water quality in Lake Cowal. The Modification would not change the existing lake isolation system, or design objectives of the ICDS and UCDS. The soil stockpile located in the north of ML 1535 would have a dedicated sediment control system, designed in accordance with Landcom (2004) and DECC (2008) (Appendix B of the EA). The continuation of existing surface water management measures and the additional management measures proposed for the Modification would continue to minimise potential impacts to surface water quality (i.e. no additional impacts to surface water quality are predicted due to the Modification) (Appendix B to the EA).
<i>The pit is to reach its maximum depth in December, 2020 if the modification is approved. It will have a depth of approximately 470m from the natural surface, an increase of approximately 80 m from the present proposed depth. There does not seem to be much information on how this increased depth will affect the hydrogeology in relation to the Bland Creek Palaeochannel. Could it be that the known information is uncertain?</i>	The location of the Bland Creek Palaeochannel (Lachlan Formation) with respect to the CGM open pit and Lake Cowal is shown on Figure 4-2 of the EA. As shown, the Bland Creek Palaeochannel (Lachlan Formation) does not extend beneath the Project area. Coffey Geotechnics (2013) developed a numerical groundwater model to assess the potential impacts associated with the extended CGM open pit proposed for the Modification. No additional impacts to groundwater users, groundwater dependent ecosystems, Lake Cowal or the Bland Creek Palaeochannel were predicted by Coffey Geotechnics (2013) due to the extended CGM open pit proposed for the Modification. Section 4.1.3 of the EA describes that, in response to Coffey Geotechnics' (2013) recommendation, ongoing groundwater monitoring would be conducted by Barrick for the Modification to validate the results of the predictive groundwater modelling.
Rehabilitation and Mine Closure	
<i>The problem of rehabilitation because of the lack of topsoil in which seeds could grow. Also the fact that so much gypsum (because of the Caton effect) has to be used to make the soil viable. Direct seeding from all accounts (see Peer Review) has been only marginally successful as a planting option. Approximately 1,200 ha of disturbed area (including endangered tree species) are to be offset. An adequate watering regime would be essential for at least the first year of planting if the vegetation is to survive. How will this be achieved on the bund etc.?</i>	The Rehabilitation Proposal prepared for the Modification (Appendix I of the EA) provides a detailed description of the rehabilitation undertaken at the CGM to date, including results of rehabilitation investigations and field trials on various CGM landforms. As described in Appendix I of the EA, stockpiled soil resources at the CGM are typically sodic and dispersive and therefore require treatment with gypsum to improve the soil structure and suitability for plant growth. Various methods for treating or ameliorating soil at the CGM have been recommended by McKenzie Soil Management (2013), including treating soil stockpiles with gypsum.

BEILA WORDSWORTH (Submission ID 74)	
(Continued)	In regard to the proposed treatment of sodic soils, the DRE in its submission to the Modification (refer to Part 3 of this Responses to Submissions document) states: <i>...there are constraints associated with sub soil sodicity. These constraints are recognised in the EA and adequate ameliorative measures have been incorporated into the project.</i> Rehabilitation performance indicators and completion criteria have been developed (based on monitoring data obtained from relevant reference sites) to assess rehabilitation performance at the approved CGM, and these performance indicators and completion criteria would apply to the Modification. The performance indicators and completion criteria have been based on landform establishment, growth medium development and ecosystem establishment, development and sustainability. As described in Section 5.7 of the EA, rehabilitation performance for the Modification would only be considered satisfactory when monitoring data indicates the completion criteria have been met. Dr David Freudenberger of ANU Edge concluded in his peer review, that the Rehabilitation Proposal for the Modification is a scientifically sound document to guide the long-term rehabilitation of the enlarged mine.
<i>The risk to the environment may not show up for years. Barrick will be long gone and the people of NSW (or maybe the Shires of Bland and Forbes) will be left with the bill. A bond of 4 million dollars may not be adequate for rehabilitation purposes. Will we have another Gladstone Harbour contamination to deal with? The Yabbie incident of 2013 may only be the first of many unusual happenings.</i>	Section 5.8 of the EA describes mine closure and lease relinquishment. Upon the cessation of mining operations, tenure of ML 1535 would be maintained by Barrick until such a time when lease relinquishment criteria have been met and rehabilitation is to the satisfaction of relevant regulatory authorities including the DRE and the DP&I. A closure security bond for the CGM significantly in excess of \$4 million is currently held by the DRE, and the value of this bond would be reviewed and updated as required for the Modification. In accordance with Barrick internal requirements and standards, a Mine Closure Plan would be developed to reflect the Modification and would include proposed mine closure concepts and decommissioning management measures. Mine closure concepts and management measures would continue to be developed via the Mining, Rehabilitation and Environmental Management Plan in consultation with the DRE and other relevant regulatory agencies. The DPI (Fisheries) and the EPA recently investigated concerns of yabby illness in Lake Cowal. Barrick has not been party to these investigations other than receiving advice from representatives of the DPI (Fisheries) and the EPA that yabby illness was not related to the activities of the CGM.
<i>Thanks to a careless camper the lignum on which the Ibis rely on for breeding habitat has been ¾ destroyed by fire. Has any attempt been made to restore the lignum?</i>	It is noted that this comment does not relate to the Modification, and that the fire referred to did not occur at the CGM or on Barrick-owned land. Notwithstanding, as detailed in Section 5.2 of the EA, areas currently under rehabilitation with seeding of species such as Lignum at the CGM include the Temporary Isolation Bund and the Lake Protection Bund. Monitoring results from the lake foreshore trial area sites indicate that planting of Lignum from tubestock and cuttings has been successful with an increase in Lignum succession in recent years with higher rainfall (Section 5.3.3 of the EA).

BEILA WORDSWORTH (Submission ID 74)	
Community Consultation	
<i>The CEMCC by which means the public are to be informed of the environmental happenings at the mine site. The minutes of these meetings are so bland that they may as well not exist.</i>	The Community Environmental Monitoring and Consultative Committee (CEMCC) was established in accordance with Condition 8.7 of the CGM Development Consent (DA 14/98). Following review of the minutes by the CEMCC committee members, they are made publicly available, in accordance with Condition 8.7(ii) of the Development Consent (DA 14/98). During the CEMCC meeting held on 4 December 2013, this comment was considered by CEMCC members (without attribution to Ms Wordsworth). CEMCC members determined that the Minutes in their current format meet the needs of the committee and the relevant statutory requirements, however, it was also agreed that copies of presentation provided by Barrick would be attached to future meeting minutes in an effort to provide further information for interested parties.
<i>The Memorandum of Understanding. Under this agreement certain green groups receive royalties from the mining operation. The Lake Cowal Foundation has been set up as a result of this agreement. When I rang the number given to me by the Parks and Wildlife Office for the Lake Cowal Foundation the telephone was answered by Barrick's Cowal Operational Mine Site. Two education officers are employed by the Lake Cowal Foundation to "educate" school children about the mine and its effects on the environment. "What are they told?"</i>	As detailed in Section 1.5 of the EA, the Lake Cowal Foundation (LCF) was established as a non-profit, independent Environmental Trust in June 2000 and continues to be supported both financially and in-kind by the CGM. Contact details for the LCF are provided at: www.lakecowalfoundation.org.au The Lake Cowal Conservation Centre (LCCC) was established in 2006 through a licence agreement between the LCF, the NSW Department of Education and Training, the Lachlan CMA and Barrick. The LCCC is located on a Barrick-owned property immediately south of ML 1535 and was established to provide a community learning centre for school students, landholders and community members to learn about and experience issues associated with landscape management. The LCCC education officers are employed by the West Wyalong Public School, through an agreement between the school the Lachlan Catchment Management Authority and the LCF. Courses offered by the LCCC to school groups are listed at: http://www.lakecowalfoundation.org.au/index.cfm?objectid=CDC9AB45-1708-51EB-A6AD51FEAF60ACA8
Greenhouse Gas Emissions	
<i>North Ltd, in its submission in reply to the second EIS 1996 stated "It is estimated that the amount of CO₂ produced will be approximately 108,000 tonnes of CO₂ per annum". The new pumping station will add greatly to this figure.</i>	As described in Appendix F to the EA, annual scope 1, 2 and 3 GHG emissions associate with the CGM incorporating the Modification are expected to be up to approximately 318,499 tonnes of carbon dioxide equivalent (t CO₂-e). Diesel consumption at the eastern pump station is expected to contribute GHG emissions of approximately 1,682 t CO₂-e per annum during its operation.

NSW INLAND COMMERCIAL FISHERMAN'S ASSOCIATION, COLIN ARMSTRONG, JOHN ALEXANDER, STEVEN ALEXANDER AND SCOTT ALEXANDER (Submissions ID 75, 76, 77, 78, 79, 80)	
Access to Lake Cowal	
Comments in regard to access to Lake Cowal.	The extent of ML 1535 is shown on Figure 1-3 of the EA, and includes a portion of Lake Cowal when inundated. In accordance with the NSW <i>Work Health and Safety Act, 2011</i> and the conditions of ML 1535, Barrick is responsible for the safety of all persons within the lease area. To ensure this, and in accordance with the NSW <i>Mining Act, 1992</i> Barrick restricts access to ML 1535 by fencing the ML 1535 area, or clearly marking the ML 1535 boundary in the inundated area of Lake Cowal with yellow buoys. It should be noted that the inundated areas of Lake Cowal within ML 1535 are proximal to active mining exploration areas. The Modification would not change the extent of ML 1535, and would not change the existing surface development extent of the CGM within Lake Cowal.
Dust, Noise, Blasting and Lighting Impacts	
Comments in regard to potential impacts associated with dust, noise, blasting and lighting to fishers at Lake Cowal.	Potential impacts associated with dust, noise, blasting and lighting at relevant receiver locations were assessed in the Modification EA. In summary: • PEL (2013) considers that it is unlikely that the CGM's contribution to potential cumulative air quality impacts would increase due to the Modification (Appendix F to the EA). Management and mitigation measures are currently implemented at the CGM to minimise potential dust emissions, and these measures would continue for the Modification. • No increase in currently approved noise levels is predicted due to the Modification (Appendix E to the EA). Existing noise monitoring and management measures at the CGM would continue to be implemented for the Modification. • The typical blast design and the average blasting frequency for the existing CGM operations would remain unchanged for the Modification, and the location of blasts would not materially, and therefore, it is predicted that blasting could continue to occur at the CGM for the Modification in compliance with relevant blast overpressure and vibration criteria (Appendix E to the EA). Blasting is conducted in accordance with the requirements of Development Consent (DA 14/98), and would continue to generally occur within the hours of 9.00 am to 5.00 pm Monday to Saturday and be limited to one blast event per day for the Modification. • The intensity of night-lighting for the Modification would be similar to the existing CGM night-lighting, and the existing mitigation measures relevant to night-lighting implemented at the CGM (e.g. unidirectional lighting and light shields) would continue for the Modification. Therefore, it is expected that potential night-lighting impacts would be similar to those associated with the approved CGM (Section 4.8.2 of the EA).

NSW INLAND COMMERCIAL FISHERMAN'S ASSOCIATION, COLIN ARMSTRONG, JOHN ALEXANDER, STEVEN ALEXANDER AND SCOTT ALEXANDER (Submissions ID 75, 76, 77, 78, 79, 80)	
Water Resources and Aquatic Ecology	
Comments in regard to potential impacts to Lake Cowal and water resources, water quality monitoring results and the CGM water supply.	Lake Cowal is hydraulically separated from the underlying aquifers and the CGM open pit by the very low permeability of the clay pan deposits that form the lake bed. The extension to the CGM open pit associated with the Modification would not change the existing distance between Lake Cowal and the open pit void (i.e. the pit would be extended away from Lake Cowal), and therefore, would not change the existing hydraulic separation between the CGM open pit and the lake (Appendix A to the EA). In addition, the final void is predicted to continue to act as a localised groundwater sink in the long-term (i.e. water would flow to the final void, and would not flow out of the final void to the surrounding aquifers) (Appendix A to the EA). A long-term final void water balance was conducted for the Modification, with the water level in the final void predicted to reach equilibrium in the long-term some 22 to 24 m below the original groundwater level, and was not predicted to spill under any climatic scenario (Appendix B to the EA). A summary of water quality monitoring data collected in Lake Cowal is provided in Appendix B to the EA. Water quality and sediment monitoring in Lake Cowal is collected in accordance with the existing Surface Water, Groundwater, Meteorological and Biological Monitoring Programme. Results of this monitoring are reported in Barrick's Annual Environment Management Reports, and this would continue for the Modification. An analysis of water quality monitoring data was conducted for the Hydrological Assessment prepared for the Modification (Appendix B to the EA). It was concluded that the data supports that there is no evidence that the existing CGM has resulted in changes to water quality in Lake Cowal (Appendix B). In addition, no impacts to surface water quality are predicted due to the Modification, given the Modification would not change the existing lake isolation system or design objectives of the ICDS and UCDS, and the soil stockpile located in the north of ML 1535 would have a dedicated sediment control system, designed in accordance with Landcom (2004) and DECC (2008) (Appendix B of the EA). As described in Section 3.8 of the EA, the Modification would not change existing annual water supply requirements or sources of internal and external water supply for the approved CGM. In addition, there would be no change to the existing daily or annual licensed extraction limits from the currently approved external water supply sources (i.e. the Bland Creek Palaeochannel Borefield, Eastern Saline Borefield and the Lachlan River).
Comments in regard to potential impacts to yabbies in Lake Cowal.	The DPI (Fisheries) and the EPA investigated concerns of yabby illness in Lake Cowal. Barrick has not been party to these investigations other than receiving advice from representatives of the DPI (Fisheries) and the EPA that yabby illness was not related to the activities of the CGM. For further information regarding this matter, it is suggested that enquiries are directed to the DPI (Fisheries) and the EPA.
Consultation prior to the Original Approval of the CGM	
<i>We wish to lodge a formal complaint against Barrick Gold for not giving fishers the opportunity to comment before the initial start of the project...</i>	It is noted that this comment is not relevant to the Modification. Notwithstanding, public notification and consultation for the CGM occurred during the preparation and assessment of the CGM Environmental Impact Statement (EIS) (North Limited, 1998) and provided the opportunity for members of the public to make submissions in regard to the CGM prior to its approval. In addition, public consultation occurred during the commission of inquiry held for the CGM in late 1998 and early 1999.

ANDREW BUTTENSHAW (Submission ID 6)	
Comments	
• Maintaining employment in a country area • Increased income for state/federal programs ... <i>As someone living with a mining operation in my backyard, I will continue to support the mine for as long as it continues to support our community.</i>	Comments noted.
Dust and Noise	
<i>Dust, not from the mine, but from the extra traffic on the road as it is a designated access to the mine from Condobolin and Forbes.</i> ... <i>What about the residences around the access roads at Lake Cowal and the affect noise and dust from the roads has on them?</i>	The Modification would not change the currently approved use of the CGM access route that passes the Coniston property (i.e. no change to the currently approved annual or daily volumes of CGM-generated traffic or location of the access route). As described in Appendix F to the EA, a dust deposition gauge (DG1) and high volume air sampler (HVAS) are located at the Coniston property (owned by Mr Buttenshaw). No exceedances of the annual average criteria for dust deposition, TSP concentrations or PM₁₀ concentrations have been identified at these monitoring locations. Notwithstanding, Barrick has undertaken periodic spraying on the road near the Coniston property using a dust suppressant (i.e. Petrotac) in a voluntary effort in agreement of the Bland Shire Council to control dust on this public road. An assessment of potential road traffic noise impacts is presented in Appendix E to the EA for the closest receivers to the primary access route to the CGM (i.e. from West Wyalong), which is used by approximately 76% of Barrick employees and contractors and all CGM-related heavy vehicles. The assessment indicated that the closest receivers to the primary access route would comply with the relevant road traffic noise criteria in the NSW Road Noise Policy, and that relevant criteria would be met at an offset distance of 23 m from the road (Appendix E to the EA). It is noted that the Coniston dwelling is located significantly further than 23 m from Lake Cowal Road.
Night-lighting	
<i>As the mine goes up so do the lights which are now above the trees.</i>	As described in Section 4.8 of the EA, the Modification would change the elevation and location of existing CGM night-lighting due to the expansion of the waste rock emplacements, low grade ore stockpile and tailings storage facilities. The intensity of night-lighting for the Modification would be similar to the existing CGM night-lighting, and the existing mitigation measures relevant to night-lighting implemented at the CGM (e.g. unidirectional lighting and light shields) (Section 4.8.1) would continue for the Modification. Therefore, it is expected that potential night-lighting impacts would be similar to those associated with the approved CGM.

ANDREW BUTTENSHAW (Submission ID 6)	
Fire Risk	
<i>There is a concern amongst local landholders that the locking up of the offset areas and other country owned by Barrick has increased the fire risk in the area. It is all very well to be trained and equipped but prevention is better than cure.</i>	Barrick implements fire risk management practices at the CGM (e.g. fire breaks) in accordance with the Bushfire Management Plan, as required in accordance with Condition 3.8 of the Development Consent. These fire risk management practices would continue for the Modification. Furthermore, the continued presence of the CGM locally also ensures the continued presence of the Barrick Emergency Response Team and their fire fighting equipment. It should be noted that Barrick has previously conducted mutual aid operations in instances of fire (unrelated to the operation of the CGM) in the local district. Continued bushfire management practices would be a condition of the land security placed over the CGM offset areas (i.e. any future owners of the land associated with the offset areas would be required to continue implementing bushfire management practices as a condition of tenure).
Final Landforms and Landuse	
<i>The end of mining will see a big void left and several conservation areas and offsets. I have concerns as to who will maintain these areas (fencing, feral animals, etc) and whether there is a chance that the increase in the pit will reduce the distance between the Lake and the void, thus allowing salt water seepage to reach the Lake over time.</i>	As detailed in Section 5.8 of the EA, upon the cessation of mining operations, tenure of ML 1535 would be maintained by Barrick until such a time when lease relinquishment criteria have been met and rehabilitation is to the satisfaction of relevant regulatory authorities including the DRE and the DP&I. The extension to the CGM open pit associated with the Modification would not change the existing distance between Lake Cowal and the open pit void (i.e. the pit would be extended away from Lake Cowal). In addition, the final void is predicted to continue to act as a groundwater sink in the long-term (i.e. groundwater would flow to the final void, not out of the final void) (Appendix A to the EA). A long-term final void water balance was conducted for the Modification, with the water level in the final void predicted to reach equilibrium in the long-term some 22 to 24 m below the original groundwater level, and was not predicted to spill under any climatic scenario (Appendix B to the EA).
<i>I am also concerned as to how much valuable agricultural land is being tied up in the whole process. How much of the 25,000 acres that Barrick now owns will be returned to valued agricultural production?</i>	As described in Section 5.3 of the EA, at lease relinquishment, it is proposed that land use within the former ML 1535 area would include fenced conservation areas to conserve and enhance wildlife values and would include areas suitable for agricultural production including commercial and recreational fishing of lake areas or managed grazing by livestock. While the land outside the former ML 1535 area (with the exception of Compensatory Wetland and Northern and Southern Offset Areas) is Barrick-owned, it would continue to be used for farming/agricultural production by Barrick and/or licensees that sign agreements to conduct agricultural activities on Barrick-owned land. Should Barrick sell this land, the land use would be determined by the new land owner. It should be noted that, as described in Section 5.3 of the EA, long-term land uses would ultimately be subject to consultation with relevant regulatory authorities and key stakeholders including surrounding landholders.

ANDREW BUTTENSHAW (Submission ID 6)	
<i>The sight of the dumps is not attractive and overtakes the landscape. Whenever we travel to town on the Lake Cowal road we are confronted by a great wall of dirt and whenever we drive around our property we observe the large area taken up by the mine. Every time there is a modification the wall goes higher and is compared to one of the surrounding hills. There are not many higher hills left to compare.</i>	An assessment of potential visual impacts associated with the CGM incorporating the Modification is provided in Section 4.8 of the EA, including from the Coniston dwelling and public roads/laneway in the vicinity of the Coniston property. As described in Section 5.3.3 of the EA, the currently approved final landform design concepts would remain unchanged for the Modification and would be applied to the modified landforms which would result from the Modification (i.e. the expanded open pit and modified waste rock emplacements and tailings storage facilities). The final landforms for the CGM incorporating the Modification would be: • designed wherever possible to be compatible with regional landscape features; • revegetated with endemic vegetation communities, selected specifically for their suitability to the created elevation, substrate conditions and the overriding objective of re-establishing a greater extent of endemic vegetation within ML 1535. The increased final heights of the northern and southern waste rock emplacements (308 and 283 m AHD, respectively) would remain below the vegetated ridgeline to the west and other regional topographic features such as Billys Lookout (368 m AHD) and Wamboyne Mountain (412 m AHD). The Modification would not involve a change to the area or height of the perimeter waste rock emplacement. Figure 5-3 of the EA shows a conceptual view of the elevation of the modified northern and southern waste rock emplacements within the wider landscape surrounding the CGM incorporating the Modification.

3 PART B – RESPONSES TO GOVERNMENT AGENCY AND COUNCIL SUBMISSIONS

Table B-1 provides the reconciliation of the submissions received from government agencies and councils for the Modification. Responses to these submissions are provided in Table B-2.

Table B-1
Reconciliation of Submissions from Government Agencies and Councils

Submission ID No.	Agency/Council Name
81	NSW Office of Water
82	NSW Office of Environment and Heritage
83	NSW Environmental Protection Authority
84	NSW Department of Resources and Energy
85	NSW Transport - Roads and Maritime Services
86	Fisheries NSW
87	Crown Lands
88	Office of Agricultural Sustainability and Food Security
89	Bland Shire Council
90	Forbes Shire Council
91	Lachlan Shire Council

Table B-2
Response to Submissions from Councils and Government Agencies

NSW OFFICE OF WATER (Submission ID 81)	
Groundwater Licensing	
<i>The project proposes no increase in water demand hence no changes are proposed to the current water sources or volumes required. The assessment however has indicated an increase in groundwater inflows to the open pit from the current 182 ML/yr to a maximum of 252 ML/yr. This will require adequate licensing within the relevant water sources to account for the water take. The proponent is in discussions with the NSW Office of Water to consider the ability of their current licence entitlements to account for this increase.</i>	As noted by the NOW, and as described in Attachment 5 to the EA, Barrick is currently in the process of obtaining the necessary water licences to account for the portion of groundwater inflow to the open pit from the Lachlan Fold Belt Murray Darling Basin Groundwater Source in accordance with the requirements of the <i>Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources, 2011</i>. Advice provided by the NOW (letter dated 7 January 2014) was that the existing Water Access Licence (WAL) 31904 held by Barrick would be reallocated to separate WALs for both the <i>Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources, 2011</i> and <i>Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources, 2012</i> according to the predicted proportions of groundwater inflow to the CGM open pit from the fractured rock and alluvial systems, respectively, consistent with the predictions in Appendix A to the EA. Barrick currently holds sufficient water licences to account for the portion of predicted groundwater inflow to the open pit from the Upper Lachlan Alluvial Zone 7 Management Zone (i.e. 280 ML/annum), as per the requirements of the <i>Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources, 2012</i>.
Groundwater Quality	
<i>The Environmental Assessment has adequately addressed the Aquifer Interference Policy minimal impact considerations with respect to the Lachlan Fold Belt Water Source.</i>	Comment noted.
<i>Additional information is requested in support of predicted impacts to the water quality of the Upper Lachlan Alluvial Water Source.</i> ... <i>To substantiate that the beneficial use category at the site will not be lowered by the proposal it is necessary to review:</i> a) <i>what water quality analytes were tested in which localities at the site, and</i> b) <i>graphical presentation of historical select analyte concentration change with time at the site (including at a minimum TDS, As, CN, Pb, and Zn) from bores located in vicinity of existing open pits/underground workings and existing/proposed tailings facilities.</i>	There is currently no beneficial use of the saline alluvial aquifers surrounding the CGM, as there are no other known users of these aquifers other than Barrick, and no groundwater dependent ecosystems, connected rivers or surface water bodies that would interact with the groundwater system in the vicinity of the CGM have been identified (Appendix A to the EA). Accordingly, there would be no change in the beneficial use of this groundwater due to the Modification (i.e. Barrick would continue to be the only known user of the saline alluvial aquifers surrounding the CGM). Based on the above, the additional information requested by the NOW is not considered to be required.

NSW OFFICE OF WATER (Submission ID 81)	
Bland Creek Palaeochannel Extraction Limit	
<i>The continued use of the Bland Creek Paleochannel borefield (BCPB) and eastern saline borefield (ESB) during the life of the Cowal Gold Mine extension modification is not predicted to result in additional groundwater pressure head impacts in the Bland Creek Paleochannel.</i> <i>Extraction is currently administered by existing approvals and licences under the Water Management Act 2000 and a Groundwater Contingency Strategy in the Cowal Gold Mine Site Water Management Plan. These set a combination of daily and annual extraction limits in addition to trigger levels for the implementation of contingency measures to manage impacts on existing water users.</i> <i>The NSW Office of Water considers these arrangements are adequate to manage the extraction from the Bland Creek Paleochannel.</i>	Comment noted. The existing Groundwater Contingency Strategy for the Bland Creek Palaeochannel would continue to be implemented for the Modification to manage groundwater extraction from the Bland Creek Palaeochannel Borefield (Section 4.1.3 of the EA).
Groundwater Modelling	
<i>Storage coefficient sensitivity analysis was not conducted for the site model.</i>	Coffey Geotechnics reviewed the effect on model outputs (i.e. pit inflows and groundwater drawdown) due to changes in the modelled storage coefficients during calibration of the mine site model. The calibration demonstrated that model outputs were significantly less sensitive to variation in specific storage than to variation in hydraulic conductivity. Therefore, horizontal and vertical hydraulic conductivity were considered in the mine site model sensitivity assessment for the Modification, which found (Appendix A of the EA): • The extent of groundwater drawdown in the hydrogeological units increases, and drawdown associated with ML1535 saline supply borefield increases, however, drawdown greater than 2 m would remain within ML 1535. • Groundwater inflows to the open pit of up to 670 cubic metres per day (m³/day) and 740 m³/day are predicted between 2013 and mine closure for, respectively, the increased vertical hydraulic conductivity simulation and the increased horizontal hydraulic conductivity simulation (compared to 600 m³/day for the basecase). The effect of varying the storage coefficient would result in less variation in predicted groundwater inflows and drawdown (i.e. in comparison to the basecase) than the variation associated with the changes to horizontal and vertical hydraulic conductivity presented in Appendix A to the EA. Actual groundwater inflows to the open pit would continue to be monitored by monitoring of pumping rates from the in-pit sumps and monitoring of water extraction from vertical de-watering bores. In addition, based on the recommendations of Coffey Geotechnics (2013), Barrick would continue groundwater monitoring within ML1535 to validate the results of the predictive groundwater modelling conducted for the Modification (Section 4.1.3 of the EA).

NSW OFFICE OF WATER (Submission ID 81)	
Although the review found the models to be Class 3 with some elements of Class 2, and deemed fit-for purpose, several model deficiencies can be drawn from the review: • A statistical measure of fit for calibration of the mine site model was not included. • Predictive uncertainty has not been quantified for both models, and is addressed by way of general comments only. The mine site model does not provide a robust representation of the calibration results to understand whether it is sufficiently calibrated.	<u>Calibration Statistics – Mine Site Groundwater Model</u> Additional analysis of the mine site groundwater model calibration statistics has been undertaken by Coffey Geotechnics, and is provided as Attachment A to this Responses to Submissions document. Two critical periods of the transient calibration were selected for statistical analysis: • May 2010 – prior to Lake Cowal becoming inundated; and • December 2012 – the end of the transient calibration period. The Scaled Mean Sum of Residuals (SMSR) for the May 2010 results is 5.3% and the SMSR for the December 2012 results is 4.9%, and therefore, Coffey Geotechnics consider that the mine site groundwater model meets the Australian Groundwater Modelling Guidelines recommended SMSR requirement. <u>Predictive Uncertainty – Mine Site Model</u> The model sensitivity analysis presented in Section 5.4.2.5 of Appendix A of the EA quantifies the uncertainty associated with varying key aquifer parameters for the predictive groundwater modelling. Two sensitivity scenarios were simulated, as follows (Appendix A of the EA): • Increasing the vertical hydraulic conductivity of all units by a factor of two. This potentially increases the vertical leakage of groundwater from Lake Cowal, thereby providing an indication of the sensitivity of assessment of impacts on Lake Cowal. • Increasing the horizontal hydraulic conductivity of all units by a factor of two. This results in increased inflows to the open pit and groundwater drawdown, providing an indication of the sensitivity of assessment of impacts on groundwater levels. As described above, groundwater inflows to the open pit of up to 670 m³/day and 740 m³/day are predicted between 2013 and mine closure for, respectively, the increased vertical hydraulic conductivity simulation and the increased horizontal hydraulic conductivity simulation (compared to 600 m³/day for the basecase), and increased drawdown was predicted (compared to the basecase) however drawdown greater than 2 m would remain within ML 1535 (Appendix A of the EA). Actual groundwater inflows to the open pit would continue to be monitored for the Modification by monitoring of pumping rates from the in-pit sumps and monitoring of water extraction from vertical de-watering bores. Based on the recommendations of Coffey Geotechnics (2013), Barrick would continue groundwater monitoring within ML1535 to validate the results of the predictive groundwater modelling conducted for the Modification (Section 4.1.3 of the EA). <u>Predictive Uncertainty – Bland Creek Palaeochannel Groundwater Model</u> The model sensitivity analysis presented in Section 7.1.3 of Appendix A of the EA quantifies the uncertainty associated with varying key aquifer parameters for the predictive groundwater modelling. The sensitivity of modelled groundwater levels to changes in key aquifer parameters was compared to modelled water levels (at groundwater monitoring bores GW036553, GW036597, and GW036611) for the following scenarios (Appendix A of the EA): • vertical conductivity (Kv) of the Lower Cowra Formation 10% lower than the calibrated value;

NSW OFFICE OF WATER (Submission ID 81)	
(Continued)	- horizontal conductivity (Kh) of the Lachlan Formation 10% lower than the calibrated value; - specific storage of the Lachlan Formation 10% lower than the calibrated value; and - private pumping in the Lachlan Formation 10% higher than values used for the calibration period (based on available records). The drawdown at the trigger bores is most sensitive to Kv of the Lower Cowra Formation, and to pumping. The GW036553 water level is also sensitive to the Kh of the Lachlan Formation. Under the perturbations used above, the model predicts that the maximum drawdown at the trigger bores varies within a range of approximately 7 m of drawdown or less. Actual groundwater levels in the Bland Creek Palaeochannel would continue to be managed in accordance with the existing Groundwater Contingency Strategy, which involves the continuous monitoring of groundwater levels, and the implementation of response measures should groundwater levels reach trigger levels developed in consultation with the NOW and other groundwater users (Section 4.1.1 of the EA). The effectiveness of the Groundwater Contingency Strategy to meet the trigger levels is shown on Figure 4-4 of the EA. As noted by the NOW in its submission for the Modification, these arrangements are considered to be adequate to manage the extraction from the Bland Creek Paleochannel. In addition to the above, based on the recommendations of Coffey Geotechnics (2013), Barrick would continue groundwater monitoring within Bland Creek Palaeochannel to validate the results of the predictive groundwater modelling conducted for the Modification (Section 4.1.3 of the EA).
<i>A detailed summary of modelled outputs to confirm the volumes of take [associated with groundwater inflow to the CGM open pit] from each water source is requested.</i>	A detailed summary of modelled outputs is provided in Attachment A to this Responses to Submissions document.
Surface Water	
<i>Section 4.2.2 of the main EA indicates the potential for the proposed access road to the eastern pump station to have potential impacts on flood waters. Due to insufficient information there is uncertainty as to whether this road will require a Part 8 approval under the Water Act 1912 and the ability to mitigate potential impacts. It is therefore recommended a conceptual plan be provided with an assessment of potential impacts prior to determination of the project.</i>	As stated in Appendix B to the EA, the proposed access road would be designed to provide “all weather” access to the pumping station, and this would involve construction of a road formation elevated over low lying sections. The construction of the access road has the potential modify overland flow patterns, however, these potential impacts would be mitigated by incorporating effective culvert crossing in low areas where the road formation is elevated relative to the surrounding natural ground surface such that overland flow is not restricted (Appendix B to the EA). Detailed design for the access road is yet to be finalised. Barrick does not consider that provision of a detailed design of the access road is required prior to determination of the Modification. Notwithstanding, Barrick would provide a detailed design of the access road to the NOW once available. Notwithstanding that the access road would be designed to mitigate potential impacts to overland flow, Barrick would apply for a Part 8 approval under the Water Act, 1912 for the access road if required.

NSW OFFICE OF WATER (Submission ID 81)	
<i>... the final rehabilitated water management system for the Cowal Gold Mine site is to retain the majority of runoff within the Internal Catchment Drainage System which will drain towards the final void. It is understood this will include runoff from rehabilitated areas in addition to the exposed walls of the final void.</i> <i>As it is generally recommended to separate clean and dirty/contaminated areas, further information is requested to justify the proposal to prevent clean runoff from re-entering the natural surface water system.</i> <i>This information will also aid in consideration of the applicability of the Maximum Harvestable Rights Dam Capacity (MHRDC) for the property and any potential requirement for licensing under the Lachlan Unregulated and Alluvial Water Sharing Plan.</i>	The currently approved water management system was designed with the UCDS and low mounds associated with the ICDS remaining as part of the post-closure water management system to facilitate the permanent drainage of adjacent areas upslope of the rehabilitated site to Lake Cowal (via the UCDS), with runoff generated within the ICDS catchment ultimately directed to the final void (which is not predicted to spill under any climatic scenario). This would not change for the Modification. The catchment area reporting to the final void from the rehabilitated areas of the Modification landforms would be approximately 13 square kilometres (km²) (Appendix A to the EA). In comparison, the catchment area of Bland Creek, which is the main tributary to Lake Cowal, is approximately 9,500 km². Should any water storages be retained following lease relinquishment for use by local landholders, these water storages would be retained in consideration of the maximum harvestable rights of the property at that time. Any surface runoff captured in the final void in the long-term would not be used for stock or domestic purposes, and therefore, should not be considered as part of any harvestable rights calculation for the property post-mining.
Monitoring and Management	
<i>The Office of Water supports the proposed review of the Site Water Management Plan and the Surface Water, Groundwater, Meteorological and Biological Monitoring Programme.</i>	Comment noted.
<i>It is recommended data from the monitoring bores be used periodically for model calibration, predictions of mine inflow, and review of groundwater drawdown impacts.</i>	Comment noted. As stated in Section 4.1.3, the Site Water Management Plan would be updated to incorporate the recommendations made by Coffey Geotechnics (2013) and supported by Kalf and Associates (2013), including for continued groundwater monitoring to validate the predictive groundwater modelling.
Recommended Conditions of Approval	
The NOW recommended conditions of approval for the Modification relating to: • Obtaining necessary water licences. • Review of the existing Surface Water, Groundwater, Meteorological and Biological Monitoring Programme in consultation with the NOW. • Review of the existing Site Water Management Plan in consultation with the NOW, incorporating a Surface Water Management Plan and Groundwater Management Plan.	Recommended conditions of approval noted. Barrick would obtain necessary water licences for the Modification. As stated in Section 4.1.3 and 4.2.3 of the EA, the existing Surface Water, Groundwater, Meteorological and Biological Monitoring Programme (SWGMBMP) and Site Water Management Plan would be reviewed and updated as required for the Modification. It should be noted that the existing SWGMBMP includes programmes to monitor surface water and groundwater flows, quality and use, and that Barrick also implements the existing Erosion and Sediment Control Plan. As such, Surface Water Management and Groundwater Management Plans are not considered to be required as additional components of the Site Water Management Plan (i.e. as the content of the recommended Surface Water Management and Groundwater Management Plans would be included as part of the existing SWGMBMP, Erosion and Sediment Control Plan and Site Water Management Plan, which would be reviewed for the Modification).

NSW OFFICE OF ENVIRONMENT AND HERITAGE (Submission ID 82)	
Flora Surveys	
OEH would support the proposal only if additional targeted threatened flora survey was undertaken within the Modification area, and appropriate mitigation measures, including offsets, were identified if any threatened flora species were found to be present. The threatened flora survey described by Australian Museum Business Services (AMBS 2012) does not meet OEH guidelines for assessing likely impacts on threatened species and their habitat. ... The targeted fauna survey is comprehensive, however, the Modification area was not subject to systematic targeted threatened flora searches as specified in our letter. The Threatened Species Survey and Assessment Guidelines (DEC and DPI 2005) also require targeted searches to be carried out in areas of preferred habitat for threatened flora considered likely to occur in the locality.	Additional threatened flora species surveys are not considered to be required for the Modification areas. Further justification for this is provided below. Notwithstanding, the existing TSMP within the approved Flora and Fauna Management Plan (Barrick Australia Limited, 2003), which would continue to be implemented for the Modification, includes provisions for conducting targeted searches for threatened species prior to construction activities. Numerous flora surveys and monitoring programmes have been conducted in ML 1535 and the broader Lake Cowal catchment, both prior to the commencement of the CGM, and during operations. A full list of these surveys is provided in Section 3.2 of Appendix D of the EA. Despite the numerous flora surveys of the CGM area and broader surrounds, no threatened flora species have been recorded since 2003 (i.e. the Austral Pillwort [<i>Pilularia novae-hollandiae</i>] was recorded (outside the Modification area) by Bower [2003] during surveys conducted in 2003). The previous flora surveys were used to inform the Modification surveys and assessment, in particular, the flora surveys conducted by FloraSearch (2008) for the E42 Modification which covered the Modification areas. No threatened flora species were identified during these surveys by FloraSearch (2008), with no issues raised during the assessment phase of E42 Modification regarding the suitability of the extent or methodology of the FloraSearch (2008) flora surveys. For the Modification, Australian Museum Business Services (AMBS) (2012) conducted targeted threatened flora surveys in areas where threatened flora species were considered (i.e. based previous flora surveys, including FloraSearch [2008]) most likely to occur. No threatened flora species were identified by AMBS (2012) during the targeted threatened flora surveys. The Modification areas were not considered to be areas where threatened flora species are likely to occur due to the degraded condition of the habitat and no previous threatened flora species records in the surrounds. However, additional flora surveys were conducted in the Modification areas by AMBS (2012) and no threatened flora species were recorded. As noted in the OEH submission, the <i>Threatened Species Survey and Assessment Guidelines</i> (DEC, 2004) require targeted searches to be carried out in areas of preferred habitat where the species are considered likely to occur. The EA conservatively describes that small portions of the Modification disturbance areas represent potential habitat of poor to medium condition (i.e. not preferred habitat) and that the Modification is unlikely to impact threatened flora species or their habitats (Section 6.2 of Appendix D of the EA). It should be noted that the vegetation types within the Modification area considered to provide potential habitat for the threatened flora species are also found within the proposed Modification biodiversity offset area, as shown in the table below. Due to the proposed enhancement of the habitats in the Modification biodiversity offset area (e.g. removal of grazing), the Modification would likely result in an increase in potential habitat for these species in the region in the medium to long-term.

NSW OFFICE OF ENVIRONMENT AND HERITAGE (Submission ID 82)				
(Continued)	Table: Comparison of Potential Habitat for Threatened Flora Species with the Modification Area and the Proposed Modification Biodiversity Offset Area			
	Threatened Flora Species	Potential Habit		
		Vegetation Community	Modification Area	Proposed Modification Biodiversity Offset Area
	Spiny Peppercreess	Weeping Myall – Belah – Poplar Box Shrubland and Woodland	1.5 ha (moderate condition)	8 ha
	Austral Pillwort	Sedgeland/Herbfield	0.5 ha (poor condition)	0.2 ha
		Weeping Myall – Belah – Poplar Box Shrubland and Woodland	1.5 ha (moderate condition)	8 ha
	Slender Darling-pea	Sedgeland/Herbfield	0.5 ha (poor condition)	0.2 ha
Biodiversity Offset				
The EA Identifies an addition to the existing offset to mitigate the impacts of the Modification, and OEH considers this to be an appropriate action, but notes the need to update Section 3.6 of the Conditions of Approval and finalisation of the Rehabilitation and Offset Management Plan (ROMP).		Comment noted. Should the Modification be approved, the Rehabilitation and Offset Management Plan (ROMP) (Barrick, 2013) would be updated to include the Modification biodiversity offset.		
Section 4.7 of the ROMP confirms that a Voluntary Planning Agreement (VPA) is being established between Barrick (Cowel) and the Minister for Planning under Section 93F of the Environmental Planning and Assessment Act 1995. OEH considers a VPA to be an acceptable mechanism for securing the offset areas in perpetuity if the agreement is in place before clearing for the current Modification commences.		Barrick notes the OEH's comments regarding a Voluntary Planning Agreement being an acceptable mechanism for securing the Modification biodiversity offset area in perpetuity.		
Long-term Land Use				
Section 2 of Appendix I of the EA (Figure 5) cites 'conservation' as a proposed land use following closure of Mining Lease (ML) 1535. OEH would consider that only land within ML 1535 that has been rehabilitated to identified standards (i.e. vegetation condition meets benchmarks identified in BioMetric) be considered for this final land use, and expects any land intended to be managed for conservation, additional to the agreed offset areas, to be protected in perpetuity through a mechanism such as extension of the VPA.		In accordance with Development Consent (DA 14/98) Condition 3.10(E), a long-term land use strategy has been developed for the currently approved CGM. The currently approved long-term land use strategy for the ML 1535 area includes fenced conservation areas to conserve and enhance wildlife values, and areas suitable for agricultural production including commercial and recreational fishing of lake areas or managed grazing by livestock. The Modification would not change the long-term land use strategy for the currently approved CGM. Upon the cessation of mining operations, tenure of ML 1535 would be maintained by Barrick until such a time when lease relinquishment criteria have been met and rehabilitation is to the satisfaction of relevant regulatory authorities including the DRE and the DP&I.		

NSW OFFICE OF ENVIRONMENT AND HERITAGE (Submission ID 82)	
(Continued)	The anticipated lease relinquishment criterion relevant to the conservation areas is as follows (Section 5.8 of the EA): Rehabilitated final landforms are indicative of a landscape on a trajectory towards a self-sustaining ecosystem and comprise self-sustaining native and/or endemic species characteristic of remnant vegetation communities in the surrounding landscape. It is not proposed that rehabilitated areas of vegetation would also meet benchmarks identified in BioMetric (i.e. in addition to meeting lease relinquishment criteria). Further detail regarding the long-term land strategy of the ML area and lease relinquishment criteria would be developed in consultation with relevant stakeholders and detailed in the Mine Closure Plan.
Aboriginal Heritage	
<i>The modification does not propose any actions that require a new approval or a variation to an existing approval under Part 6 of the National Parks and Wildlife Act 1974. OEH notes the commitments in the Environmental Assessment to salvage, excavate, monitor and manage Aboriginal heritage sites in accord with existing approvals. OEH also noted that Cowal Gold Mine Indigenous Archaeology and Cultural Heritage Management Plan will continue to operate and will be used to manage Aboriginal heritage issues in the area.</i>	Comment noted.
Definition of Inland Grey Box EEC	
<i>OEH does not agree with the justification for excluding Community C3 from the NSW 'Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions' endangered ecological community (Inland Grey Box EEC).</i> ... <i>Community 3 was not mapped within the Modification area. However, the conservation value of the southern Offset Area Extension is potentially increased by recognising Community 3 within the definition of the NSW Inland Grey Box EEC.</i>	AMBS (2012) considers that vegetation community C3 (Inland Grey Box – Belah – Poplar Box Woodland) does not meet the criteria for classification as the Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions Endangered Ecological Community (EEC) under the TSC Act, because the composition of the vegetation is different to the listed EEC (Attachment A of Appendix D to the EA). AMBS (2012) describes how the Final Determination for the community include the Benson <i>et al.</i> (2006) types ID76, ID81, ID82, ID110 and ID237, whereas it is believed that this community in the study area is closer to ID248. A detailed reconciliation of the criteria for the Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions EEC applied to vegetation community C3, is provided in Attachment A (Appendix H) of Appendix D to the EA. As noted by the OEH, vegetation community C3 is not mapped within the Modification area, but has been mapped in the proposed Modification biodiversity offset area. Despite not meeting the criteria for the EEC under the TSC Act, it is recognised that the vegetation community is of conservation value given that it is listed as an EEC under the EPBC Act.

NSW ENVIRONMENTAL PROTECTION AUTHORITY (Submission ID 83)				
Recommended Conditions				
<i>We recommend that the following conditions are included in any modified development consent.</i> Operational <i>Operational mining activities must not occur post 31 December 2024.</i> ... <i>Embankment lift works at the tailings storage facilities must not occur between 7.00am and 6.00pm.</i>	Recommended conditions noted. It is not expected that maximum waste rock and tailings storage facilities heights would form part of any modified Development Consent conditions for the CGM. Notwithstanding, operations at the CGM would need to be conducted generally in accordance with the operations described in the Modification EA.			
<u>Acquisition upon request</u> <i>Upon receiving a written request for property acquisition from the owner of any property listed in Table 6 the applicant must acquire the property.</i> Table 6 <table><tr><td>Coniston</td></tr><tr><td>McLintock</td></tr><tr><td>Westlea</td></tr></table>	Coniston	McLintock	Westlea	As identified in the Noise and Blasting Impact Assessment (Appendix E to the EA), one privately-owned receiver (Coniston) is predicted to be in the Noise Affection Zone for the CGM incorporating the Modification, and accordingly, it is expected that the owners of Coniston would be given the right to acquisition upon request in any modified Development Consent for the Modification. It was predicted that the McLintock and Westlea receivers would be within the Noise Management Zone for the CGM incorporating the Modification, and accordingly, it is expected that the owners of McLintock and Westlea would be given the right to mitigation works upon request in any modified Development Consent for the Modification.
Coniston				
McLintock				
Westlea				
<i>If the noise generated by the development exceeds 40 dB(A)¹ when measured at any residence on privately owned land, or on more than 25 percent of privately owned land not located within Lake Cowal,</i> <i>the applicant shall advise the owner of the property that they have acquisition rights, and</i> <i>must acquire the property upon receiving a written request for property acquisition from the owner of the land.</i> <i>Within three months of receiving a written request from the owner of any land with acquisition rights the applicant must make a binding written offer to the land owner based on current market value as if the property was unaffected by the development.</i>	Recommended conditions noted.			

NSW ENVIRONMENTAL PROTECTION AUTHORITY (Submission ID 83)	
<i>In addition to the unaffected property market value the applicant's offer must include compensation for relocation and any expenses associated with the acquisition.</i> <i>If the applicants written binding offer is not accepted by the land owner, the applicant must request the Director General (Department of Planning and Infrastructure) to resolve the dispute through an independent valuer².</i> <i>The property owner may withdraw the request for land acquisition at any time in this process.</i>	(Continued)
<i>Recommended conditions regarding: noise mitigation measures, noise limits, construction noise and blasting.</i>	Recommended conditions noted. With regard to noise mitigation measures, it should be noted that Barrick can determine the timing for offering to fund the implementation of noise mitigation works, but cannot determine the timing of the actual implementation of noise mitigation works at a private receiver (i.e. it is considered that the timing of the recommended condition of approval regarding noise mitigation measures should be linked to Barrick offering noise mitigation works, as opposed to the implementation of noise mitigation works).
Noise and Blasting Impact Assessment	
<i>The 'Noise and Blasting Impact Assessment' (NIA) dated September 2013 undertaken by SLR Consulting Australia Pty Ltd was completed generally in accordance with the New South Wales Industrial Noise Policy (INP).</i>	Comment noted.
Noise Mitigation	
<i>The NIA considered several mitigation measures including replacing the existing fleet, retro fitting the existing fleet with noise dampening articles and creating earthen barriers between mobile fleet pathways and receptors. These mitigation measures were considered too expensive and not effective.</i> <i>The NIA and CGM do not propose to implement any additional mitigation measures to what is currently in place at the CGM site. It is questionable whether the benefits to the community of continued mining at the CGM then outweigh noise (and other) impacts upon them.</i>	Barrick is currently approved to operate the CGM (including tailings lift construction activities) 24 hours per day, 7 days per week. The Modification EA commits that tailings lift construction activities would occur during the daytime only to minimise potential noise impacts during the evening and night-time at privately owned receivers. This noise management commitment is considered by Barrick to be reasonable and feasible. It should be noted that, with the implementation of this additional noise management commitment, predicted noise levels for CGM incorporating the Modification are predicted to be lower than, or equal to, the currently approved noise level specified in the CGM Development Consent (14/98) at all privately-owned receiver locations (with the exception of Bramboyne, which has not previously been identified as a receiver at the location shown in the Modification EA, and hence no noise levels have been previously predicted at this location). The currently approved and maximum predicted noise levels are summarised in Table 4-12 of the EA.

NSW ENVIRONMENTAL PROTECTION AUTHORITY (Submission ID 83)	
(Continued)	As noted by the EPA, other mitigation measures were investigated for the Modification. Justification for why the implementation of these other mitigation measures is not considered to be reasonable/feasible is provided in Section 4.5.2 of the EA, and summarised as follows: While the development of noise bunds would be effective during calm conditions, they would result in a very limited reduction (i.e. less than 1 dB) in predicted noise levels at private receiver locations during adverse weather conditions. On this basis (i.e. limited effectiveness), the implementation of noise bunds was not considered by Barrick to be reasonable for the Modification. The existing CGM mobile equipment fleet would continue to be operated for the Modification, with the cost of replacement approximately \$3.7 million (M) per truck for up to 15 trucks. The expected capital cost to retrofit the existing truck fleet is approximately \$6M, with ongoing operational costs associated with maintaining the effectiveness of the noise attenuation additional to this. Given that no increase in currently approved noise levels at privately-owned receivers is expected due to the Modification (Appendix E), Barrick does not consider the additional costs associated with fleet attenuation to be reasonable for the Modification.
Noise, Acquisition, Rights	
<i>...the CGM chose not to operate as stated in the Environmental Assessment (EA) for the E42 Modification – Modified Request, and the residents at Coniston, McLintock and Westlea potentially suffered unacceptable noise exposure impacts of up to 9dB(A) above the project specific noise criteria without having access to acquisition rights due to clauses in the modified development consent that tied the acquisition right to the CGM mobile fleet size.</i>	The CGM is currently approved to operate 24 hours per day, 7 days per week. However, tailings lift construction activities have been restricted within the operating constraints of the approved CGM to daytime hours only resulting in the minimisation of potential noise impacts during the evening and night-time at privately owned receivers (i.e. operations have been restricted in comparison to what was described, assessed and approved for the Modified Request EA). The CGM has operated such that Barrick has not been required to acquire the Coniston, McLintock or Westlea properties upon request of the respective owners in accordance with the conditions of Development Consent (DA 14/98). Notwithstanding, in response to comments from the owner of the Westlea property that they would consider selling their property, Barrick has previously entered into negotiations for the acquisition of the Westlea property (letter dated 24 September 2008) (despite Barrick not having a requirement to purchase the property). Barrick and the owner of the Westlea property obtained independent land valuations of the property, and based on these, an offer for consideration was presented by Barrick. Acquisition of the property was not pursued by the owner of the Westlea property under the general terms proposed by Barrick. Neither of the owners of the McLintock and Coniston properties have sought acquisition of their properties by Barrick during consultations with Barrick.

NSW ENVIRONMENTAL PROTECTION AUTHORITY (Submission ID 83)

Consequently for the EPA to support the current proposed modification, the residents at Coniston, McLintock and Westlea must receive the acquisition rights upon project approval given the noise impacts on their properties and based on the following.

- Significant portions of these properties are in the affectation zone [>40 dB(A)].
- The EPA assessment of the NIA modelling is that it is marginal between the three (3) residential properties. Modelling suggests there is 2dB(A) difference between each location (39 to 41). For compliance purposes 2dB(A) does not represent a discernable difference under the INP.
- Modelling of the CGM night time sleep disturbance impacts indicated that the criteria of 45dB(A) LA 1 (1 minute)) is exceeded at each of these three (3) locations.
- The previous noise modelling for the CGM in development applications titled 'E42 Modification' and 'E42 Modification - Modified Request' has not proven completely accurate. The noise impact assessment modelling presented in these applications indicated that when the mobile equipment fleet was increased to its maximum (years 6 to 11 of the mine) the worst case scenario at Westlea would be a 41dB(A) LAeq(15minute) impact from mining activities.
- Advice from CGM and an independent audit established that the mobile fleet was never increased as described in the E42 noise impact assessments yet still exceeded the noise limit at Westlea by 2dB(A) in August 2012 when measured at 43dB(A) - SLR Consulting "CGM Mine Operation Noise Monitoring" report dated October 2012.
- Noise impacts from the CGM have increased at these receptors and background noise levels have been measured at night up to 8dB(A) above pre-mine background levels.

Despite no increase in the mobile fleet the SLR Consulting "CGM Mine Operation Noise Monitoring" report dated September 2013 found "Noise levels monitored in August 2013 were generally higher than the noise levels monitored during the previous year".

Based on the predicted noise levels for the Modification, it is expected that the owners of Coniston would be given the right to acquisition upon request, and the owners of McLintock and Westlea would be given the right to mitigation works upon request in any modified Development Consent for the Modification.

With regard to the EPA's comments:

- Based on the contours prepared for the Noise and Blasting Impact Assessment for the Modification (for the night-time during adverse weather conditions), less than 25 percent (%) of the McLintock and Westlea properties is predicted to be affected by noise from the CGM incorporating the Modification in excess of 40 dBA $L_{Aeq,15minutes}$.
- Consistent with the existing CGM Development Consent (14/98) and other contemporary Project Approval and Development Consent conditions, acquisition rights are typically conferred to privately-owned receivers with predicted noise impacts greater than 5 dBA above project-specific noise levels (i.e. noise acquisition rights are not conferred to receivers with predicted noise levels 3 to 5 dBA above project-specific noise levels).
- No privately-owned receivers were predicted in the Noise and Blasting Impact Assessment to be in the Noise Affectation Zone for the Modification due to predicted sleep disturbance impacts.
- As described in the Noise and Blasting Impact Assessment, measured daytime, evening and night-time intrusive noise levels for the period 2010 to 2013 were below the relevant residential receiver noise limits in the CGM Development Consent at all measurement locations, except at Westlea where the measured daytime (morning) intrusive mine levels were above the noise limit of 41 dBA by up to 2 dBA on two occasions and 1 dBA on two occasions. However, according to Section 11.1.3 of the INP, monitored noise levels within 2 dBA of the statutory noise limit would not generally be considered a non-compliance. Furthermore, on both occasions the measured intrusive mine level of 43 dBA coincided with a wind speed of 4 m/s which is outside the INP assessable weather conditions for the CGM. As such, these monitored noise levels at Westlea above 41 dBA are not considered to represent non-compliances of the Development Consent noise limit for Westlea.

NSW ENVIRONMENTAL PROTECTION AUTHORITY (Submission ID 83)	
<i>The remaining residential receptors impacted above the project noise specific criteria (Bramboyne, Bungabulla, Gumbelah, Laurel Park and The Glen) are only predicted to be up to 2dB(A) above the project specific noise criteria however this is up to 7dB(A) above pre-mine background levels and they should receive the option to implement the mitigation measures that are already currently available to them in the existing development consent and as detailed in Attachment 'A'.</i>	Comment noted.
Air Quality	
<i>The methodology used in the Pacific Environment Limited Air Quality Impact Assessment dated September 2013 has been completed generally in accordance with the EPA guidelines "Approved Methods for the Modelling and Assessment of Air Pollutants in NSW".</i> <i>The air quality impact assessment for the proposed modification does not propose any additional dust monitoring and the EPA accepts that based on analysis of the dispersion modelling the existing air quality monitoring program is sufficient.</i>	Comment noted.
Ground and Surface Water	
<i>Proposed surface water management measures (primarily directing clean rainfall runoff from undisturbed areas away from the mine path) will ensure negligible impacts on surface water quality.</i>	Comment noted.
Waste	
<i>We have no concerns in relation to the continued management and operation of these structure [waste rock emplacements and tailings storage facilities] or the monitoring associated with them as detailed in the Environmental Assessment (EA).</i>	Comment noted.

NSW DEPARTMENT OF RESOURCES AND ENERGY (Submission ID 84)	
Final Landform	
<i>DRE notes the final height of the Northern Waste Emplacement will be increased by 42 metres to 308 metres AHD. While this is significant, it is not expected to dominate or detract from the landscape qualities of the local environment when rehabilitation has been completed in accordance with the EA.</i>	Comment noted.
Rehabilitation Plan	
<i>The rehabilitation and mine closure measures and outcomes are not significantly different from the existing approved project, but there are constraints associated with sub soil sodicity. These constraints are recognised in the EA and adequate ameliorative measures have been incorporated into the project.</i>	Comment noted.
Recommended Conditions	
<i>DRE recommends that the following conditions be incorporated into any Project Approval for the CGM Modification:</i> Rehabilitation Plan <i>The proponent must prepare and implement a Rehabilitation Plan to the satisfaction of the Director General of Department of Trade & Investment, Regional Infrastructure & Services. The Rehabilitation Plan must:</i> <i>be prepared in accordance with DRE guidelines;</i> <i>be submitted and approved by the Director General of Department of Trade & Investment , Regional Infrastructure & Services prior to the implementation of the Modification;</i> <i>address all aspects of rehabilitation and mine closure, including post mining land use, rehabilitation objectives, completion criteria and rehabilitation monitoring and,</i> <i>include a final landform design that is consistent with the surrounding topography principles</i> <i>It is the intention of DRE that the Rehabilitation Plan fulfils the requirements of the Mining Operation Plan (which will become the REMP once the Mining Act Amendments have commenced).</i> <i>DRE does not object to the approval of the Project provided the above recommendations are taken into account and implemented.</i>	The existing ROMP will be revised (as necessary) to reflect the rehabilitation objectives and concepts for the CGM incorporating the Modification described in the CGM Extension Modification EA. The revised ROMP will be prepared in consideration of the DTIRIS-DRE's relevant rehabilitation guidelines, and will include a description of the post-mining land use, final landforms, completion criteria and the rehabilitation monitoring programme. The ROMP would be submitted to the Director-General of the DTIRIS-DRE for approval. Prior to implementation of the Modification, Barrick will submit a new MOP which will be prepared in accordance with the DTIRIS-DRE's new ESG3: MOP Guidelines. The DRE's comments regarding the commencement of provisions of the <i>Mining Amendment Act, 2008</i> relating to the requirement for a Rehabilitation and Environmental Management Plan (REMP) are noted, and Barrick would comply with the relevant contemporary standard once these provisions have commenced.

NSW TRANSPORT - ROADS AND MARITIME SERVICES (Submission ID 85)	
Comment	
<i>Roads and Maritime Services (RMS) has assessed the development application and supporting information provided and would raise no objection to the modification as proposed.</i>	Comment Noted.
Worker Fatigue and Transport	
<i>Given the nature of the mining operation, the location of the subject site and the 12 hour shift work periods Roads and Maritime promotes the need to address and review workers fatigues issues particularly relating to travel to and from the subject site. It is noted that the proponent has adopted practices to encourage the use of the existing employee shuttle bus service and car pooling. It would be appropriate for fatigue issues and mitigation measures to be regularly reviewed.</i>	As noted by the Roads and Maritime Services, Barrick encourages the use of the employee shuttle bus service and car pooling to manage potential fatigue risks associated with employee travel to and from the CGM. In addition, compliance with Barrick's internal Fatigue Risk Management Standard is mandatory for all Barrick sites including the CGM, effective 1 January 2014. The Fatigue Risk Management Standard requires the implementation of a Site Fatigue Management Plan, shift schedules to be designed in consideration of fatigue management principles, ongoing fatigue monitoring, and provisions for continual improvement, review and audit of fatigue management practices.
FISHERIES NSW (Submission ID 86)	
Comment	
<i>Fisheries NSW advise no issues.</i>	Comment noted.
CROWN LANDS (Submission ID 87)	
Comment	
<i>Crown Lands advise that the overall mine area includes certain Crown land and that the proposed modification encroaches on land (Lot 7323 DP 1157291, part Travelling stock reserve) that is subject to an Aboriginal Land Claim and thus may limit the granting of any required tenure over that land.</i>	The Modification is not seeking the grant of any new mining tenure (i.e. no mining tenure is required in addition to the existing ML 1535). Barrick entered into an agreement with the registered native title claim group for the ML 1535 Area (N6002/02), who represent the Wiradjuri Condobolin people, on 15 April 2003 pursuant to the right to negotiate process of the Commonwealth <i>Native Title Act, 1993</i>.
OFFICE OF AGRICULTURAL SUSTAINABILITY & FOOD SECURITY (Submission ID 88)	
Comment	
<i>The Office of Agricultural Sustainability & Food Security advises no issues</i>	Comment noted.

BLAND SHIRE COUNCIL (Submission ID 89)	
Comment	
<i>Barrick, the owner of the mine, has proven to be a strong corporate citizen and has provided our local community with many opportunities in the areas of youth sports, social activities, capacity building and road safety initiatives just to name a few.</i> <i>The operation of the Cowal Environmental Management Community Committee (CEMCC) is also proving to be very beneficial in allowing interaction between the public and the mine in respect to environmental issues.</i> <i>In addition, Bland Shire Council, along with Lachlan and Forbes councils, have recently entered into a MOU in regard to road funding being provided by Barrick based on recent road safety audits.</i> <i>The commitment of Barrick, in seeking an extension to the life of the Cowal Gold Mine, is to be applauded as, if successful, the economic viability of the Bland Shire will continue to be enhanced as long as this mine is operating within our Shire.</i>	Comment noted. As noted by the Bland Shire Council, Barrick has entered into a Memorandum of Understanding (MOU) for the establishment of funding by Barrick for road safety works in the Bland, Lachlan and Forbes Shires.
FORBES SHIRE COUNCIL (Submission ID 90)	
Comment	
<i>Forbes Shire Council supports the proposal to extend the operational life of the Cowal Gold Mine</i> <i>...</i> <i>Barrick is conscious of the community and environmental responsibilities and Council is represented on their Community Environmental Monitoring and Consultative Committee by 2 Councillors. The EIS is comprehensive and Council believes it addresses all the requirements to ensure there is minimal environment impact and rehabilitation of the mine expansion.</i> <i>...</i> <i>Barrick has entered into 2 Memoranda of Understanding (MOU) with the Bland, Forbes and Lachlan Shire Councils.</i> <i>The first establishes a legacy fund which will provide benefits to the residents of the three local government areas beyond the operational life of the mine.</i> <i>The second MOU is a voluntary commitment by Barrick to contribute \$150,000 annually towards the identification and improvement of safety issues on the road network surround and leading to the Cowal Gold Mine.</i>	Comment noted. As noted by the Forbes Shire Council, Barrick has entered into two MOUs for the establishment of funding by Barrick for a legacy fund providing benefits to the residents of the Forbes, Bland and Lachlan Shire Councils beyond the operational life of the mine, and for road safety works in the Forbes, Bland and Lachlan Shires.

LACHLAN SHIRE COUNCIL (Submission ID 91)	
Comment	
<i>Lachlan Shire Council has historically provided its support to both the original development application and subsequent modifications to the Cowal Gold Mine (CGM) project and continues to do so.</i>	Comment noted.
Mine Access Route	
<i>Council along with the Shires of Bland and Forbes recently signed a Memorandum Of Understanding on road maintenance (MOU) with Barrick (Cowal) Ltd in which a funding committee (the committee) was established to allocate the funds provided by Barrick for road maintenance projects along the approved traffic routes for the CGM.</i>	Condition 7.1 of Development Consent (14/98) for the CGM requires Barrick to use its best endeavours to ensure that the preferred mine access routes to the CGM are used by its employees and contractors. Barrick's preferred access route from Forbes to the CGM is via the Newell Highway, Burcher Road and Bogeys Island Road. However, a section of this preferred route (i.e. Bogeys Island Road) is currently inaccessible due to the inundation of Nerang Cowal, and therefore, Barrick's employees and contractors (i.e. a total of approximately 81 employees and contractors using light vehicles) have accessed the CGM from Forbes via a temporary alternative access route since the inundation of the road commenced in 2010.
<i>In October at the first meeting of the committee at which representatives of all parties to the MOU were in attendance, it was agreed that the preferred access route across Nerang Cowal Bogey Island not be supported into the future for the following reasons:</i> <i>• High maintenance costs associated with this preferred access route;</i> <i>• The road suffers from long periods of closure due to flooding and other wet weather events;</i> <i>• More effective use of resources to focus on the present alternate route which is easier to maintain.</i> <i>• This position was supported by both Forbes and Lachlan Shire Council representatives;</i> <i>• In accordance with the CGM Memorandum of Understanding a safety based priority listing of maintenance and improvement works to affected Council's road networks is to be prepared collaboratively in order to allocate the 2013 and 2014 Barrick road fund contributions.</i>	The temporary access route currently being used by Barrick's employees and contractors includes the use of the Corinella Manna Road within the Lachlan Shire Council local government area. It is this route which the Lachlan Shire Council is identifying as a preferred alternative to the previously described preferred CGM access route via Bogies Island Road. It should be noted that heavy vehicles do not use the temporary access route (i.e. the haulage route to the CGM is from the south via West Wyalong) and that Barrick has received no community complaints regarding its use of the temporary access route since use began in 2010. Barrick accepts the Lachlan Shire Council's recommendation that the access route via Bogeys Island is removed, and the currently used temporary access route via Corinella Manna Road becomes a preferred route to be used by Barrick employees and contractors. As noted by the Lachlan Shire Council, Barrick has entered into a Memorandum of Understanding for the establishment of funding by Barrick for road safety works in the Lachlan, Bland and Forbes Shires.

4 REFERENCES

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- Barrick Australia Limited (2003) *Cowal Gold Project Flora and Fauna Management Plan*.
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- Coffey Geotechnics Pty Ltd (2013) *Hydrogeological Assessment – Cowal Gold Mine Extension Modification*.
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ATTACHMENT A
ADDITIONAL GROUNDWATER MODELLING INFORMATION

Barrick (Cowal) Limited
c/o Resource Strategies Pty Ltd
PO Box 210
West Wyalong
NSW 2671

2 December 2013

Attention: Shane Goodwin

Dear Mr Goodwin,

RE: Response to Request for Model Information, Cowal Gold Mine Extension Modification Environmental Assessment

In response to a request from Barrick (Cowal) Limited (Barrick) in relation to the Cowal Gold Mine Extension Modification Environmental Assessment currently under assessment by NSW government agencies, this communication provides the following information relating to the Hydrogeological Assessment (Appendix A of the Cowal Gold Mine Extension Modification Environmental Assessment) conducted by Coffey Geotechnics Pty Ltd (Coffey):

- A complete mine-site water balance over the life of mine for the model layers in the mine site model
- Calibration statistics for the mine site model.

These model outputs are provided below for the inundated Lake Cowal scenario. (Note the results of dry and inundated lake scenarios showed negligible difference for the predictive period.)

1 MODELLED PIT INFLOWS FOR HYDROGEOLOGICAL UNITS AND SITE WATER BALANCE

Table 1 presents the model-predicted groundwater inflows to the open pit from each hydrogeological unit. The inflows reported represent horizontal flows to the open pit directly beneath the crest of the open pit. The inflow contributed by each hydrogeological unit to the total pit inflow varies with time.

In 2013, approximately 9% of the predicted inflow to the open pit is sourced from the alluvium (Transported unit) and the remaining 91% is sourced from the rock (Saprolite, Saprock and Primary Rock units).

At the end of mine life (2024), approximately 6% of the predicted inflow to the open pit is sourced from the alluvium (Transported unit) and the remaining 94% is sourced from the rock (Saprolite, Saprock and Primary Rock units).

These results are consistent with those provided in Section 5.4.2.1 of Appendix A of the Cowal Gold Mine Extension Modification Environmental Assessment (approximately 10% from the alluvium and 90% from the rock in 2013, and 5% from the alluvium and 95% from the rock by 2025). The results in the report were rounded to the nearest 5%.

Table 1: Pit Inflows From Hydrogeological Units*

	Average Pit Inflow From Hydrogeological Unit (ML/year)				Total Inflows in Groundwater System (ML/year)		Inflow from Aquifer (% of Total Pit Inflow)	
Hydrogeological Unit:	Transported	Saprolite	Saprock	Primary Rock	Alluvium	Rock	Alluvium	Rock
Model Layer:	1-3	4-5	6	7-14	1-3	4-14	1-3	4-14
Year								
2013	14.6	61.3	18.9	72.6	14.6	152.8	9	91
2014	13.9	53.5	14.8	74.6	13.9	142.9	9	91
2015	14.4	51.6	13.6	81.9	14.4	147.1	9	91
2016	14.8	49.6	12.7	90.6	14.8	152.9	9	91
2017	15.0	47.1	11.9	102.3	15	161.3	9	91
2018	15.2	43.4	10.8	116.1	15.2	170.3	8	92
2019	15.3	39.2	9.7	129.2	15.3	178.1	8	92
2020	14.9	36.1	9.0	142.8	14.9	187.9	7	93
2021	13.6	30.7	7.6	140.9	13.6	179.2	7	93
2022	12.8	27.8	6.9	141.0	12.8	175.7	7	93
2023	12.3	26.0	6.5	141.1	12.3	173.6	7	93
2024	11.8	24.7	6.2	141.0	11.8	171.9	6	94

As shown in Table 1, the maximum annual pit inflows from the fractured rock groundwater system would be approximately 188 ML (year 2020). It is relevant to note that peak dewatering flows (groundwater take) may exceed this value by up to approximately 40 ML/year.

Table 2 presents the model water budget for the entire model domain for each modelled year (2013 to 2024) of the predictive modelling period.

Table 2: Model Water Budget

	Flow for Entire Model Domain (ML/day)					
	Model Boundary Conditions*		Wells^		Change in Aquifer Storage&	
Year	In	Out	In	Out	In	Out
2013	186.1	11.5	0.0	0.0	0.0	174.5
2014	109.9	11.4	0.0	0.1	0.0	98.4
2015	113.9	11.7	0.0	0.1	0.0	102.1
2016	52.8	12.1	0.0	0.1	0.0	40.6
2017	88.0	12.5	0.0	0.1	0.0	75.4
2018	41.2	12.9	0.0	0.1	0.0	28.2
2019	61.1	13.2	0.0	0.1	0.0	47.8
2020	65.1	13.6	0.0	0.1	0.0	51.4
2021	63.2	13.3	0.0	0.1	0.0	49.8
2022	63.7	13.2	0.0	0.1	0.0	50.4
2023	46.5	13.1	0.0	0.1	0.0	33.3
2024	27.8	13.0	0.0	0.1	0.0	14.7

*All model head and flow boundary conditions (including constant head, recharge and seepage face boundary conditions).

^Mine pumping bores including pit dewatering wells and Eastern Saline Supply Borefield.

&Changes in water stored in all soil and rock units over whole model domain.

2 MODEL CALIBRATION STATISTICS

Coffey conducted both steady state flow and transient flow calibrations for the mine site model. Steady state calibration was undertaken to model initial groundwater heads for the start of the transient model simulation.

The transient calibration is considered the more important of the two calibrations, exercising far greater influence on the modelling outcomes.

The transient calibration considered a period from January 2005 (prior to mine dewatering) to January 2013 (the most recent available data at the time the calibration was undertaken). This period included the inundation of Lake Cowal from mid-2010, and the transient calibration modelled this behaviour explicitly.

Observed heads were compared against modelled heads for both the steady state and transient calibrations. Groundwater heads were compared for available groundwater level data collected from bores within the mine lease. The bores for which data were available and were adopted for calibration are listed in Table 3. The locations of these bores are shown in Figure 1.

Table 3: Bores for Which Groundwater Level Data was Used in Model Calibration

Steady State Calibration	Transient Calibration
MON01A	MON01A
MON01B	MON01B
MON02A	MON02A
MON02B	MON02B
P412A	P412A
P412A-R	P412A-R
P414A	P414A
P414B	P414B
P417A	P417A
P417B	P417B
P418A	P418A
P418B	P418B
P555A-R	P555A-R
P558A-R	P558A-R
P561A	P561A
P561B	P561B
PDB1A	PDB1A
PDB1B	PDB1B
PDB3A	PDB3A
PDB3B	PDB3B
PDB5A	PDB5A
PDB5B	PDB5B
PP01	PP01
PP02	PP02
PP03	PP03
PP04	PP04
PP05	PP05
PP06	PP06
TSFNB	TSFNB
TSFNC	TSFNC



Figures 38 to 41 in Appendix A of the Cowal Gold Mine Extension Modification Environmental Assessment show hydrographs for the modelled and observed groundwater heads for bores within ML 1535 for the transient calibration period for the mine site model. The modelled and interpreted average monthly total dewatering rate (vertical dewatering bores plus pit face seepage inflows) are shown in Figure 46. Measured dewatering rates compare favourably with modelled rates, providing confidence in the model's ability to accurately represent groundwater flow conditions.

Figures 3 and 4 show modelled and observed groundwater heads for the transient groundwater flow calibration at those two times, respectively. The SMSR for the May 2010 results (Figure 2) is 5.3% and the SMSR for the December 2012 results (Figure 3) is 4.9%.

Coffey Geotechnics
GEOTLCOV21910AW-AM
2 December 2013

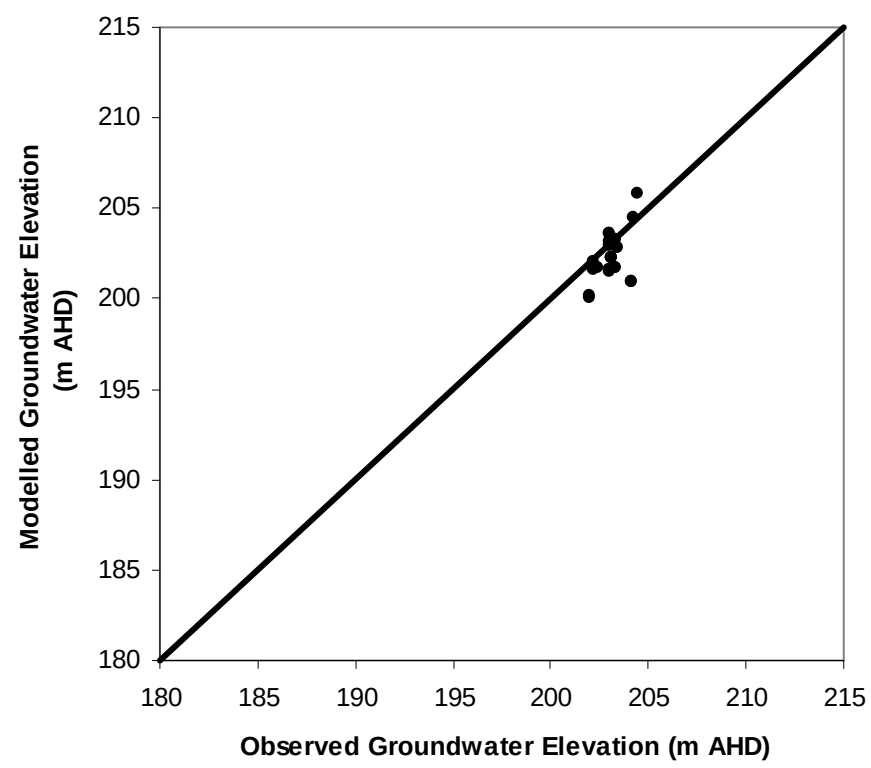


Figure 2: Observed and Modelled Groundwater Heads for Steady State Calibration

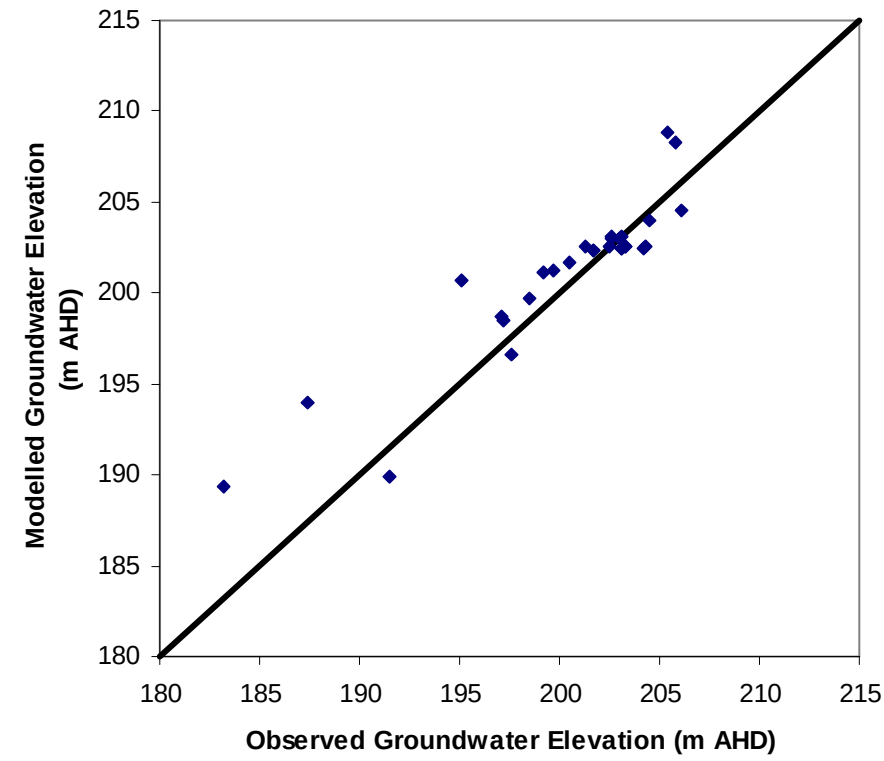


Figure 3: Observed and Modelled Groundwater Heads for Transient Calibration in May 2010

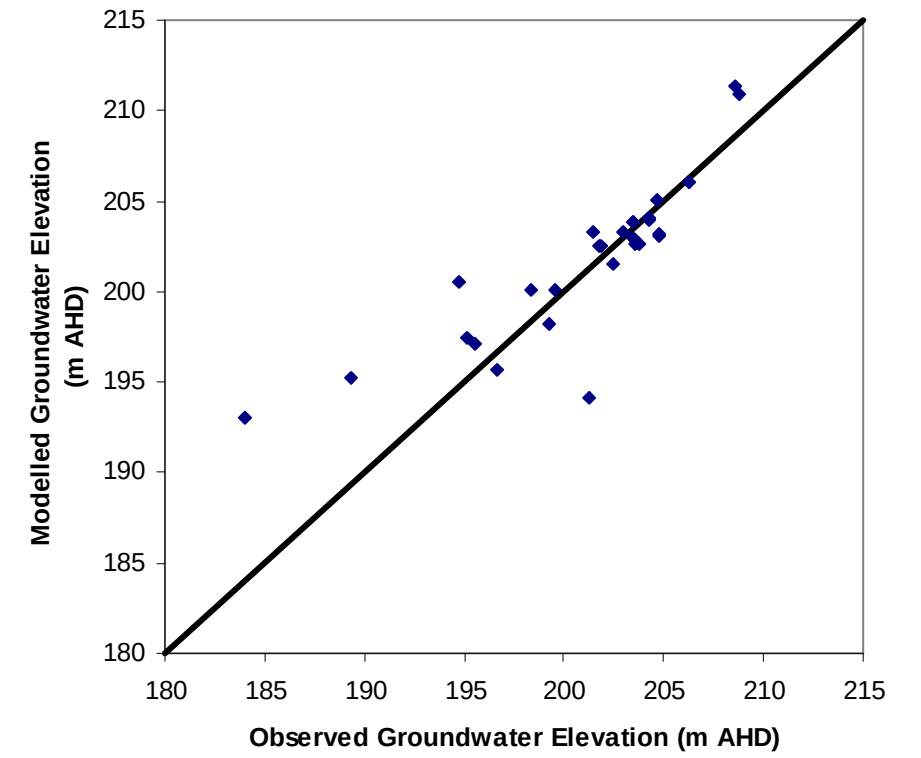


Figure 4: Observed and Modelled Groundwater Heads for Transient Calibration in December 2012

Should you have any questions, please contact the undersigned by email or phone on 02 9406 1000.

For and on behalf of Coffey



Ben Rotter

Project Groundwater Engineer