



ABM Resources NL

Supplementary Environmental Impact Statement *Twin Bonanza 1 Gold Mine*

ABM Resources NL



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Supplementary Environmental
Twin Bonanza 1 Gold Mine



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1 Purpose and Context

This document supplements the Draft Environmental Impact Statement (EIS) for the Twin Bonanza 1 Gold Mine submitted to the Northern Territory, Environment Protection Authority (NT EPA) on 13 December 2013 as a legislative requirement under the Northern Territory's *Environmental Assessment Act 1982*. The submitted EIS entered a public and government exhibition period commencing on the 14 December 2014 and finishing on the 7 February 2014. The aim of this document is to respond to the written submissions received during the exhibition period and includes further information to stakeholders to support the previously lodged draft EIS. This supplement will undergo review by the Northern Territory Government to establish the adequacy of the measures to manage the environment during project implementation and operations. In combination with the previously reviewed draft Twin Bonanza 1 Gold Mine EIS, these documents form the environmental assessment documentation that will determine the acceptability of the project to proceed.

Submissions on the EIS were received from the following government agencies, statutory bodies and non-government organisations during the exhibition period:

Government Departments

- Department of Environment (Commonwealth Government)
- Northern Territory, Environmental Protection Authority
- Department of Mines and Energy
- Department of Land Resource Management
- Department of Primary Industries and Fisheries
- Department of Lands, Planning and the Environment

Statutory Body or Commission

- Central Land Council
- Tourism NT
- Parks and Wildlife Commission NT

Non-government organisations

- Environmental Defenders Office (NT) Inc

The structure of the document is designed to:

- 1 Update the project description and design based on feedback through the EIS process.
- 2 Summarise and respond to each respondent's comments
- 3 Update the commitments table.
- 4 Provide supporting appendices.

Once this supplement is lodged and, if no further information is required, an assessment report is prepared within 35 calendar days following the supplement's submission. This report forms the basis of the Environment Protection Authority's recommendations to the decision making minister. As the proposal also triggered the *Environment Protection and Biodiversity Conservation Act 1999*, a joint assessment of the project by the Northern Territory and Federal government has occurred. The assessment report will also be forwarded to the Federal Environmental Minister as part of the bilateral agreement for a decision.

2 Background

The Twin Bonanza 1 project is located approximately 750km NW of Alice Springs (by road) (Figure 1) and approximately 120km east of the permanent settlement of Balgo.

ABM Resources NL (ABM) intends to develop the proposed gold mine in a staged approach with the stage two phase of mining projected to process between 120 000 and 150 000 tonnes of ore per annum over a two year period and stage three phase projected to process between 200 000 and 300 000 tonnes of ore per annum over a four year period.

Ore will be crushed with the majority of gold recovered via a gravity circuit. Depending on overall gold recoveries an intensive cyanide leaching and elution circuit may be used on small volumes of concentrates. Tailings and waste rock produced by the project will report to purpose designed tailings dams and waste rock dumps respectively.

It is estimated that the total work force of 68 will be required during operations and will be housed onsite within an accommodation village. During project implementation and operations economic benefits to the community and government will include employment, royalty payments, rates and taxes.

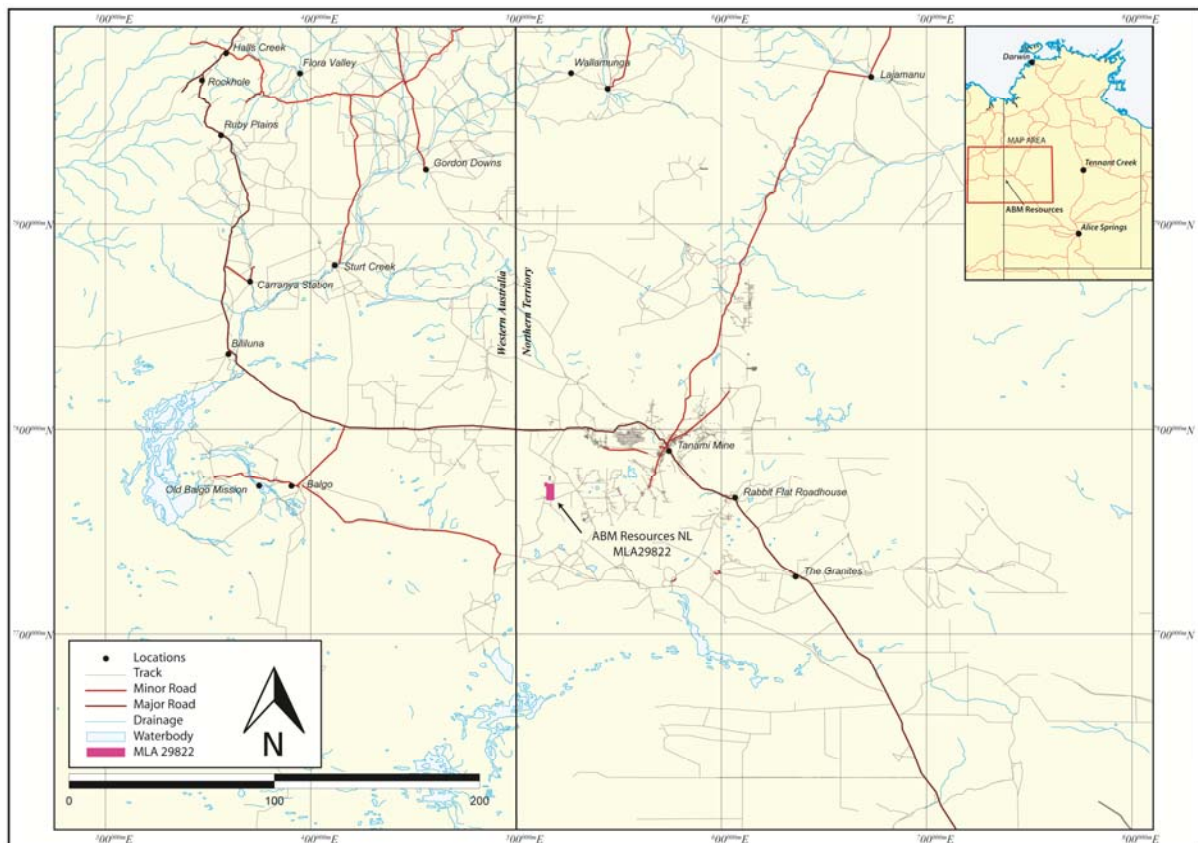


Figure 1. Project location map

3 Project Amendments

In responding to stakeholder submissions and documenting the refinements in the proposed design of the project, Sections 3.1 to 3.4 detail the modifications that have occurred to the project infrastructure. As a result of these changes Section 4 details the ramifications these changes have had on the proposed environmental management. Additionally, Section 4 documents refinements to the environmental management measures as a result of feedback during the EIS process to ensure the environmental outcomes remain robust. To reflect changes in environmental management the environmental commitments table has been updated to reflect these changes and is contained in Appendix A.

3.1 Relocation of the Landfill and Camp Sewage Pond

In the Draft EIS, the landfill and camp sewage leach pond were located in close proximity to the western boundary of the Mineral Lease 29822. Based on the advice from the Department of Mines and Energy (Comment 17, Section 5) the locations of both the sewage pond and landfill have been moved to the east to provide further separation between the facilities and the tenement boundary for ongoing management (Figure 2).

3.2 Reconfiguring of the Topsoil Area 2 and Erosion Control Measures

To enable the unimpeded flow of water from the sediment traps located at the workshop and ROM pad on the eastern side of topsoil stockpile 2 (As discussed in comment 25 and 32, Section 5). Topsoil stockpile 2 was moved to the west, with the north-eastern corner reconfigured to allow surface water to flow between the stockpile and the Northern Waste Rock Dump (NWRD). This will prevent water ponding against infrastructure. In addition, a drain is to be positioned between the topsoil stockpile and NWRD with bunds positioned in the area at the base of each stockpile to capture any liberated sediment (Figures 3 and 4).

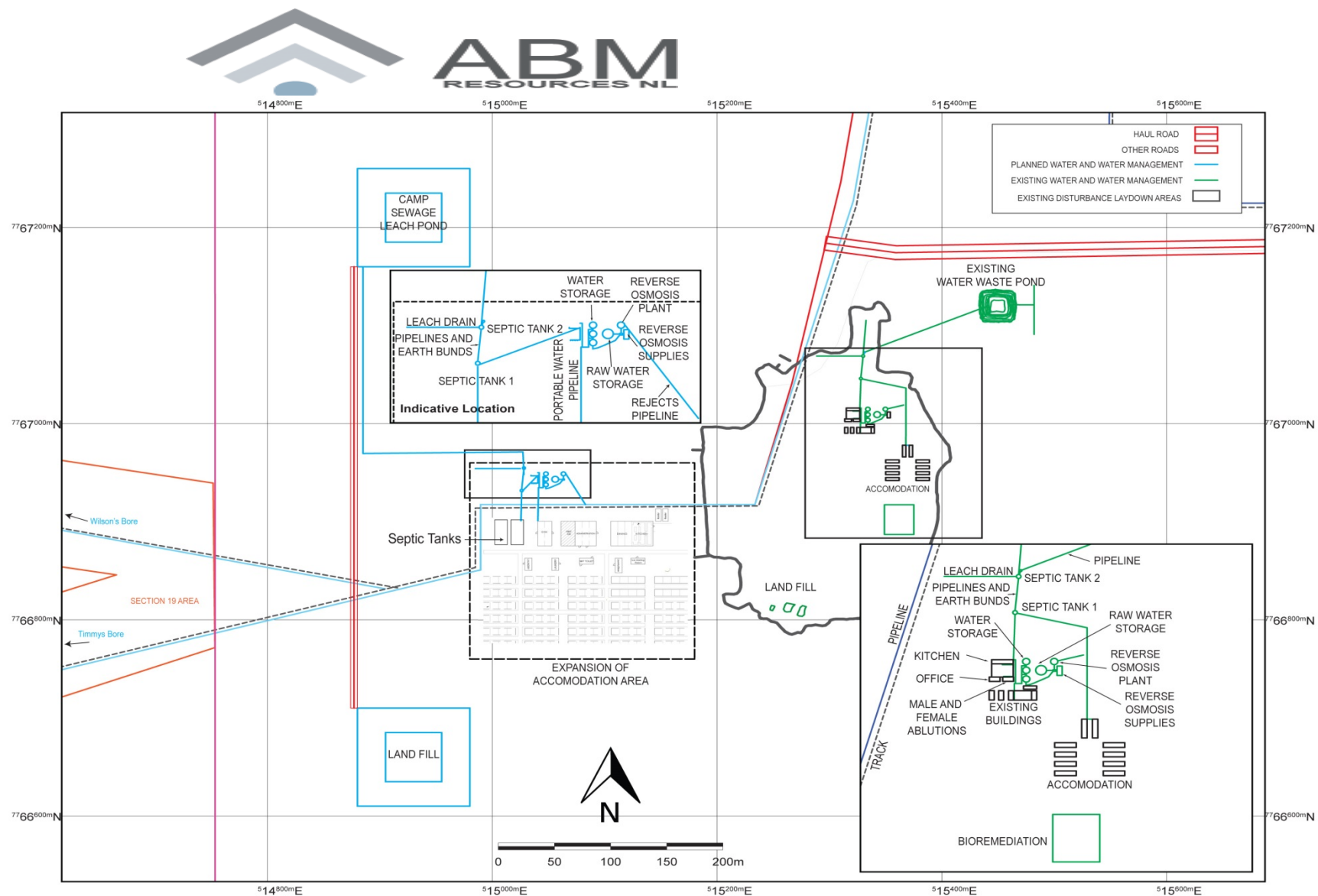


Figure 2. Revised expansion footprint of existing accommodation village and associated infrastructure.

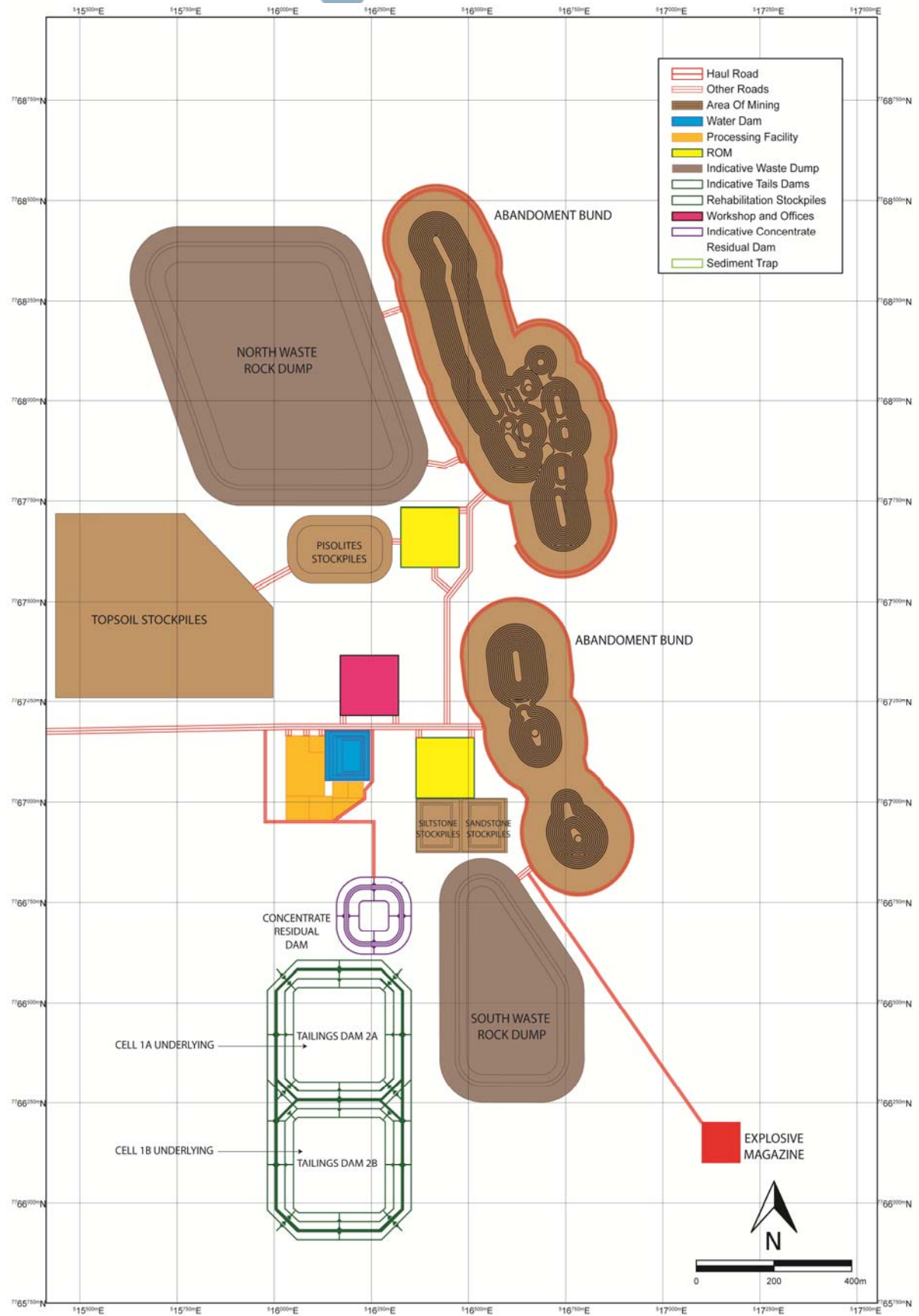


Figure 3. Revised stage three layout with indicative waste rock dumps and tailings dam for the Twin Bonanza Project.

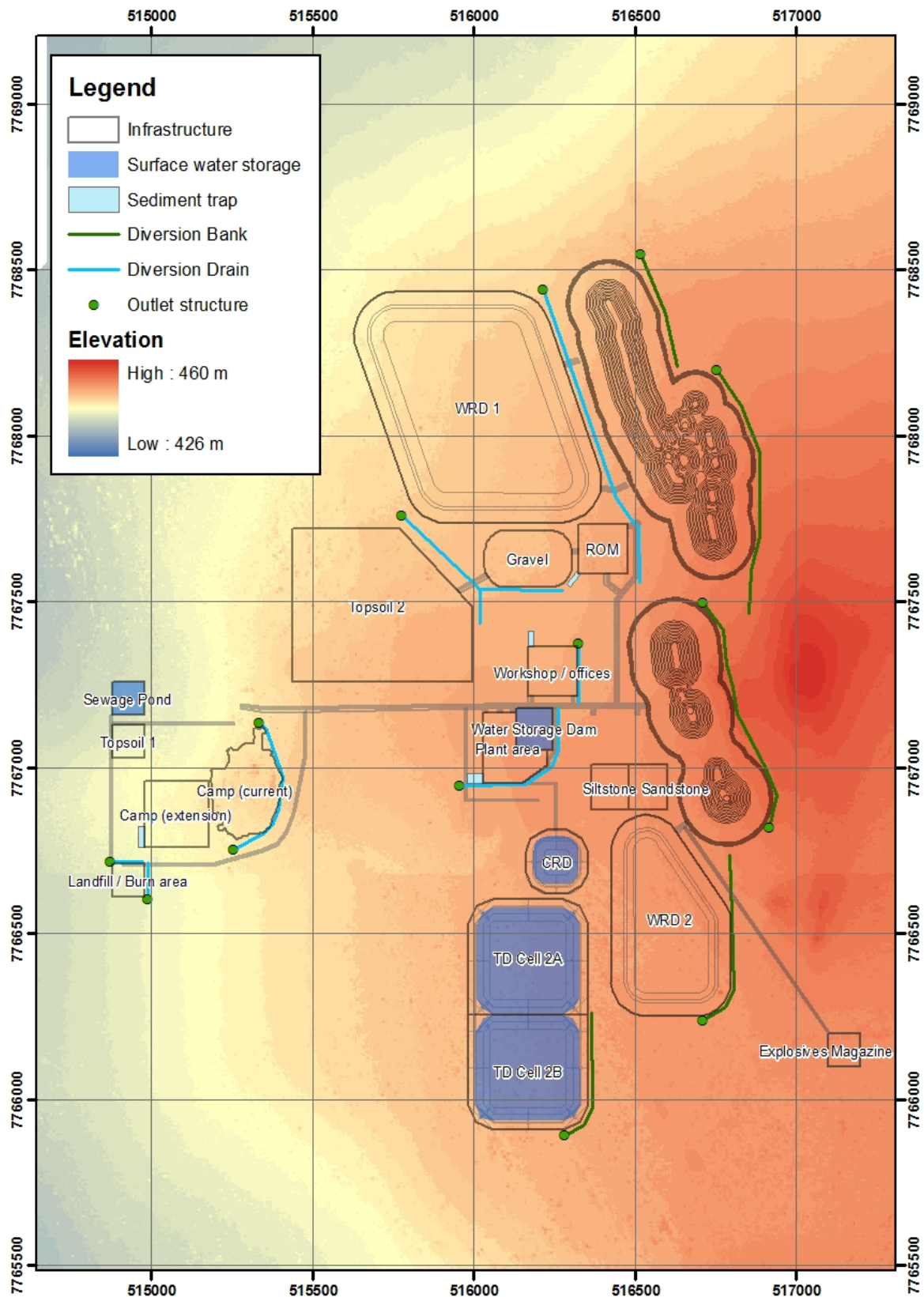


Figure 4. Revised site layout showing updated surface water management infrastructure (mapped produced by Soilwater Group).

3.3 Repositioning of the Concentrate Residual Dam and Tailings Dam 2A/2B

The Concentrate Residual Dam (CRD) and Tailings Dam have been positioned further south to allow for the positioning of a diversion drain around the proposed plant site (as detailed in Comment 26, Section 5). This will allow rainwater runoff to flow unimpeded around the proposed plant site to the east. Also the increased distance between the CRD and the process areas will reduce bottlenecks of surface water flows and minimise erosion at the base of the CRD embankment.

3.4 Additional Access and Haul Roads

As a result of the modifications/relocations of stockpiles and infrastructure as detailed in sections 3.1, 3.2 and 3.3, additional roads were required to access the areas (Figure 3). An additional road is required:

- Between the pisolite stockpile and the northern topsoil stockpile.
- From the plant site to the CRD.

3.5 Amended Disturbance Table

To reflect the project changes which have altered the size of several disturbance types, Table 1 provides an update of the changes.

Table 1. Summary of the revised Twin Bonanza project components and disturbance areas.

Component	Proposed area, Draft EIS (Hectares)	Revised area (Hectares)	Existing area (Hectares)	Total area (Hectares) including existing areas	Description	Draft EIS section
Haul roads	3.2	3.4	0	3.4	Haul roads designed to be water shedding.	Chapter 12
Other roads	0.7	1	3.5	4.5	Existing roads incorporates both pre bulk sample and bulk sample roads.	Chapter 12
Main diversion structures	3.4	4.1	0	4.1	Designed to 1:1 000 year peak flow event.	Chapter 7, Erosion and Sediment Control Plan – Appendix E
Internal diversion structures	1.4	1.8	0	1.8	Designed for 1:100 year peak flow event.	Chapter 7, Erosion and Sediment Control Plan – Appendix E
Total	8.7	10.3*	*An increase of 1.6 hectares above the 255.8 hectares quoted in the EIS			

4 Changes to Environmental Measures and Management

Based on the proposed modifications and relocation of infrastructure the proposed environmental management and mitigation measures in the Draft EIS do not require updating; however, based on the submissions a number of management measures and processes have been refined. These changes can be summarised as:

- Inclusion of management measures and controls for the European red fox if it is identified within the project area. Include in the Biodiversity Management Plan (refer to Comment 2, Section 5).
- Incorporation of measures and details on resourcing to be used for controlled burning around site and for the protection of fauna during an event. Updating of the Fire Management Plan and Biodiversity Management Plan (refer to Comment 3 and 78, Section 5).
- Liaising with Department of Land and Resource Management on management of threatened species within the proposed disturbance areas. Finalising a procedure for the immediate care and transfer of sick or injured wildlife. Modifying Biodiversity Management Plan (refer to Comment 5 and 8, Section 5).
- At known bilby burrows blasting vibration is to be controlled below levels as specified under Australia Standard AS2187.2-2006 for occupied non sensitive sites. Modification of the Noise Management Plan and Biodiversity Management Plan (refer to Comment 11, Section 5).
- Collection of surface water samples and/or identified seepage if present from around the waste rock dump to monitor surface water quality. Revision of water management plan to incorporate this sampling (refer to Comment 13 and 71, Section 5).
- Updating of the legislative matrix to reflect all relevant agencies in respect to incident reporting (refer to Comment 14, Section 5).
- Investigating alternative methods for dust suppression to improve water efficiency. If methods are found to be effective they will be incorporated into Water Management Plan (refer to Comment 22, Section 5).
- Modifications to sediment and erosion management in response to Comments 29, 30, 32, 34 Section 5. Updating of the Erosion and Sediment Control Plan and Water Management Plan.
- Inclusion of a water usage table in the water management plan that incorporates details on water usage at the different stages of mine development (refer to Comment 48, Section 5)
- Review of the risk assessment to incorporate Comments 54 and 55, Section 5.
- Revising the fauna monitoring program to incorporate an inspection of the waste rock dumps and other areas for fauna including brush tailed mulgara and greater bilby (refer to comment 56, Section 5). Revised Biodiversity Management Plan.

As detailed throughout Section 5, ABM is committed to ongoing dialogue and discussion with regulators and stakeholders during development and implementation. This will include ongoing engagement with the CLC (as representatives of the Traditional Owners) in the areas of tailings management, waste rock dump design, fire management, environmental offsets and closure planning.

5 Responses to Draft EIS Submissions

After a review and compilation of the submissions a total of 90 comments were received and have been addressed in this document. To ensure each matter is fully considered, rather than providing a compilation of environmental information for examination, comments will be addressed individually. When required supporting appendices are referenced within a response and are provided.

Submissions have been addressed on an individual respondent basis with each submission further divided into the separate points which have been raised. Each point is tabulated with a response underneath. Where points raised in one submission are similar to those in another the reviewer may be referred to the similar question for which the response has been written. From the responses a number of updates are required for the various management plans, risk and legislation matrix, an update of these documents will occur as part of the first review once the EIS process has been finalised.

5.1. Department of Environment (Commonwealth Government) and Northern Territory, Environment Protection Authority (this includes Pollution NT EPA)

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
1	<i>Environmental Management Plan, Chapter 14.</i>	<i>Pages 411, 462 and 464 of the Environmental Management Plan refer to the Heritage Conservation Act. The NT EPA notes that the Heritage Conservation Act has now been replaced by the Heritage Act. All references to this legislation in the Environmental Management Plan should be updated to reflect this change.</i>	NA

Response:

Noted, as part of the Environmental Management Plan review the references to *Heritage Conservation Act* will be amended to read *Heritage Act*.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
2	Chapter 6 and Appendix D.	<i>The Fauna and Flora Surveys/Biodiversity Management Plan states that 'the European red fox was not observed in the project area.</i> <i>The species distribution may still be expanding northwards, having reached the Tanami Desert in the 1970's and becoming relatively common as far north as Tennant Creek, there is a possibility that established populations occur in the region of the project. The NT EPA notes that while the fox was not identified during fauna studies at the site, the Project is located within the known range of the species and there is potential that the species could either occur in low densities or re-establish at the site when favourable conditions return. The Supplement should outline additional measures that will be put in place for identifying and managing the fox numbers should the species be detected on site.</i>	NA

Response:

Response from ABM with contributions from EcOz Environmental Services.

Current database records and personnel observations in the area suggest that foxes do not currently occur in the Twin Bonanza project area. Additionally, dingoes have been observed in the area and there is research that areas with higher dingo presence tend to support low fox populations as dingoes prey on fox, and outcompete them during droughts (Pavey 2006). However, it is true that the proposed development may attract foxes to the area as they have been observed in the Tanami. As with other pest fauna, the main attractant for foxes are the camp and accommodation areas (provide food and shelter), man-made surface water supplies (fresh water source), and soil stock piles (suitable for making dens). These areas will be inspected regularly for feral cats, dog and dingo intrusion/presence (these inspection will include foxes). In addition, if fox tracks or scats are recorded during fauna monitoring, this evidence will trigger ABM to implement a control program to eliminate individual foxes from the project area.

The management response for foxes will be taken very seriously, and would be similar to that described for feral cats as referenced in Section 4.5 of the Biodiversity Management Plan. Measures would include:

- Localised trapping and shooting program will be conducted around potential attraction sources.

- Professional hunters or trained Traditional Owners will undertake periodic culling.
- The landfill will be fenced to exclude native species including dingoes,
- If foxes are seen to be accessing the landfill, baiting and trapping within the landfill compound will be undertaken.

There will be an additional control measures to the above and that being den fumigation. Den fumigation will only be used on a localised basis around the site if dens are located and confirmed to be utilised by foxes. This will be carried out using current technologies and in accordance to accepted methodologies. ABM will review the content of the current Biodiversity Management Plan and amend to include specific reference to “management and control of foxes”.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
3	Chapter 15.	<i>Chapter 15 (Environmental Offsets) proposes the use of fire to alter the habitat at sites that have been identified for clearing/construction activities. The aim is to modify the habitat and promote the movement of burrowing marsupials such as bilby and mulgara away from the site. The Fire Management Plan should include details of these activities and outline the measures/resources that will be made available to undertake this work. The Supplement should identify what measures will be put in place to reduce the risk of wildlife being injured or killed during these burning activities.</i>	NA

Response:

The following section will be inserted in the Fire Management Plan:

The aim of pre-clearing controlled burns is to modify the habitat at sites that have been identified for clearing/construction activities, promoting the movement away from the site of burrowing marsupials such as bilby and mulgara. Controlled burning will only be undertaken with a permit under the Bushfire Act and working with the CLC and/or relevant CLC Rangers to ensure:

- The positioning of firebreaks either by mechanical clearing to create a 4 metre wide fire break or removing fuel load via slashing to effectively contain the controlled burn.
- The timing of the prescribed burn and positioning of the ignition line takes into consideration the prevailing wind conditions and temperature.
- Clearances from CLC are in place covering the intended controlled burn.

Appropriately trained staff will be in attendance to monitor the fire and take preventative actions to ensure the fire is contained within the designated area. The number of staff in attendance will reflect the nature and size of the controlled burn. Resources will include a tank and associated firefighting unit with a direction nozzle/cannon. Additionally earthmoving equipment will be on standby in case supplementary firebreaks are required.

In addition, to minimise the local risk of wildlife being injured or killed during controlled burns the following measures will be put in place:

- The timing of control burns will be coincided to periods of low fauna activity (for example not occurring when nocturnal species are active).
- When small areas are being burnt, the area will first be traverse to move highly mobile fauna on.
- If practical, burn progressively to limit the area burnt at any one time.
- Light the fire along designated margins allowing fauna time to exit (for example not lighting the fire on all sides at once).
- Undertake control burning when temperatures are cooler as hot/dry fuel can result in a hotter burn.
- Only burn when prevailing wind conditions are suitable.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
4	Chapter 5.	<i>The Risk Assessment Section of the draft EIS (Chapter 5) notes that the extraction of groundwater beyond sustainable limits as one of the highest risks to the Project. The management, mitigation and controls identified in the draft EIS specifically mention the 'monitoring of water table, with monitoring bores and monitoring of vegetation health; in accordance to ABM's Paleochannel Vegetation Monitoring Plan'. The supplement should identify what contingency measures will be implemented in the event that extraction exceeds sustainable limits and water availability declines or becomes unavailable. In addition, the Supplement should identify what provisions will be made for ensuring water will still be available for the ongoing management of environmental issues on site (i.e. dust suppression etc.).</i>	Comment 22

Response:

Further investigatory work is proposed to better define the various aquifers and their parameters and details are provided in response to Comment 20. This work is targeted to establish sustainable limits to operate under. With the staged development approach water demand will increase incrementally allowing the performance to be monitored over time. If it is identified drawdown has exceeded expectations then reduced pumping will be implemented while further water exploration is completed on the eastern side of the project at Target 3. In the event that reduced pumping is further drawing down then pumping would be minimal or ceased (in consultation with relevant agencies) with activities scaled down at site to reduce water requirements, while water would be directed to critical areas including environmental issues. If water quality is appropriate, water within the water storage dam would be made available for dust suppression. A full water storage dam would have the capacity to provide 3,000 tonnes of water in the short term.

As detailed in Comment 22, ABM has committed to optimising the site water balance to maximise water use and retention. During this process alternative measures other than water will be explored to manage environmental issues, this will also aid in reducing water requirements, allowing these issues to be better managed in the absence of water.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
5	Appendix D	<i>The Biodiversity Management Plan provides no indication as to the use of translocation for avoiding impacts to threatened species. The Supplement should discuss the methods that will be used to manage threatened species following controlled burns of proposed clearance areas. In addition, the discussion should include consideration of any juvenile animals which may remain in burrows at night, during any night time activities or actions that may impact the burrows.</i>	NA

Response:

The translocation of threatened species to an area away from Twin Bonanza does not form part of the current Biodiversity Management Plan. This decision was based on discussions during considerations of offsets with a number of consultants and researchers (listed in Chapter 15 – Environmental Offsets). Translocation is considered highly problematic and success limited due to the effect on the individual being relocated and the individuals present at the site of release. However, if a burrow of a threatened species is located during pre-clearance inspections then ABM will consult with the Department of Land and Resource Management on the potential to implement a catch and release program that will be conducted under a Parks and Wildlife Commission NT

permit. All release points will be close to capture point (i.e. within 1 km) to ensure that individuals are still within their home range. This will involve engagement of an appropriately experienced ecologist. In addition, ABM is in the process of developing a procedure for the immediate management and transfer of sick and injured animals. This procedure will incorporate published and soon to be published resources from Parks and Wildlife Commission NT. ABM has investigated the transfer of individual bilby to a captive breeding program but this currently appears unviable.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
6	Section 4.1.8, Appendix D	<i>Section 4.1.8 identifies the management actions that will be implemented to mitigate risks to the greater bilby. The Biodiversity Management Plan states that 'the implementation of night time speed restrictions can significantly lower the risk of vehicle strike to Greater Bilby and that a night speed limit of 60km/hr allows individual bilbies to avoid vehicles and vehicle drivers to make safe adjustments to avoid a collision should a bilby be sighted'. The Supplement should include justification for the 60km/hr speed limit and discuss the efficacy of the measure for reducing the risk to threatened marsupials. Ideally the supplement should reference scientific literature or the successful implementation of the speed limit at other mining operations where the bilby is a factor (i.e. Tanami region or Pilbara).</i>	NA

Response:

The 60km/hr speed limit was set, based on publicly available information on speed limits used by approved operations in the Pilbara and Tanami (Table 2). In the majority of cases fauna surveys have been unable to locate the presence of bilbies, so the speed limits were set for threatened species that occur in the area or have the potential to occur in the area. A search of published company reports failed to find any details on the effectiveness of the speed limits in reducing the risk to threatened species. In the approval documentation for each of the projects contained in Table 2 little detail has been given for the basis of adopting the designated speed limits.

Table 2. Summary of the literature on speed limits at mining operations across the Pilbara and Tanami Regions.

Company	Speed Limit	Reason
Fortescue Metals Group Ltd (Various sites across the Pilbara)	80km/h access tracks 60km/hr on haul roads and mine site roads	Safety and minimise effect on fauna. (No bilbies documented in close proximity.) Assessed under <i>Environment Protection and Biodiversity Conservation Act 1999</i>
BHP Billiton Iron Ore (Various sites across the Pilbara)	60km/hr on haul roads and mine site roads - No detail on access roads	Safety and minimise effect on fauna. (No bilbies documented in close proximity.) Projects either assessed as controlled or non-controlled action under <i>Environment Protection and Biodiversity Conservation Act 1999</i>
Rio Tinto Iron Ore (Various sites across the Pilbara)	60km/hr on haul roads and mine site roads - No detail on access roads	Safety and minimise effect on fauna. (No bilbies located in close proximity.) Projects either assessed as controlled or non-controlled action under <i>Environment Protection and Biodiversity Conservation Act 1999</i>
Tanami Gold NL (Coyote Mine site)	60km/hr around the mine site 80km/hr on haul roads	Safety and fauna management. Haul road speed increased from 60km/hr to 80km/hr after mulgara identified as <i>Dasycercus blythi</i> species. Approved by Environmental Protection Authority, Western Australia.
Newmont Pty Ltd (Granites Tanami Mine)	No restrictions on speed limits based on the presence of fauna.	Speed limits designated for mine safety. Approved under the Mining Management Act

Literature specifically on preventing vehicle and wildlife collisions have highlighted that there are a number of other contributing factors besides speed. These include driver detection distance of the species in question, driver experience, lighting (including low and high beam headlights), verge width and frequency of traffic. In summary, two of the surveys recommended speed limits being reduced below 80km/hr while the third recommended a speed limit of 50km/hr in respect to the Tammar Wallaby (Table 3).

Table 3. Summary of literature detailing studies on vehicle speeds and fauna fatalities.

Species	Comments	Recommendation/findings	Study
Hare, Tasmanian bettong, Brushtailed Possum, Eastern barred bandicoot, spotted tailed quoll, Bennetts' Wallaby, Tasmanian pademelon, Eastern quoll and Tasmanian Devil.	Species tested for detection distance and stopping. Detection distance varied depending on the species.	Night time driving speeds slower than 80km/hr may be effective in reducing roadkill in wildlife hotspots.	(Hobday 2010)
Roe deer, Otter, Rabbit and Hedgehog	Constructed theoretical model for determining potential fauna deaths from road design	Lower speeds than 80km/hr have the potential to improve driver ability to detect and stop while animals more likely to evade the collision.	(Jaarsma, van Langevelde and Botma 2006)
Tammar Wallabies	Used GIS to explore the relationship between wallaby deaths verge width, fences, speed limits roadside lighting.	A night time driving speed limit of 50km/hr was recommended (however it was indicated that the higher number of collisions at 60km/hr may be related to drivers not slowing down from the prior speed limit i.e. still travelling at 80km/hr).	(Chambers et al 2010)

The 60km/hr night speed limit is targeted at nocturnal fauna and is based on the ability for drivers to identify fauna on the road and instigate an evasive manoeuvre. From the current industry practice and the literature, adoption of a night speed limit of 60 km/hour would be consistent with current practices and recommendations for managing threatened species.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
7	Section 5.4.5, Appendix C	<i>The Flora and Fauna Report (Section 5.4.5- Threatened Species) notes that the positioning of the tailings dams on laterite substances could deleteriously impact bilbies and other threatened marsupials. The potential for this impact on threatened marsupials by the Twin Bonanza Project should be discussed further in the Supplement.</i>	NA

Response:

Response from ABM with contributions from EcOz Environmental Services.

This comment was taken from published literature and is purely to present context on suitable habitat types of greater bilby, and should not be taken as a targeted issue of the tailings dams at the Twin Bonanza Project. Based on the available literature documenting preferred bilby habitat types, ABM undertook an assessment to define potential habitat types and their distribution across the project. This assessment, in conjunction with field surveys, found bilbies tend to focus activities and burrow construction in areas with a higher laterite content. Land units known as lateritic sand plains were used as a criteria for investigating the location of potential bilby habitat. Based on this mapping structures such as tailings dams and waste rock dumps were located away from lateritic substances/sand plains. Additionally, each proposed location was activity walked by Aboriginal staff, ABM field staff, and experienced ecologists from EcOz Environmental Services. This potential impact of siting infrastructure on laterite was also considered in the Chapter 5 - Risk Assessment within the Draft EIS, that stated one of the management measures was the siting of infrastructure in areas that will least impact threatened species.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
8	Section 6.4, Appendix C	<i>Section 6.4 of the Flora and Fauna Report appears to have some discrepancy around the translocation of Greater Bilby and Mulgara. The report initially states that one management option is to conduct a two night trapping program with animals released adjacent to the cleared area. The report also states that 'Ecoz does not recommend a translocation program for threatened fauna species, as there is little evidence that translocations are successful and the research required to confirm success would not be within the scope of this project. The supplement should include a statement identifying whether translocation or relocation will be used for this project. If translocation/relocation is planned to be used to avoid impacts, the Supplement should outline the relevant measures for minimising risk to translocated animals (including juveniles). Consideration should be given to the Australian Government's policy for translocating listed threatened species. The guidelines are available at: http://www.environment.gov.au/resource/epbc-act-policy-statement-translocation-listed-threatened-species-assessment-under-chapter.</i>	Comment 5

Response:

It is not proposed to translocate. The intention is that if threatened species were located within proposed disturbance zones then efforts are to be conducted to preserve individuals as detailed in Comment 5. The above comment is referring to translocation programs that involve release of animals outside of their current home range (which was not recommended in the reference provided above and not proposed by ABM).

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
9	Section 5.4.5, Appendix C	<i>Flora and Fauna Report (Section 5.4.5- Threatened Species) appears to have a lack of detail regarding the level of effort and experience of staff undertaking surveys for the Great Desert Skink (Liopholis kintorei). The Supplement should outline the measures that were used during the surveys as well as a summary of the experience of the observers. The Supplement should discuss whether the survey effort conducted was consistent with the EPBC Act Survey Guideline for Australia's Threatened Reptiles which states: 'the most appropriate survey technique is to locate burrow systems by walked transects, employing experienced observers familiar with the appearance of burrows of this species (particularly utilising local Aboriginal experience), and then observe those burrows that show signs of activity (active latrine site, recently dug soil at entrances) for the emergence of animals'..</i>	NA

Response:

Response from EcOz Environmental Services is as follows:

Survey methodology for threatened species was outlined in Section 4.4.8 which was consistent with EPBC Act methods, and included specific methods for surveying for the Great Desert Skink (*Liopholis kintorei*). Specific transects for Great Desert Skinks (and other threatened species) were walked during the surveys (these transects are provided in the Flora and Fauna report, however they were labelled Bilby Transects in that report).

A brief description of survey team was presented in Section 4.4.1, however there was no specific detail included in terms of experience with surveying threatened species in the Tanami. A more detailed description of the survey team responsible for tracking Greater Desert Skinks is provided below.

The Twin Bonanza fauna surveys (October 2012 and May 2013) were led by Tom Reilly who has several years of experience in fauna surveys within the Tanami and is well trained in identification of Greater Bilby, Great Desert Skink and Mulgara (including identification in hand and via tracks/scats/other sign). Tom was initially trained by Dr Bill Low (of Low Ecological Services) in the identification of fauna in the Tanami, and has since been working with EcOz Environmental Services where he has had many mentors (including Dr Noel Preece). Tom was also involved in voluntary fauna surveys at Newhaven Sanctuary in 2010 where additional Great Desert Skink burrows were found. Tom has worked in the Northern Territory conducting fauna surveys since 2003, and has identified burrows of Great Desert Skink in the past.

The October 2012 survey included Dane Trembath who is a specialised zoologist well known within the Northern Territory, and has worked in a variety of positions across Northern Australia for 15 years. Dane's previous role to EcOz was a research associate at the Museum and Art Gallery of the Northern Territory where he focused his time on identification and characterisation of the fauna of the Northern Territory (specialising in herpetofauna). All photographs and voucher specimens collected in the May 2013 surveys were also reviewed by Dane to ensure that identifications were correct.

Brendan Schembri participated in both surveys and is a well-known fauna surveyor in the Northern Territory. Brendan has worked throughout Australia on a range of environmental impact studies. Brendan was specially sub-contracted to EcOz for this project for his expert ability to readily spot and catch fauna during the day and night (he is currently a field ecologist for Phoenix Environmental Consultants). Brendan is also a nature photographer and is pedantic in terms of correct identifications

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
10	Section 5.4.4, Appendix C	<i>Noting the historical complications surrounding the naming of Mulgara species, there remains some uncertainty as to which is present at the Twin Bonanza site according to the Flora and Fauna Report Dry Season, May 2013 (Section 5.4.4-Mammals). For example, it is stated 'Two Brush-tailed Mulgara (Dasycercus blythi) were captured, including one individual at Site 1F and one at Site 2C. This species is listed as vulnerable under the TPWC Act and EPBC Act (as Dasycercus cristicauda)'. The Supplement should include a discussion of the methods that were used to identify the captured and observed individuals. The Supplement should include comment on the level of confidence that the identification is correct.</i>	NA

Response:

Response EcOz Environmental Services is as follows:

EcOz can confirm that all Mulgara caught and identified during the surveys are *Dasyercus blythi* and NOT *Dasyercus cristicauda*. Identifications made by Dane Trembath in the field based on tail morphology and confirmed by Stephen Richards, the Terrestrial Vertebrates Curator at the Museum and Art Gallery of the Northern Territory. Recent literature by (Wooley et al. 2013) also shows that identification by tail morphology is the correct way to identify this species. (Wooley et al. 2013) also records specimens of *D. blythi* from near the project area, with *D. cristicauda* only occurring in the Simpson Desert within the Northern Territory.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
11	Appendix Y	Noise Management Plan -The draft EIS outlines a discussion of the potential risks associated with blasting, noise and vibration on threatened fauna. The Supplement should include information on the potential risks of blasting/vibration on bilby and mulgara burrows (e.g. the effects of vibrations on burrow stability). The information should include references to any previous studies on the effects of blasting on burrow stability.	NA

Response:

After a review of the literature, ABM was not able to locate any previous, publically available, studies on the effects of blasting on burrow stability for bilby or mulgara. Attempts to obtain relevant non public information from government departments, other mining companies and a major explosive supplier have also resulted in no relevant information being obtained. With blasting yet to occur on site it is also not possible to undertake any actual studies or monitoring.

Monitoring of bilby or mulgara burrows is also practically limited to what can be seen at surface. Without residence of an animal, and given that they are located in a weathered profile and often transported cover, burrows are prone to collapse in any case without maintenance due to natural deterioration. Monitoring of burrows is not likely to be significantly informative.

In terms of bilby burrows, a number of the recorded burrows in the area are inactive and totally or partially collapsed (see maps in Figure 1 and Figure 2). The closest burrow is 200 m from the edge of the proposed open cut pit, however the majority of the burrows are approximately 500 m away from the open cut pit. It is not uncommon that burrows naturally collapse over time, especially if they are not in use (and therefore not being maintained). As burrows take a large amount of effort

to dig and provide important protection, greater bilbies will often repair and re-use old burrows. Some of these burrows can date back numerous years (Australian Museum 2014).

A greater bilby may have up to a dozen burrows—some for sleeping in and the others for escaping into. When returning to the burrow after a night of foraging, the greater bilby often back-fills the burrow to prevent predators from entering and providing some stabilisation to the hole entrance.

It is possible that mulgara burrows will be impacted as they are more widespread than bilby burrows and are also less conspicuous (i.e. smaller in size and often built within mature *Triodia* hummocks). However, the impact of noise and vibrations on Mulgara is likely to be minimal as they have been caught in close vicinity to mine sites within the Tanami, including an individual being found scavenging at the Wilsons Camp (ABM exploration camp) under the kitchen.

In respect to blasting vibration, Australia Standard AS2187.2-2006 suggests a peak particle velocity of 25mm/s for occupied non-sensitive sites at all frequencies. Measurements will be undertaken for both representative and significant blasts at known bilby habitat most proximal to blasting locations to control blasting vibration below the Australian Standard for occupied non sensitive sites.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
12	Chapter, 6,7,8,9,10,11	<i>Consideration should be given to the cumulative effect of the various impacts to threatened species discussed in the draft EIS, such as noise, vehicle movements and habitat clearance. The cumulative impact of these threats is likely to be greater than the sum of the individual threats and as such, should be further explored and discussed, particularly with reference to the Greater Bilby population.</i>	NA

Response:

The localised effect of the Twin Bonanza can be divided into spatial and temporal components, which will occur concurrently during mining. During the preparation of the Draft EIS, threatened species were a fundamental consideration in the project's decision making and design process. In particular care was taken to consider the effect on bilby populations (which will also protect brush-tailed mulgara) from the summation of the spatial and temporal components to ensure the combination will not result in an impact that is more detrimental than the impacts of the individual items. With this consideration each environmental impact and associated risk assessment was considered both in terms of the broader ecosystem and bilbies as a key receptor (Chapter 5 Risk Assessment, Draft EIS). For example blasting will be coincided with periods (dawn and dusk) that

mark the transition from nocturnal activity to daytime inactivity and the relocation of mining infrastructure will provide a greater separation distance from the known areas of activity. This will lead to a portion of the noise and vibration being attenuated through the substrate/ground. At an individual impact level ABM, as well as complying with all relevant legislation, has aligned itself to current guidance material on leading practice in a number of areas including biodiversity, waste management, noise and vibration as detailed in Chapter 2 – Regulatory Environment of the Draft EIS in an effort to reduce the effects of each impact as much as possible.

Intensive on-ground surveys were undertaken to demarcate areas of bilby activity. Areas of activity were used as criteria in determining infrastructure positioning. This approach led to a more compact site layout with reduced habitat fragmentation of known areas of bilby habitat with road and haul ways surrounded by mine infrastructure such as pits and waste rock dumps thus limiting fauna and vehicle interaction. The integrated approach as detailed above was taken to avoid a piecemeal decision making and design process that could have resulted in individual impacts that may have created greater cumulative effect on both the ecosystem and at an individual species level.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
13	Chapter, 10	<i>(Pollution NT EPA) Stormwater management</i> <i>It is not clear from the draft EIS how the proponent intends to manage stormwater from the waste rock dump (WRD) or whether the proponent intends to monitor stormwater down gradient of the WRD. Some 'intercalated anomalous arsenic samples' which will be deposited in the WRD have been identified in the draft EIS as having the potential "to result in acid drainage". The draft EIS does not describe how stormwater from the WRD will be managed or monitored to ensure that any potential acid drainage does not move to surrounding waterways.</i>	Appendix B

Response:

An assessment of the waste rock demonstrated that the majority of the material was Non Acid Forming with low Sulphide-S in most cases below 0.1%. Samples with higher Sulphide-S were re-examined to determine the form of the sulphur. In almost all cases the sulphur was associated the trace sulphides along vein margins and selvages. As detailed in Appendix M – Waste Dump Characterisation, the analysis highlighted that all waste rock units are unlikely to produce acid mine

drainage. As a conservative approach units with higher trace sulfides are to be positioned in the centre of the waste rock dump thus limiting the amount of sulphides exposed to oxygen and rain water.

Rainfall on top of the dump surface will be contained and allowed to infiltrate as the typical field capacity of the waste rock is about 330mm per metre meaning infiltration is high likely to be contained in the dump (Appendix B). Rainfall on the sides of the dump will infiltrate or flow downslope. At the toe of the dump a bund will be established to capture the water and sediment. During rainfall events that result in flowing storm water around the waste rock dumps samples will be collected for analysis of a suite of elements to determine if the activities are affecting water quality. Sampling will be completed as detailed in the Standard Operating Procedure for Surface Water Monitoring contained in Appendix F – Water Management Plan, Draft EIS. The operating procedure will be updated to include sampling around the waste rock dump. This update will occur once the EIS process is completed. Additionally, if any areas of seepage develop along the waste rock dump batters, a sample either of the water or the dehydrated salts will be taken for analysis to investigate the chemistry of the sample.

5.2. Department of Mines and Energy

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
14	Section 1.3.2, Chapter 1	<i>"Crocodile Gold new mine at Pine Creek is the closest of these new development to the proposed project and is 700km away; consequently there will be no cumulative impacts on the region":</i> <i>Cumulative impacts should consider existing and proposed projects in the Tanami Bioregion.</i>	NA

Response:

Within a regional context the Twin Bonanza 1 project is surrounded by four mining projects at various stages of their lifecycle from evaluation through to closure (Table 4). Of the four projects only one is currently active with the remainder either undergoing evaluation or on care and maintenance. In addition, to these operations, exploration activity also occurs in the area with the levels of activity reflecting availability of funding for exploration. As detailed in Chapter 1 of the Draft EIS the project is underlain by the Mt Fredrick No.2 Aboriginal Land Trust and as such no pastoral activities are present with the primary land use associated with traditional land practices and management. When considering the cumulative impacts of the project the spatial, temporal, linked and source impacts of the project in association with other mining operations or land uses needs to be examined. The effect of these impacts then needs to be considered in the context of their effect on habitat value, water quality and socio economic aspects (Franks et al 2010).

Table 4. Summary of operations and proposed operations surrounding the Twin Bonanza Project.

Project Name	Distance from Twin Bonanza (km)	Status
Coyote (Tanami Gold NL)	47km to the North West	Gold Mine (Care and Maintenance since 2013)
Central Tanami (Tanami Gold NL)	64km to the North East closest pit 36km to the North East	Gold Mine (Care and Maintenance)
Granites (Newmont Mining Corporation)	131km to the South East closest part of operation Callie 86km to the South East.	Gold Mine (Operating)
Browns Range	144km to the North	Rare Earths (Under Evaluation)

Habitat Value

The Tanami bioregion covers a total area of 259,970km² spanning from Western Australia to the Northern Territory. Implementation of the project will result in a final footprint of approximately 260 hectares or 2.6km² which is 0.001% of the total bioregion. When considered in the context of the estimated overall clearing of < 1% that has occurred in the bioregion up until 2005 (Barker et al 2005) the amount of proposed clearing represents a small addition to the overall bioregion.

With the proposed project spatially separate from the nearest mine site infrastructure is a pit located 36km to the north-east and with minimal linkage (i.e. only connected by regional roads) the impact of clearing will be localised. At a project level infrastructure has been moved as detailed in Chapter 15 – Environmental Offsets to reduce the impact on threatened species and their preferred habit, and management measures have been put in place to reduce operational effects Chapter 6 – Biodiversity. In the situation of dust, noise and vibration the distance between operations will have little if any cumulative effect on the overall ambient regional air quality. This is lessened further by the fact that two of the three existing operations are on care and maintenance.

Water Quality

Further discussion on the response detailed below is contained in Chapter 7 - Water Management and Appendix I – Preliminary Groundwater Assessment of the Draft EIS. The location of the project on the drainage divide prevents surface water that sheds to the east from coming into contact with the site. Water interacting with the site sheds to the west and drains into a broad valley underlain by a palaeochannel located 8km to the west. The majority of groundwater occurs in palaeochannel systems flowing to the south west with lesser groundwater contained in fractured rock aquifers. It is proposed to extract water from a palaeochannel on the western side of the project and as the project expands potentially extracting water from a palaeochannel on the eastern side. The cumulative effect on surface and groundwater quality from the mining operations detailed in Table 4 is highly unlikely due to the following points:

- The distance between operations and topography prevents the mixing of surface water from each site.
- Operations have a high spatial separation with a number of palaeochannels existing between operations, as a result each operation draws from a different palaeochannel network with minimal linkage to the other.
- Each site is located on a separate palaeochannel recharge catchment thus preventing water quality of a single palaeochannel being affected by multiple mining sources.

Socio-Economic Aspects

Socio-economic effects of the project and management have been discussed in detail within Chapter 13- Social, Economic, Cultural and Heritage Risks of the draft EIS. The proposed project will contribute to further employment and economic activity in the region. To manage these community impacts the following measures will be adopted:

- Open communication with all stakeholders.
- Continual engagement with the local communities, with open and responsive dialogue.
- Identify issues early and consult with the affected groups.
- Providing employment and training opportunities for local communities.
- Establishing a working relationship with other operations in the area.
- Comply with regulatory requirements and stakeholder commitments.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
15	Section 3.4.10, Chapter 3	<i>"If it is not practicable to dewater open pits to water storage facilities, such as when freeboard is limited or tailings deposition may be compromised, water may be pumped to an alternate open pit if available or discharged to the environment via a discharge method to prevent erosion, such as rock discharge."</i> <i>If there is any discharge to the environment outside the tenement, a Waste Discharge Licence may need to be acquired.</i>	NA

Response:

The potential requirement for a Waste Discharge Licence for discharging water to the environment outside of the tenement boundary is noted. If water discharge is required that may result in discharge outside of mining tenure, a licence will be sought. It needs to be noted that water discharge would only occur in consultation with government agencies and only water of a suitable quality would be discharged to the environment.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
16	Table 5-4 Risk Assessment Chapter 5	<i>Liberation of sediment from Airstrip</i> <i>ABM will need to identify options for controlling discharge of polluted runoff into the environment near the airstrip</i>	NA

Response:

As the airstrip has been established for a number of years the rate of sediment erosion would have stabilised over the period. It is proposed as part of the airstrip upgrade to complete an investigation of the topography in relation to the detailed plans thus ensuring the drains and sediment traps are appropriately sized and positioned. These details would then be submitted as part of the Mining Management Plan. Conceptually at least one sediment trap will be located at the eastern end of the airstrip as this is the lowest point. The design of the sediment traps will be in accordance to Appendix E – Erosion and Sediment Control Plan (ESCP) sediment traps and will remove $\geq 90\%$ of particles ≥ 0.045 mm in diameter (fine sands) during storm events as large as the 1:20-yr peak flow event. With the sediment traps being flow through systems the discharge point will be designed to minimise erosion. As part of the maintenance of the erosion control measures the sediment trap will be cleared regularly to maintain capacity.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
17	5.5.2 Environmental Incidents, Chapter 5	<i>Depending on the type of incident (e.g. disturbing a sacred site or heritage site) ABM Resources NL will have reporting requirements under other NT and/or Commonwealth legislation that are regulated by additional agencies not included in this list</i>	NA

Response:

Noted, ABM has established a Legislation Matrix (Appendix B – Legislation Matrix for Twin Bonanza, Draft EIS) which contains a list of the applicable legislation and associated compliance requirements. This includes Northern Territory and Commonwealth legislation and other guidelines. This matrix will be regularly reviewed to maintain up to date details on the relevant compliance, incident reporting and regulatory requirements. This comment will be incorporated in the first review which will be undertaken on completion of the EIS process.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
18	Figure 9.1, Chapter 9	<i>The Camp Sewerage Leach Pond and Landfill are located close to the boundary of the MLA 29822. Any leachate outside the MLA may require reporting under the Water Act and the Waste Management Pollution Control Act. Adjustments to the proposed locations of these facilities should be considered.</i>	NA

Response:

In response to this comment, ABM has reviewed the location of the leach pond and landfill and has moved their locations towards the east as detailed in Figure 2, this will provide greater separation from the tenement boundary.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
19	General	<i>All other issues identified are operational and can be managed under the Mining Management Act within a Mining Management Plan.</i>	NA

Response:

Noted, ABM will operate as per the Mining Management Act.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
20	Section 3.4.10, Chapter 3	<i>Details of the location and design of this discharge infrastructure will need to be provided in the MMP. What environmental controls will be put in place?</i>	NA

Response:

Noted, further details of the location and design of the discharge infrastructure will be provided in the Mining Management Plan. The environmental controls put to place to minimise erosion and ensure discharged water quality is suitable can be detailed as follows:

- The discharge structures will be constructed with a zone of keyed in rip rap (rock armouring) to reduce water velocity and disperse the water over a wider area.
- Discharge areas will be regularly inspected during rainfall events for erosion. If the area is eroding remediation work will be undertaken to minimise the potential for ongoing erosion.
- If monitoring of the discharge highlights the presence of sediment discharge measures will be taken to improve the water residence time in the sediment trap to improve sediment settling volumes.
- If the presence of oil/grease or petroleum hydrocarbons are detected visually or a water analysis details a value of TPH > 15mg/L highly absorbent pads (known as a Global Hisorb Filter) suspended from a boom would be used to recover the oil for disposal in designated hydrocarbon bins with any hydrocarbon affected soils placed in a designated bioremediation area.
- If water quality at the discharge point exceeds the set triggers based on ANZECC guidelines modified for background levels. Investigations will be implemented to establish the source of the elevated elements and action taken to remediate the issue.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
21	Chapter 7 and Appendix J	<i>Table 5-4 Scores "Extraction of groundwater beyond sustainable yields" as the joint highest gross risk value.</i> <i>Chapter 7 Water Management and the Groundwater Resource Assessment (Appendix J) is based on a desktop assessment of the hydrogeological conditions which exist on the site. Completed assessments and more detail on recommendations are required.</i>	Appendix C

Response:

To assess the groundwater resource ABM proposes to undertake testing of Timmy's (once re-established), Corsair, and Wilson's bores to determine the potential of the groundwater resource. The proposed investigations will include:

- Establishment of a monitoring bore network to assess both water quality and extraction across the operation (including the production bores).
- Pumping testing of the established and re-established bores (Corsair, Wilson's and Timmy's)
- Collection of baseline water data for the purpose of ongoing monitoring.
- Determination of the aquifer properties and associated ground water resource.

During this process the relevant government agencies will be consulted to ensure all programs meet agency requirements. Once completed, the findings and recommendations will be incorporated into the site water account and management plan for inclusion in the Mining Management Plan. Further details of scope and extent of work is provided in Appendix C.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
22	Section 7.1 and 7.2.4, Chapter 7	<i>ABM Resources NL will need to provide the completed assessment of the sustainability and viability of water resources available to meet the projected demand as part of the MMP. There is a concern that this project will struggle to find the water resources that it requires.</i> • <i>There is no permanent surface water.</i> • <i>The paleochannel aquifer potentially cannot support this project considering its current low flow rate (the paleochannel located bore "Wilsons" is currently producing 2 Lis with a maximum and unsustainable rate of 8Lis (Section 3.3.1 of Appendix F) and considering the aquifers low recharge rate of approximately 4.5mm per year.</i> • <i>The bedrock aquifers are 100+ meters deep and are low flowing, or often dry.</i> <i>A groundwater budget estimation may be useful to determine if the current groundwater resource is sufficient enough to meet future demands.</i>	Comment 21

Response:

It is acknowledged that the completed assessment of the sustainability and viability of water resources is required as part of the Mining Management Plan. As detailed in the response to Comment 21, the on-site assessment is proposed to expand upon the desktop work. To assess the groundwater resource and sustainability of that resource, ABM proposes to undertake testing of

Timmy's (Strezza's) (once re-established), Corsair, and Wilsons bores. This on ground work will provide a better understanding of the hydraulic conductivity and the potential storage characteristics of the aquifers that may diverge from a normal recharge and discharge flow through system.

Appendix I - Preliminary Groundwater Assessment, Draft EIS (Page 39) provides a preliminary assessment of the maximum sustainable yields of the palaeochannel. With the staged development of the project transitioning through stage two and stage three as detailed in Chapter 3, Draft EIS, it is intended that the palaeochannel groundwater resources located at the west (Target 2) and east (Target 3) will be brought on line to meet water demand as the project ramps up.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
23	Section 7.1, Chapter 7	<i>"Mine water requirements include, but are not limited to, ore processing, dust suppression, laundering, showers and a wash-down bay."</i> <i>It is recommended that ABM Resources NL investigated alternative methods of dust suppression to reduce water extraction</i>	NA

Response:

Being located in the Tanami Desert a semi-arid region with an average pan evaporation rate of approximately 3,000 mm/yr ABM Resources NL considers water efficiency and conservation is a primary focus. As recommended above, ABM will investigate alternative methods of dust suppression. The main focus of the investigation will look at changing the fundamental properties of the dusty material by increasing the size or density of the particles; agglomerating the smaller particles; and forming a protective layer or crust on the surface of the materials. Potential alternatives to be investigated will include:

- The use of dust suppressant products over disturbed areas.
- The use of polymer based sealants
- Design roads to take the most direct route and enforce speed limits.
- Orientate stockpiles to offer minimum cross sectional area to prevailing winds.
- Re-sheet high traffic areas to reduce build-up of fines material and dust.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
24	Section 7.2.4, Chapter 7	<i>"No local assessment of the extent of groundwater sensitive ecosystems (GSE) has been completed, and it is possible that GSE exists within the palaeochannel areas, given that groundwater has been encountered at ≤ 10 mblg."</i> <i>Further assessment should be carried out to survey paleochannels for the presence of groundwater sensitive ecosystems.</i>	Appendix D and Comment 61

Response:

A desktop study based on landscape mapping, literature reviews and expert knowledge was undertaken to assess the potential occurrence for groundwater sensitive ecosystems of the defined types conventionally recognised in Australia. From the assessment, the area of most interest was the paleochannel systems located adjacent to the project. From previous studies conducted on similar spinifex dominated channels in the region it was concluded that it is unlikely that groundwater sensitive ecosystems are present within the palaeochannels to the west of the project area. Further details of the study are provided in Appendix D. Nonetheless as detailed in the Appendix D – Biodiversity Management Plan, of the draft EIS tree health and groundwater levels will be monitored to assess if the ecosystem are being affected by water extraction activities.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
25	Section 7.3.1, Chapter 7	<i>"Each facility will also be designed, constructed, and monitored to maintain a minimum freeboard sufficient to hold a 1:100-yr, 72-hr rainfall event of approximately 150 cm"</i> <i>According to the Bureau of Meteorology the 1:100yr, 72hr rainfall event is 331.7mm for the project area. The structures should be designed with this freeboard as a minimum target, more freeboard is required if the total catchment area is greater than the footprint of the water storage structure.</i>	Comment 39

Response:

This was an error in the text of the Draft EIS, all water storage structure will be designed to capture as a minimum a 1:100yr, 72hr event based on the facilities footprint. For example in Section 6.7.1 of Appendix I – Twin Bonanza Conceptual Geotechnical Design Report for the Tailings Dams and

Concentrate Residual Dam, Draft EIS a more detailed description of the proposed freeboard is given for the Tailings Dam. For ease of review this section is provided below:

Based on the Australian National Committee on Large Dams Guidelines (ANCOLD) the structure is considered a “No-Spill Allowance” structure with a high to extreme consequence category for the design flood. Based on the guidelines, the Probable Maximum Flood (PMF) was used to select the required freeboard allowance. The proposed structure will be a “Paddock Dump” style structure therefore the watershed into the TSF will only occur from precipitation within the TSF catchment.

The Probable Maximum Precipitation (PMP) was estimated using the Generalised Short- Duration Method based on the requirements for the Commonwealth Bureau of Meteorology. The results indicate that the PMP for the TSF will be approximately 820mm for a 5-hour storm event assuming a downpour resulting from a tropical depression that has swung inland. Using a runoff coefficient of 1, the freeboard required for the TSF is ~1.0m with an additional 500mm for wave run-up. A spillway is required by the ANCOLD guidelines for “No-Spill Allowance” structures. Accordingly, a spillway has been incorporated into the conceptual design, with the spillway invert located 500mm below the crest level and the supernatant pond to be maintained at least 1.0m below the spillway invert.

Also refer to comment 39 for further details that have been provided on the total storage capacity of the dams.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
26	Section 7.3.1, Chapter 7	<i>"Four sediment traps are required, and these will be installed at the processing plant, workshop/office area, ROM pad, and camp (Figure 7-5)."</i> <i>The sediment basins for the workshop/office area and the ROM pad are directly uphill of the topsoil and gravel storage areas.</i> <i>Considering that they are flow-through cells, the supernatant that overtops the sediment basin will immediately run into the topsoil and gravel storage areas, which will immediately release more sediment and cause issues down gradient. These sediment basins need to have their spillways located in an area that will direct any supernatant to an undisturbed area, and the spillway must be designed so that it reduces the chance of erosion occurring when supernatant leaves the sediment basin.</i>	Comment 33

Response:

The site layout has been revised to allow for the unimpeded discharge of water to undisturbed areas and to avoid flowing against stockpile areas. In addition, along the margins of the topsoil and rehabilitation stockpiles either bunds or whoa boys will be developed of competent material. Each of

the spill ways from the sediment ponds will be broad rock armoured chutes to dissipate water velocities to thus limit erosion at discharge points. The revised layout is presented in Figures 3 and 4.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
27	Section 7.3.1, Chapter 7	<i>There is a diversion drain that appears to pass through, or very close to the CRD in Figure 7-5. What is the risk of this drain eroding or overtopping into the CRD?</i>	NA

Response:

The site layout has been revised to provide further separation between the diversion drain and CRD (Figures 3 and 4). The risk of the drain eroding or overtopping into the CRD is deemed to be low based on the measures and engineering considerations that will be put in place. These measures can be detailed as follows:

- The diversion drain will be designed to convey 1:100yr 72hr peak flow event.
- When constructed the CRD embankment will attain a final height of five metres. This will prevent larger peak flood events which overflow the diversion drain from entering the CRD.
- The external facing batters of the CRD embankment will be designed with a 1 in 4 gradient (14 degrees). This, in combination with the increased height of the CRD and diversion drain separation, will limit the amount of bottle necking of water flow if the 1:100yr 72hr peak flow event is exceeded.
- Consideration of armouring the lower CRD embankment based on geotechnical parameters, available materials and natural armouring of the embankment.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
28	Section 7.5.1, Chapter 7	<i>Any soil areas that are affected by elevated salinity resulting from dust suppression practices will be addressed through remediation activities implemented at closure."</i> <i>Best practice management should be used e.g. - use alternate safe products, avoid over spraying and remediate as soon as issues are identified.</i>	Comment 23

Response:

As detailed in comment 23, ABM will examine alternative dust suppression methods to reduce the amount of water used and the potential for salt build up. Operators of the water carts will be trained on the appropriate use of spray and drizzle bars to avoid overspraying. If areas become salinity affected adjacent to haul roads and operational areas, the issue will be investigated to establish the cause and measures implemented to prevent a re-occurrence. Remediation of the area may involve removal of the affected sediment and placement of that material in the waste rock dump in a location that does not affect the proposed rehabilitation of the land form. Inspections for potential salinity affected areas will be undertaken as part of the regular site audits.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
29	Section 7.6.2, Chapter 7	<i>"Four monitoring Bores (M01-M04) are intended to intercept the primary potential contaminant pathways down-gradient from the site. Five deep bores within the vicinity of the site will also be monitored (M05-M09)."</i> <i>Please provide more detail on the selection of the location of the groundwater monitoring bores around the project. Are they aligned with the groundwater flow and include upstream and downstream sites?</i>	Comment 21 and Appendix E

Response:

The initial location of the monitoring bores were based on the geology and expected directions of groundwater flow incorporating both upstream and downstream aspects. Two further in-house assessments were completed using available topography, aerial photography, geological information

and mapping to ensure the bore locations are best suited to intersect areas that have the potential for groundwater movement across the site. These two internal assessments have been provided as Appendix. E. As part of the works associated with the aquifer and hydrological assessment (as detailed in Comment 21) the location of these bores will be further refined based on hydrological grounds. The bores, once confirmed, would provide permanent monitoring points around the site for collection of baseline data prior to the planned development and for ongoing site monitoring.

5.3. Department of Land Resource Management

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
30	Section 3.1, Appendix E	<i>The draft Environmental Impact Statement (EIS) for the Twin Bonanza Gold Mine, Appendix E Erosion and Sediment Control Plan (ESCP), proposes a number of drainage controls using diversion drains and diversion banks with stabilised outlet points (Section 3.4), and a series of 'Type I' sediment traps / basins, as shown in Figure 3.1. The Department recommends that all proposed works within the ESCP are planned by a Certified Professional in Erosion Control, and all hydrological design calculations are reviewed by a suitably qualified engineer.</i>	NA

Response:

Noted, for the planning of the ESCP either a Certified Professional in Erosion Control will be engaged to finalise the work or the work will be peer reviewed by one. All hydrological design calculations will be reviewed by a suitably qualified engineer.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
31	Appendix E	<i>The Department recommends staging of erosion and sediment control (ESC) works between 1 May and 30 September, and definition of 'no go' areas (excluded from development) by demarcation / flagging on the ground or by GPS coordinates, for direction of contractors and construction personnel.</i>	NA

Response:

Noted, ABM can confirm that the erosion control and sediments works will be timed between 1 May and 30 September. Prior to the disturbance activities occurring, the areas will be demarcated as per Appendix X –Ground Disturbance Management Plan. Within this plan there are the following requirements:

- Confirm clearing areas are delineated based on clearly marked out scale maps and/or set of coordinates consistent with approvals
- Land to be cleared is demarcated by cones/flagging/pegs (note if large area no more than 50m between markers. If markers not visible from one to the next then markers need to be closer).
- Clearing is to be supervised

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
32	Appendix E	<i>Sediment traps are noted for the accommodation camp and office/workshop sites, and further detail is required for drainage control and surface stabilisation within these areas.</i>	NA

Response:

Response from ABM with contributions from Soilwater Group.

Sediment traps will be utilised to remove excess sediment from any runoff water generated within the accommodation camp and office / workshop sites. Each of the sediment traps will be located at an elevation below the associated disturbance area, and each disturbance area (where required) will be reshaped and bunded so that all drainage is directed into the sediment traps (Figure 4).

The detailed design of these areas (e.g. exact placement of buildings within the accommodation camp extension) has not yet been finalised, and thus it is not possible to provide individual site drainage plans at this stage of development. However, each of the areas will be carefully shaped so that all drainage is directed toward the sediment traps, which have been placed at the lowest possible elevation adjacent to each of the areas. Small compacted earth drains will be utilised internally where necessary, to direct runoff around infrastructure items within each area and into the sediment trap. A 50cm high perimeter bund will be constructed around the downslope edges of each area to contain any water that may back up during extremely intense rainfall events. This bund will be installed at the crest of any areas that are raised above the natural land surface (e.g. ROM Pad). Additionally, where raised pads are used, the outer slopes will be constructed of compacted gravelly soils, or waste rock material, and battered to $\leq 14^\circ$ to provide a high degree of erosion resistance.

Generally, the control of raindrop impact erosion is more important than the control of surface water velocity on flat land (IECA, 2008). All of the infrastructure areas in question will be constructed surfaces, and will be generally flat, so fast overland flow velocities are not expected. The land surface within active areas (e.g. ROM Pad, parking pads, go-lines, etc.) will be armoured against erosion by compacting the native soil profile, which has a high gravel content and has been shown to naturally armour itself (Appendix AB – Topsoil Characteristics and Erosion Analysis, Draft EIS). Application of water will be used to control dust within all active mining areas. Areas outside of active mining areas that have been disturbed during construction of site infrastructure will be rehabilitated as soon as practicable to reinstate the natural erosion resistance.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
33	Appendix E	<i>With regard to two sediment traps and a diversion drain discharge on the western (upslope) side of topsoil area 2, the Department recommends that the northern side of the topsoil area be reconfigured to allow an adequate path for this discharge to flow unimpeded in a downslope (NW) direction, and a diversion bund to separate the topsoil area from this flow path. The Department also recommends suitable sediment controls around the NW corner of Waste Rock Dump 1 (WRD 1) and the NW corner/western side of the Topsoil 2 area.</i>	Comment 26

Response:

Response from ABM with contributions from Soilwater Group.

ABM have modified the design of Topsoil Area 2 to accommodate the flow of surface water from the approximately 13 ha upslope catchment area, which includes diversion water and sediment basin discharge from the ROM Pad and Workshop areas (Figures 3 and 4). Small drains will be installed along the north-eastern edge of the Topsoil Area 2 and along the southern edge of the pisolite stockpile area to further facilitate proper drainage and help ensure the integrity of the stockpiles. These drains will each be approximately 1.1 m deep, and have been designed as non-permanent structures to convey the expected 1:100-yr peak flow of approximately 7.3 m³/s.

Further separation between the diversion drain and stockpile area will be provided by a perimeter bund to be installed around the stockpile area. The bund will be approximately 50 cm in height, and will be constructed from the native gravelly surface soil (which has been shown to be self-armouring

and resistant to erosion) or waste rock material to ensure that the bund does not readily erode into the diversion drain.

Additional bunding will be installed all the way around the Waste Rock Dumps (NWRD and SWRD) and the topsoil stockpile areas as a precautionary measure against direct sediment loss from these areas. The bunds will be approximately 50 cm in height, and will be constructed from the native gravelly surface soil (which has been shown to be self-armouring and resistant to erosion) or waste rock material to ensure that the bund does not readily erode.

Once the additional erosion and sediment control measures and infrastructure have been finalised under the EIS process they will be incorporated into the Twin Bonanza Erosion and Sediment Control Plan.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
34	Appendix E	<i>Further ESC information is required in regard to internal access/haul road construction, including staging, 'no go' demarcation and road drainage. With regard to the latter, this would include channel profile, capacity, gradient and lining (in respect to maximum flow velocity) and stabilised outlet points. Note: The Department does not recommend 'V' drains; parabolic or trapezoid profiles are generally stipulated. Where road floodway crossings are installed, information should be provided regarding stabilisation of road margins, particularly on the downstream side.</i>	Comment 31

Response:

To minimise vegetation removal to areas designated for clearing. Clearing will be completed in accordance to Appendix X –Ground Disturbance Management Plan. This plan requires clearing boundaries to be demarcated and adhered to (i.e. areas not within the proposed footprint are designated as “No Go” where vegetation is to be maintained).

As detailed in Chapter 12 – Road transport and traffic management, in the situation of a high rainfall event along the access track and, where that track intersects a palaeochannel, typically sheet flooding, (which covers large expanses of land in water) will rise quickly and evenly across the landscape but drains slowly. Water velocities during these periods remain low. No purpose designed causeways or any other elevated road infrastructure are to be built across the palaeochannels as in such events the culverts and other infrastructure are likely to be inundated, create barriers to water flow and have the potential to liberate sediment. Therefore ABM proposes to use low crossings and

minimise windrows across palaeochannel areas. The roads will be well maintained and compacted to prevent erosion during and after inundation. Further engineering design is required for the access and haul roads where these infrastructures interact with surface water. Once finalised, this detail will be incorporated in the Erosion and Sediment Control Plan and submitted via the Mining Management Plan

The Erosion and Sediment Control Plan and on-ground implementation will be in accordance with (IECA 2008).

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
35	Appendix E	<i>Similarly, further ESC information is required in regard to pipelines, tracks, firebreaks or other service corridors, with respect to ensuring windrows are removed from bladed formations, runoff controls (e.g. 'whoa-boys') are deployed as required and disturbed surfaces are stabilised. With regard to progressive rehabilitation and stabilisation of infrastructure areas, the Department recommends that soil surfaces disturbed during site construction (and not subject to future works) be stabilised by revegetation, mulching (e.g. gravel) or other appropriate means, to the satisfaction of the Department of Mines and Energy.</i>	NA

Response:

Response from ABM with contributions from Soilwater Group.

Due to the tightly confined clearing boundaries the majority of disturbed areas will be required for ongoing operation, however when an area is no longer required ABM is committed to progressively rehabilitate with native flora species to minimise future wind or water erosion of these areas.

The following general erosion sediment control measures will be applied in any additional miscellaneous disturbance areas (e.g. pipelines, tracks, firebreaks or other service corridors):

- All clearing will be conducted in a manner that minimises the amount of disturbance as much as practicable.
- The native gravelly surface soil will be left in place in any cleared area if the area will be required to remain cleared throughout mining. The native gravelly surface soils have been shown to be naturally erosion resistant, and readily self-armouring. If suitable gravelly

material is not found to be present within a particular area, the native material's suitability will be assessed, and suitable soil or stockpiled waste rock material will be imported from another area of the site.

- All disturbed areas will be reshaped to ensure that they are 'keyed-in' with the surrounding landscape as much as practicable. This will reduce the potential for erosion in these areas by ensuring that any disturbed soil is already at ground level, and any surface water flows are allowed to pass over the area without altering the surface flow regime (i.e. avoids concentration of flow in sheet flow areas).
- 'Whoa-boys' will be deployed, as required, to maintain the integrity of diversion banks and drains where they are intersected by pipelines, tracks, firebreaks, or other service corridors.
- Any cleared areas that are not required to remain cleared throughout mining will be rehabilitated as soon as practicable to reinstate the natural erosion resistance in these areas.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
36	Appendix E	<i>The Weeds Management Act states that the owner and occupier of land must- (a) take all reasonable measures to prevent the land being infested with a declared weed; (b) take all reasonable measures to prevent a declared weed or potential weed on the land spreading to other land. It is recommended that prior to commencement of works, any machinery, equipment, vehicles and any materials such as fill being brought on site is clean of weeds and or weed seeds.</i>	NA

Response:

Noted; as part of the proposed project the weed management plan (Section 4.6, Appendix D – Biodiversity Management Plan, Draft EIS) has been developed. This plan is to be implemented during development to ensure vehicles, import materials and equipment do not introduce or spread declared or potential weeds across the site.

5.4. Department of Primary Industries and Fisheries

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
37	NA	NA	NA

Response:

No response required as no comments were raised.

5.5. Department of Lands, Planning and the Environment

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
38	NA	<i>Heritage Branch feels that all heritage/archaeological issues have been adequately addressed and there should be no further issues associated with this Draft EIS.</i>	NA

Response:

Noted

5.6. Central Land Council

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
39	ES 8.0, Executive Summary	<i>ES 8.0 Surface water and groundwater</i> <i>'As there are no permanent surface water features present within the proposed mining lease the management of surface water quality across the project will involve:</i> <i>• preventing overtopping of the water storage facilities by constructing and operating with a minimum freeboard sufficient to hold the entire volume of a 1:100-yr, 72-hr rainfall event'.</i> <i>CLC comment: The CLC's preference is that a more cautious design parameter of a 1:1000-yr, 72-hr rainfall event is adopted by ABM in order to prevent overtopping of tailings dams/water storage facilities. In the past decade there has been an exceptional rainfall event in the region. In the week from 26 January to 2 February 2006, 550 mm of rainfall was recorded at Tanami Mine and most of this over three days. An analysis by GHD indicated that the expected return time of a three-day event of this magnitude was of the order of 910 years (cited in Reid et al 2006). This particular rainfall event is acknowledged in Chapter 12 of the Draft EIS- Road transport and traffic management (see Figures 12.6 and 12.7)- but is not discussed in the context of water, waste and tailings management. Moreover, given current uncertainties about global climatic conditions a more precautionary approach to mine infrastructure design is warranted.</i>	Appendix F

Response:

The conceptual design and proposed management of the tailings dam as detailed in Appendix I of the draft EIS does not only provide for the operation freeboard of 1:100yr but has additional height (freeboard) that can accommodate a 1:1000yr Annual Exceedance Probability storm event and the Probable Maximum Flood. Further clarification in respect to the storage capacity of the tailings dam is provided in Appendix H.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
40	ES 12.0, Executive Summary	<i>ES 12.0 Tailings and waste rock management</i> <i>'Following completion of mining the WRDs will be contoured, covered in top soil and reseeded. This will reduce both the aesthetic impact and the impact on the cultural landscape'.</i> <u>CLC comment:</u> <i>The country around the Twin Bonanza project area is relatively flat in nature, resulting in potentially significant impacts of the WRDs on the cultural landscape. Indeed, WRDs in the Tanami region have generally not exceeded 15m in height in order to limit cultural impacts. The presence of WRDs has been acknowledged by Traditional Owners as a necessary negative impact of the mine. As the WRDs attain greater height, ABM will need to consult with the CLC and Traditional Owners in order to assess and monitor impacts on the cultural landscape.</i>	NA

Response:

It is fully acknowledged by ABM that ongoing discussions about the final waste rock dump heights and configuration are required to ensure the final landform impacts on the cultural landscape are acceptable to the Traditional Owners at closure. The conceptual design of the waste rock dumps have been based on the physical characteristics of the waste rock through erosion analysis of the material and landforms (Appendix AB - Topsoil Characterisation and Erosion Analysis, Draft EIS). The aim of this and ongoing testing (including rehabilitation trials) is to ensure whatever is the agreed final height and slope configuration, is a balance that meets the Traditional Owners expectations while minimising the clearing footprint thus reducing the potential for habitat fragmentation,

surface water disruption and to ensure selective handling of the waste rock is undertaken in the most efficient way.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
41	Fig 1.3, Chapter 1	<i>p7. Fig 1.3. Oberon prospect location is incorrect.</i>	NA

Response:

Noted, in the future maps will show the correct location.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
42	Section 1.3.2, Chapter 1	<i>p12.1.3.2. Project context. 'Crocodile Gold new mine at Pine Creek is the closest of these new developments to the proposed project and is 700 km away; consequently there will be no cumulative impacts on the region'.</i> <i>CLC comment: Whilst ABM's statement is correct, there is also the possibility that Tanami Mine could re-open in the next few years, though Tanami Gold is currently reassessing the viability of the project. If Tanami Mine does re-open, there will be cumulative impacts on the region. An assessment of cumulative impacts should also consider the current Newmont operation at Granites/Dead Bullock Soak and Tanami Gold's Coyote Mine across the WA border, which is currently in care and maintenance.</i>	Comment 14

Response:

Please refer to comment 14.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
43	Section 1.3.3, Chapter 1	<i>p14. 1.3.3. Project land tenure and environmental aspects. 'The CLC has approved all previous exploration work, and the CLC archaeology /anthropology team and Traditional Owners have conducted several sacred site clearances and surveys'.</i> <i><u>CLC comment:</u> The CLC has not carried out any formal archaeological surveys at the Twin Bonanza project site.</i>	NA

Response:

The CLC comment is correct, an archaeological survey was conducted over the area by an archaeologist independent of the CLC. The survey findings are contained in Appendix V – Twin Bonanza Archaeological Heritage Assessment, Draft EIS.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
44	Section 1.4.1, Chapter 1	<i>p19. 1.4.1. Consultation process. 'During the development of the draft EIS, members of the public and other interested or affected parties have been encouraged to participate in the EIA process by providing input during public consultation programs'.</i> <i><u>CLC comment:</u> The CLC is not aware of any specific public consultation programs run during the EIA process, apart from the public comments period for the Draft EIS Guidelines and now for the Draft EIS document. This could be clarified by ABM, or the other programs could be identified.</i>	NA

Response:

This statement was in reference to the public exhibition period for the Twin Bonanza Draft EIS that ran from the 14 December 2013 to the 7 February 2014.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
45	Section 1.4.1, Chapter 1	<i>p20. 1.4.1. Consultation process. 'Preliminary feedback from the CLC has resulted in:</i> <i>• modifying procedures and processes to ensure compatibility with traditional activities and surrounding land management practices</i> <i>• modifying the design of infrastructure to manage the project's impact on the cultural landscape</i> <i><u>CLC comment:</u> The CLC wants to make it clear that the WRD design has not to this point been modified by ABM to manage the project's impact on the cultural landscape, though the matter has been flagged for further discussion and consultation between ABM, CLC and Traditional Owners.</i>	NA

Response:

Noted, this point was in reference to the resizing of a number of diversion drains that will be left at closure as detailed in Appendix O – Conceptual Mine Closure Plan.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
46	Section 2.6, Chapter 2	<i>p53. 2.6. Standards and codes of practice. 'The proposed Project's construction and operation will take into consideration and adhere to all applicable standards and codes of practice' (as listed in Table 2.1).</i> <u>CLC comment:</u> <i>The CLC would prefer that there is a commitment by ABM to seek certification under these standards and codes of practice where practicable.</i>	NA

Response:

It needs to be noted a number of the standards in Table 2.1, Chapter 2 of the Draft EIS do not have a certification process, rather they provide a generic framework to ensure consistency of approach. ABM commits to discussing further with the CLC.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
47	Section 3.4.4, Chapter 3	<i>p78. 3.4.4. Slope design. 'Stage three pits are envisaged to a depth of between 35m and 150m below surface, however ore body grade remains critical in determining the total optimal depth. For the purposes of this EIS, a potential open pit boundary is based on an 80m deep excavation, consistent with submissions related to the mineral lease'.</i> <u>CLC comment:</u> <i>This still represents a high level of uncertainty with respect to the design parameters of Stage 3. It is possible that the depth of pits could go down more than 100m and therefore intersect with the groundwater system. If this becomes a real possibility, then detailed assessment of this potential impact and a description of methods for dealing with groundwater in the pit are essential and can be dealt with as part of the MMP process.</i>	NA

Response:

The draft EIS has only detailed mining above the water table. Prior to mining below the water table further work is required to determine the volume of water that will be encountered and methods to manage this water during operations. Once these investigations and studies have been completed appropriate approvals will be sought.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
48	Section 3.4.10, Chapter 3	<i>p81. 3.4.10. Mine water management. 'Mine water requirements during the staged development include, but are not limited to, ore processing, dust suppression, laundering, camp and a wash-down bay. Stage one and stage two, water requirements are in the order of 4.1 L/s. Water requirements will be in the order of 11.1 L/s for stage three; including loss to tailings, loss at the processing plant, camp use and mining'.</i> <i><u>CLC comment:</u> Given the current uncertainty surrounding the identification and management of a sustainable water supply for the life of the mine project, some additional information is warranted about how the anticipated increase in water requirements will be staged by ABM over the next 3-4 years. A table could be included in the Water Management Plan- Appendix F- outlining the stages of mine development and the associated water requirements at each stage.</i>	Comment 21

Response:

Currently, further refinement in the processing flow sheet is occurring based a result of the 2013 trial processing. Once completed, this information will be incorporated into the water account and a table will be included in the water management plan. The table would detail the specific areas of water usage for each stage of the development approach as developed.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
49	Section 3.4.10, Chapter 3	<i>p85. 3.4.10. Mine water management. 'If it is not practicable to dewater open pits to water storage facilities, such as when freeboard is limited or tailings deposition may be compromised, water may be pumped to an alternate open pit if available or discharged to the environment via a discharge method to prevent erosion, such as rock discharge'.</i> <i>CLC comment: Discharge of mine water directly to the environment is considered unacceptable by the CLC.</i>	NA

Response:

This concern is noted, the above statement on page 85 is in reference to water that has accumulated in the base of the pit from rainfall. Based on the presence of trace sulphides in the waste rock Appendix L the exposure of rainfall water to the exposed pit walls is unlikely to produce water chemistry that would contain elements and metalloids in sufficient quantities to adversely affect the surrounding environment. Discharging to the environment would be a last resort as use of this water would offset the use of water extracted from the water bores. In the event rainfall captured in the pit would be discharged to the environment all required approvals will be sought and appropriate discharge management developed in consultation with the CLC.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
50	Section 3.4.12.2, Chapter 3	<i>p89. 3.4.12.2. Chemical characterisation of waste. 'The geochemical review found that the bulk of the waste was classified as non-acid forming (NAF (using the ABA/NAG approach)), with trace sulphides present in vein systems'.</i> <i>CLC comment: There have been two sets of ore samples sent for geochemical review (Appendix L- Tailings Characterisation). The first external review by Pendragon (February 2013) was conducted for the bulk sampling operation. The second review was an internal ABM memorandum based on the Pendragon analysis and additional samples analysed by ALS Environmental Laboratories. The Pendragon report recommended more targeted studies to assist in further assessment of samples defined as 'uncertain'. The second internal review again classifies the vast majority of the samples as non-acid forming (NAF) but with some, albeit limited, potential for acid mine drainage from the oxidation of pyrite. The CLC specifically requests that the Department of NT Mines and Energy review the data provided in the Draft EIS to ensure that there will be no unwelcome surprises when it comes to tailings management.</i>	NA

Response:

Noted

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
51	Section 3.4.10, Chapter 3	<i>p95. 3.5.4.1. Tailings dam design. 'The option of two dams with an interconnected wall far exceeds the projected volumes for this proposal but provides contingency should further mining occur'.</i> <i><u>CLC comment:</u> How much larger are the tailings dams than actually required by the mine proposal outlined in the Draft EIS? Table 10.4 (p296) provides a tailings volume estimate of 245,700m³ for the TSF and CRD combined. Cells 1A/1B, 2A/2B and the CRD appear to have a combined capacity of approximately 1, 467,000m³ (see Tables 10.6 and 10.7, p306-307). Is it reasonable to therefore conclude that the TSFs are designed to contain around six times the capacity of the current mine proposal?</i>	NA

Response:

This is correct, as stated previously in the draft EIS rather than putting forward a piece meal approach to tailings management, the draft EIS contains an integrated approach to the management of tailings now and into the future. The conceptual design of the tailings dam takes into account the staged development approach of the Twin Bonanza project whereby the tailings dam is up scaled from the initial below ground storage cells to above ground tailings impoundments. By up scaling in such a way the entire tailings dam area does not require disturbance until additional tailings storage capacity is required and at any point during the staged approach the completed component of the tailings dam can be rehabilitated. For this reason, details of the larger structure are provided to stakeholders to demonstrate that a clear long term tailings strategy has been considered and to ensure certainty of an integrated long term management approach.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
52	Section 3.5.4.1, Chapter 3	<i>p95. 3.5.4.1. Tailings dam design. 'Investigations are still required to establish the natural soil permeability to assist with the engineering of any required liner or construction works to achieve sufficiently low floor permeability. This will be undertaken prior to the submission of the mining management plan under the Mining Management Act'.</i> <i>CLC comment: The CLC would like to see the issue of the tailings dam liner settled as soon as possible. Our preference is for a clay or HDPE liner based on experience from other mine sites in the CLC region. ABM will need to demonstrate to the regulators that the floor permeability level meets best practice criteria, if a conditioned earth structure is to be relied upon.</i>	NA

Response:

Noted

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
53	Section 4.4.3, Chapter 4	<i>p120. Table 4.1. Project alternatives explored by ABM. 'Approach nearby operations for toll treatment of ores'.</i> <i>CLC comment: Given that ABM says that this was 'considered seriously, and is still possibly an option' additional information is required on possible toll options and the potential route of haul roads to Coyote Mine and/or Granites Mine'.</i>	NA

Response:

Should a toll treatment or alternative treatment option become available to ABM the Company will seek additional consultation and approvals with the traditional owners, via the Central Land Council, and the relevant government departments.

If a scenario arose where the Coyote Gold Mine treatment plant was available and was deemed a more viable option, the Company will look to initially upgrade the existing Twin Bonanza access road (to limit new road disturbance) and apply for relevant permits for the use of the public Tanami Road for haulage. At a processing rate of 150,000 tonnes per annum approximately 7 truckloads of ore per day will be required. If this was considered a long-term option and it made economic sense to install a more direct private haul road linking Twin Bonanza with Coyote Gold Mine then separate approvals along with the relevant consultation, environmental surveys (including flora / fauna surveys) will be undertaken. Under this scenario it is likely the Company will only undertake day time haulage. Night-time and twilight haulage will not be used for reasons of safety, and to avoid risk to native fauna.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
54	Section 3.5.4.1, Chapter 3	<i>p124. Table 4.1. Project alternatives explored by ABM. 'The key effects of this project not proceeding are:</i> <i>2. reduced revenue for the CLC.'</i> <i><u>CLC comment:</u> The presumption is that this means payments to the CLC on behalf of Traditional Owners. If the mine does not proceed there will be no royalties for Traditional Owners.</i>	NA

Response:

This is correct.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
55	Table 5.4, Chapter 5	<i>Table 5.4. Risk Assessment ABM Resources Twin Bonanza 1 Project- Surface and Groundwater.</i> <i>p147. Extraction of groundwater beyond sustainable yields</i> <i>p153. Habitat modification- changes to fire regime</i> <i>p153. Habitat modification- failure to implement mitigation and management measures</i> <i><u>CLC comment:</u> All of the above potential events resulted in a net risk ranking of 14 after controls had been implemented. For example, according to the risk assessment there is still up to a 10% likelihood of major consequences from non-sustainable groundwater extraction after proposed management, mitigation and control measures have been implemented by ABM. This reflects the high level of uncertainty about aspects of mine management given the relative paucity of data on groundwater systems. The CLC would like ABM and regulators to explore additional options for further reducing this level of risk (and also habitat modification risks detailed in the Table).</i>	NA

Response:

The likelihood category applied to each of these risks details that such an event is highly unlikely but has occurred in the industry previously. Due to this definition senior management are to maintain a focus on these areas to ensure that the likelihood is maintained at a minimum. In particular, ensuring that mitigation and management measures are implemented which continuously deliver the desired environmental, rehabilitation and closure outcomes. ABM will regularly undertake a risk assessment process for the operation and work with regulators to continually assessment and adaptively manage these risks via:

- The adoption of leading practice methodologies.

- The use of data generated throughout the life of the Project to refine management and mitigation measures.

All risks associated with the Project are taken seriously and in the areas highlighted by this comment senior management will maintain a focus on these areas as detailed in Chapter 5 – Risk Assessment, Draft EIS.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
56	Table 5.4, Chapter 5	<i>p156. Inadvertent impact on aesthetic values for local communities</i> <u>CLC comment:</u> The net risk after controls is assessed as 'm'. What does this mean?	NA

Response:

“M” was a typographical error. To clarify the net risk after controls value should be 9 with a consequence of moderate and a likelihood of unlikely. Once the EIS process is finalised the table will be amended to reflect the correction as part of the first risk assessment review.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
57	Section 6.7.2.3, Chapter 6	<i>p200. 6.7.2.3. Habitat modifications. 'Mitigation measures proposed to reduce the gross risk that habitat modifications may have on palaeochannels include:</i> <i>• Implementation of the Weed Management Plan (see Appendix D).</i> <i>• Implementation of the Fire Management Plan (see Appendix Z).</i> <i>• Construction of access roads and pad to reduce chance of erosion development'.</i> <u>CLC comment:</u> There is no assessment of net risk after these mitigation measures have been implemented.	NA

Response:

An assessment of the risk can be detailed as follows

Net risk

If mitigations are enforced, the risk that habitat modifications will impact on palaeochannels is considered to have a “minor” consequence and an “unlikely” likelihood, which results in a “low” residual risk ranking (risk score 5).

The risk matrix will be updated to reflect these changes once the EIS process is complete.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
58	Section 6.7.3, Chapter 6	<i>p201-202. 6.7.3. Threatened Fauna Species: EVENT- Habitat modification</i> <i>CLC comment: New waste dumps may attract bilby as occurred at Groundrush Mine when under Newmont's operation in the early 2000s. Mitigation would involve conducting regular checks for bilby (and mulgara) burrows on the waste dumps and on other infrastructure that might attract threatened species.</i>	NA

Response:

Noted, inspections of the waste dumps and other infrastructure that have the potential to attract bilby and mulgara will be incorporated into regular site inspections and if species are present incorporate the area into future fauna monitoring.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
59	Section 7.3.1, Chapter 7	<i>p224. 7.3.1. Surface water. 'Each (TSF) facility will also be designed, constructed, and monitored to maintain a minimum freeboard sufficient to hold a 1:100-yr, 72-hr rainfall event of approximately 150 cm'.</i> <i><u>CLC Comment:</u> Table 10.7 (p308) shows the TSF is designed to hold a probable maximum precipitation event of approximately 820mm for a 5 hour event. In the event of a 1:1000-year, 72- hour rainfall event (similar to the January/February event of 2006) how much water would need to be discharged from the TSF via the spillway? There is a strong case to increase the freeboard capacity to above 150cm in order to contain a 1:1000-year, 72- hour rainfall event and take into account the potential impacts of climate change.</i>	Appendix F and Comment 39

Response:

Please refer to comment 38.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
60	Section 7.3.2, Chapter 7	<i>p228. 7.3.2 Groundwater. 'As the project is to be developed in a staged approach the 11 L/s will not be required at start up, giving an opportunity to monitor sustainability of the current bores'.</i> <i><u>CLC comment:</u> As previously remarked, it would be useful if ABM included a graph or table in the Water Management Plan showing how the staged mine development will impact on groundwater use, including a description of what the water will be used for. Data points for groundwater analysis are limited with 2 out of the existing 3 bores having already had problems i.e. with collapse and the other running dry in 2012- possibly due to pump operations. It should also be noted that two thirds of the existing bores within 40km have been classified as 'duds' and there would appear to be no pump test data indicating sustainable yield from any of the 3 current production bores. Due to this lack of data, including lack of regional standing water levels to infer groundwater flow, the desktop groundwater assessment must be treated as speculative until a groundwater drilling and pump testing investigation is actually carried out.</i>	Comment 21 and Comment 48

Response:

Refer to comments 20 and 47.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
61	Section 7.4.2, Chapter 7	<i>p234. 7.4.2 Groundwater. 'The extent of potential effects on GSE is dependent on the degree and extent of drawdown caused by the groundwater abstraction, and this has yet to be characterised. Presence of GSE are also yet to be confirmed'.</i> <i><u>CLC comment:</u> It is not clear whether ABM will provide further information about potential Groundwater-Sensitive Ecosystems prior to the commencement of Stage 2 of the mine and the establishment of the bore monitoring system. This is not made clear in the Biodiversity Management Plan in Appendix D. The Water Management Plan- Appendix F (p4-5)- says that the four monitoring bores around Timmy's Bore and the one near Wilson's Bore are likely to be installed at the time of exploration pump-testing. When will pump testing occur? It would be useful if ABM could clarify the timing of when it will provide further information about potential GSEs with reference to the bore monitoring program.</i>	Comment 24

Response:

Pump testing of the water bores will occur during the 2014 field season. To investigate the potential for GSE, a preliminary spatial assessment using existing ABM and regional datasets by an environmental scientist that has experience of GSE in the region has been completed. The aim of the assessment was to identify ecosystems that potentially use groundwater and the nature of the relationship. Refer to comment 24 for further information and the findings.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
62	Section 7.5.2, Chapter 7	<i>p238. 7.5.2 Groundwater. 'Drawdown effects on other groundwater users. Activities in the upcoming period will primarily focus on filling information gaps, particularly around defining aquifer depth and extent, and measuring key aquifer properties such as transmissivity and storativity so that the effects on downstream groundwater users can be predicted and minimised'.</i> <i>CLC comment: Whilst the initial indications are that downstream users will incur minimal impact from groundwater drawdown (see p3-7 Appendix F: Water Management Plan), the CLC will be seeking further assurance that groundwater drawdown, particularly from target area #3, will not have any impact on the Tanami Downs cattle operation.</i>	NA

Response:

If target area number 3 is required to supplement the water supply at the Twin Bonanza project, investigations will involve testing the aquifer for the sustainable yield and the potential to meet the water requirements. As part of this process an assessment of the effect on other groundwater users will be undertaken to ensure Tanami Downs cattle operation is not impacted. The findings of this investigation will be forwarded and discussed with the CLC.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
63	Section 10.5.1, Chapter 10	<i>p294. 10.5.1 Operational wastes. 'ABM proposes to construct two new waste rock dumps and three rehabilitation stockpiles {Figure 10-1}:</i> <i>1. Northern waste dump total height 20 metres; receiving waste from Old Pirate deposits/pits.</i> <i>2. Southern waste dump total height 16.5 metres; receiving waste from Old Glory and Golden Hind deposits/pits'.</i> <i><u>CLC comment:</u> Management of the project's impact on the cultural landscape has been flagged for further discussion and consultation between ABM, CLC and Traditional Owners. WRDs in the Tanami region have generally not exceeded 15m in height.</i>	Comment 40

Response:

Noted, please refer to comment 40.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
64	Section 10.6.4, Chapter 10	<i>p308. 10.6.4 Conceptual tailings dam design. Table 10-7. Tailings dam cell 2A and 28- design specifications. Spillway: '0.5m deep, rip rap-lined, 20.0m-wide spillway to guard against uncontrolled spillage during unforeseen circumstances'.</i> <i><u>CLC comment:</u> It should be explained where the spillway will release tailings dam water to- i.e. open pit, another excavation, or discharged to the environment? Discharge of mine water directly to the environment is considered unacceptable by the CLC.</i>	Appendix F

Response:

The ANCOLD guidelines require a spillway even if it is not planned for use, regardless of other capacities/design features. The conceptual design of the tailings dam is considered to be a “No-Spill Allowance” structure as such discharge of water from the spillway would be a last resort and as detailed in Appendix F, only a number of high rainfall events combined would result in this situation. At this stage the water being discharged would be in contact with tailings that would have been processed via a gravity separation only and be diluted due to the input of rainfall. The quality of the water would be assessed and the transfer of water from the tailings dam would be in consultation with the relevant regulators to ensure requirements are met. It is proposed that any discharge would be directed to an existing pit or purpose built excavation.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
65	Section 10.6.7, Chapter 10	<i>p313. 10.6.7. Conceptual tailings dam seepage analysis. 'As this is a preliminary analysis, further work during the design stage is required to investigate insitu permeability and the possibilities of higher permeability zones that may affect localised seepage'.</i> <i>CLC comment: It is recognised that further work on the permeability of the TSF is needed as a matter of priority. From the conceptual assessment it appears that without an HDPE liner there will still be some seepage. We note that a recommendation is put forward in the Draft EIS to design the tailings dams to achieve a permeability of 10^{-8} which could potentially occur with the use of HDPE, compacted clay liner, or even through conditioned earth. As mentioned previously, the CLC would prefer that a compacted clay or HDPE liner is put in place.</i>	NA

Response:

Noted, work on tailings characterisation has highlighted that the gravity treated tailings is highly unlikely to produce acid mine drainage and has limited potential to liberate elements Based on this analysis and the associated risk the objective of the tailings dam liner/barrier is to achieve an outcome that has a permeability barrier of 1×10^{-8} m/s.

The lining of the tailings dam will be further discussed with the CLC and all other stakeholders so that the option that is implemented will ensure the management of tailings during operations and at closure will minimise the effect on the surrounding environment. Once finalised, the detailed design will be lodged under the Mining Management Plan process for assessment of the design parameters.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
66	Section 10.6.7, Chapter 10	<i>The Draft EIS does not consider tailings management in the event that recovery rates are deemed inadequate from the gravity gold plant and conventional cyanide processing is adopted. Consideration could be given to this possibility in the Draft EIS, with any future changes in processing method also being dealt with under the MMP process.</i>	NA

Response:

Since the EIS was lodged, the Company has received further information from the Stage 1 trial mine indicating 85 to 95% recovery of gold is a reasonable target range. The introduction of a small cyanide circuit to leach small volumes of tailings concentrates as detailed in the draft EIS could enable the recovery rate to improve up to approximately 95%.

Based on these recovery rates the preferred processing flow chart remains as detailed in the draft EIS. However, should ABM wish to expand or add conventional cyanide processing to Twin Bonanza, the Company will seek additional approvals and provide further environmental management measures to ensure the surrounding environment is protected. The Company recognises that in agreement with the Traditional Owners (via the CLC) that consent to the project was given as *informed consent* and not using conventional cyanide was considered a key aspect of this *informed consent*.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
67	Section 10.6.11, Chapter 10	<i>p315-316. A conceptual design for the tailings dam cells and CRD have been presented in Section 10.6. Prior to final design and construction the following ground breaking investigations are required to ensure the design reflects the natural variations within the proposed construction location:</i> <i>• A site assessment and geological mapping to examine the in situ characteristics of rock and soil materials.</i> <i><u>CLC comment:</u> This should also be made a matter of priority. It is noted that the TSF will be situated upon ground with similar geochemical characteristics as the tailings, including elevated levels of arsenic. Site assessments are obviously crucial to confirm this observation and to enable assessment of any potential cumulative impacts of resulting seepage.</i>	NA

Response:

It is proposed that the tailings dam site investigations will be part of the preliminary site works to ensure the ground conditions are fully assessed and the tailings dam design reflects these conditions and any variations. In addition, initial hydrological baseline testing will be conducted to investigate the characteristics of the groundwater in the vicinity of the tailings dam. This data will be used to assess the potential for cumulative impacts. The preliminary work is part of moving the conceptual tailings dam design to a final design that can be fully assessed by the Department of Mines and Energy.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
68	Section 10.7.2, Chapter 10	<i>p317 10.7.2 Waste rock characterisation chemical. Table 10-9 Rock units within the proposed pit shells, broken into units for characterisation. 'Ore and fresh rock highlighted in yellow are included within the table to provide context. However, ABM is not proposing to mine this material at this stage'.</i> <u>CLC comment:</u> Nothing is highlighted in the table.	NA

Response:

The statement needs to be removed as the table was modified to only contain the rock lithologies that are to be mined.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
69	Section 10.7.5, Chapter 10	<i>p323. 10.7.5 Waste rock dump design. 'If defined as low grade ore the material will be stockpiled on the ROM pad or within the WRD footprint and managed to prevent runoff for later processing and disposal in the tailings dams and CRD as detailed in Section 10.6'.</i> <u>CLC comment:</u> So it is possible that most Potentially Acid Forming (PAF) material may sit at the surface for a while- for how long?	NA

Response:

It needs to be noted that the testing of this material has detailed a low sulphide content, whereby % sulphide is $S < 0.02\%$ and the majority of the samples have an APR < 2 . These results would support that the low grade ore has a low potential to generate Acid Mine Drainage and to be Acid Forming. In addition, as the material has not been crushed, a component of sulphides will still be

encapsulated within the mined material therefore limiting the egress of oxygen and thus minimising sulphide oxidation.

The low grade ore may remain in stockpiles until scheduling requires additional mill feed. This requirement for low grade may occur within a matter of months or over an extended period. To manage these stockpiles they will either be stored on the ROM pad or in the footprint of the waste rock dump. If stored in the waste rock dump footprint the stockpiles will be encircled by a bund with surface water being diverted around the waste rock dump footprint as detailed in the Appendix F – Water Management Plan, Draft EIS.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
70	Section 10.7.5, Chapter 10	<i>p324. 10.7.5 Waste rock dump design. 'From field observations of existing WRD at the Central Tanami mine (constructed of similar geological units) and the interlocking nature of the majority of the waste rock units, a detailed geotechnical stability analysis was not undertaken for the proposed WRD as the potential for stability problems is considered unlikely'.</i> <i><u>CLC comment:</u> Is there a third-party analysis to back up this statement, or is it exclusively an in- house ABM view?</i>	Appendix B

Response:

The statement by ABM why a full geotechnical stability analysis was not undertaken is supported by the work undertaken for the waste rock characterisation. The consultant that undertook the erosion analysis, completed an overview of the waste rock dump stability and concluded that a detailed geotechnical assessment was not required. Details attached in Appendix B.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
71	Section 10.7.6, Chapter 10	<i>p328.10.7.6 Waste rock dump surface management. 'The upper surface of the waste rock dumps will be designed to be inward sloping to trap any rainfall during a 1:100yr 72hr event that falls on the upper surface and to prevent it from running down the slopes'.</i> <i>CLC comment: Is there any likelihood of this design increasing the incidence of seepage through the WRDs?</i>	Appendix B and Comment 13

Response:

A preliminary assessment of the water holding capacity of the waste rock (Appendix B) highlighted that the potential for seepage from rainfall events contained on the top surface of the waste rock dump would be minimal. As stated in Comment 13 the waste rock dump would be monitored for seepage, with seepage being analysed for water quality.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
72	Chapter 11	<i>CLC comment: At this stage of the EIS process, the CLC is satisfied that ABM has made an appropriate attempt to ensure the Closure Plan is broadly consistent with the terms and conditions of the Mining Agreement and the aspirations of Traditional Owners. The CLC provided preliminary feedback on the closure plan to ABM during the preparation of this document. The closure plan, however, should be viewed as a living document that requires ongoing input from Traditional Owners and the CLC.</i>	NA

Response:

Noted, the mine closure plan is a 'living document' that will evolve as ongoing mining and subsequent consultation occurs.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
73	Chapter 13	<i>CLC comment: The CLC provided feedback to ABM on the draft of this chapter as well as the Social Impact Management Plan and the Cultural Heritage Risk Management Plan. Therefore our comments on this re-drafted chapter are more limited in scope.</i>	NA

Response:

Noted, that the CLC comment reflects a previous review of these plans.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
74	Section 13.3.1, Chapter 13	<i>p370. 13.3.1. Estimated total project revenue for the duration of the project and contribution to gross domestic product {GOP} and Gross State Product. 'Stage three, whilst conceptual in nature and assuming that stage three is proven to be economically viable, and assuming a ...70% conversion of resources into mining inventory, will generate project revenue of between \$408 mil/ion (based on A\$1 200 gold price) and \$544 mil/ion (based on A\$1 600 gold price)'.</i> <i>CLC comment: A further explanation of what the 70% conversion rate means should be included.</i>	NA

Response:

The 70% conversion rate is a target and approximation. In any mining scenario it can never be assumed that every piece of ore is mined and processed. The 70% conversion rate is defined as an assumption (target and approximation) that 70% of the resource tonnes is converted into mineral

inventory or reserve and then subsequently mined. This conversion rate is, as noted, an approximation and a guideline only for purposes of modelling potential.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
75	Section 13.3.1, Chapter 13	<i>p370-71. 13.3.1. 'ABM intends to use Australian contractors and suppliers for nearly all services. As a result GDP contribution is estimated at a total of 95% of the total revenue'.</i> <i>CLC comment: Does this include imported products and components used by Australian contractors and suppliers?</i>	NA

Response:

ABM is unlikely to have control on where Australian suppliers source their products or components from. Decisions will be made on economic grounds and if two products are of equal quality and price then the Company will endeavour to select the Australian made product as a priority.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
76	Section 13.4.2, Chapter 13	<i>p376. 13.4.2. Economic and social impact assessment on Indigenous Australians/Traditional Owners of the project. Table 13-6. Summary of economic and social impact on Indigenous Australians/Traditional Owners of the project.</i> <i>CLC comment: It is possible that there could be additional negative effects in Aboriginal communities in receipt of mining-related payments- increased alcohol consumption, vehicle accidents, social discord etc. However, the CLC will work with ABM and other community stakeholders to mitigate these impacts, including the promotion and implementation of community development projects through our Community Development Unit. The CLC has had considerable experience with these types of programs over the past 30 years of</i>	NA

		mining in the Tanami region.	
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Response:

ABM agrees with CLC comment in this regard and will take guidance and work with the CLC on managing these issues.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
77	Section 13.5.2, Chapter 13	<i>p391. 13.5.2. SIMP management of economic and social impact assessment. 'A Traditional Owner/Indigenous Australian is not to be denied access to any part of the project area or surrounding lands for hunting or bush food gathering (except for reasons of mine safety)'.</i> <i>CLC comment: ABM should remove the reference to 'Indigenous Australian' in this statement as the CLC believes it is an oversight. The Social Impact Management Plan -Appendix T- includes a similar statement on p4 that does not include the reference to 'Indigenous Australian'.</i>	NA

Response:

The reference to Indigenous Australian in Section 13.5.2 will not be used in this context again. ABM apologises for the misuse of this term.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
78	Section 14.3, Chapter 14	<i>p422-426. 14.3 Construction Environmental Management Plan</i> <i>CLC Comment: There appears as though there might be a layout problem with this section of the document. Is the information in the table about Air Quality and Greenhouse Gases Management meant to be inserted here?</i>	NA

		<i>Section 14.3.5 suggests that the table has been unnecessarily duplicated from Section 14.4.5.</i>	
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Response:

Yes, that is correct, the identified layout problem will be rectified during the first review and updating of the EMP to reflect the input from the EIS process.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
79	Section 14.4, Chapter 14	<i>p437 14.4 Operational Environmental Management Plan. Flora and fauna-biodiversity</i> <i>CLC Comment: Add to Actions/measures/land management: Regular inspection of site infrastructure for presence of bilby and mulgara.</i>	Comment 58

Response:

Regular inspection for the presence of bilby and mulgara within infrastructure will be incorporated into the Flora and Fauna – Biodiversity section of the EMP. Inclusion of this element will occur as part of the first review and updating of the EMP to reflect the input from the EIS process.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
80	Section 14.4.4, Chapter 14	<i>p448-451. 14.4.4 Fire Management</i> <i>P449. The site induction, which covers environmental and safety aspects, will inform all personnel about fire awareness, the requirement to obtain a Hot Work Permit before undertaking welding, cutting or grinding activities, emergency contact numbers, and procedures in case of a fire.</i> <i>CLC Comment: The Basic Wildfire Awareness Course should be considered a minimum for site</i>	NA

		<i>staff. The person controlling burning activities should have also completed a Fire Fighter NT course.</i>	
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Response:

ABM is committed to minimising the operations potential effect on local fire regimes. As requested, part of onsite staff training will include a basic Wildfire Awareness Courses for selected staff. In addition, key personnel supervising the controlled burn will have completed a Fire Fighter NT course. Each burn is to occur in consultation with the CLC and Bushfires NT.

The fire management plan will be updated to reflect the proposed training.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
81	Section 14.4.4, Chapter 14	<i>p449. ABM will conduct prescribed reduced-fuel burning along fire breaks as a standard feature of fire prevention and to create a reduced fuel buffer of 50m around the facilities. This will aid in the control of fires approaching the mine site. The location and timing of prescribed burning will be negotiated with traditional owners in order to minimise risks to any assets in the surrounding area, such as sacred sites.</i> <i>CLC Comment: The CLC will undertake further discussion with ABM and Traditional Owners about the optimal area of the reduced fuel buffer. The CLC's preference is for a 100-200m buffer. Another option is to establish a system of double fire breaks. All firebreaks must be established under standard conservation earthworks principles e.g. not altering the flow of surface water to ensure no windrows are created and erosion is not caused.</i>	NA

Response:

It is acknowledged that ABM will consult further with the Traditional Owners via the CLC in respect to fire breaks and management of fuel loads around the site.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
82	Chapter 15	<i><u>CLC comment:</u> The CLC welcomes further discussion with ABM and others regarding the range of environmental (and social) offsets proposed in this chapter. We have already discussed a number of these proposals with ABM, though some, such as the Tanami regional biodiversity monitoring, have been discussed in more detail than others.</i>	NA

Response:

As part of ABM's commitment to having open dialogue with the Traditional Owners via the CLC, discussions on the nature and implementation of the environmental offsets will be ongoing.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
83	Section 16.2, Chapter 16	<i>p497. 16.2 Bush fire and fire management <u>CLC comment:</u> As noted in Section 16.2.1.2, the CLC provided comments on an earlier draft of ABM's Fire Management Plan (CLC email to ABM dated 11 September 2013). Where appropriate, we will work with ABM and Traditional Owners to implement recommended fire management measures around the mine site.</i>	NA

Response:

Noted, ABM will work with the CLC and traditional owners to ensure fire management measures are implemented around site.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
84	Reference	<i>Reid J., Potts R., Ziembicki M. and Jaensch R. 2006. Aerial survey of waterbirds in the northern Tanami Desert. [Online content]</i> http://www.wetlands.org/Oceania/En/articlemenu.aspx?id=8981371d-798c-4fa6-8598-9cc644ead77c. Wetlands International-Oceania, Brisbane.	NA

Response:

Noted, for future referencing purposes.

5.7. Tourism NT

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
85	Section 12.2.1, Chapter 12	<i>The impact of the additional road traffic on the Tanami Road presents a potential impact to visitors and tourism operators using this road. Information from tour operators is the road is severely corrugated in sections at times during the year and has degraded as heavy vehicle usage has increased over the past few years. Although a 5% increase, on average, in heavy vehicle movements is moderate, this extra traffic may cause additional wear and tear on tour operator vehicles who also use the road reasonably frequently. This may result in an expectation from other users the road be graded more regularly.</i>	NA

Response:

The draft EIS provides an evaluation of the intended increase in road usage as a result of the Twin Bonanza 1 project. During current exploration and bulk sampling activities ABM has complied with all road restrictions due to seasonal weather conditions to prevent road surface damage. This will continue to be the situation in the future. Your current concerns of wear and tear on vehicles that

use this road is also of concern to ABM as one of many road users. In the future, ABM intends to have further dialogue with the Central Desert Regional Council on how road maintenance can be implemented to minimise vehicle and machinery damage. ABM looks forward to the support of the relevant responsible authorities.

5.8. Parks and Wildlife Commission NT

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
86	NA	NA	NA

Response:

No response required as no comments were raised.

5.9. Environmental Defenders Office (NT) Inc

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
87	Appendix C, Flora and Fauna Report	We note that in Appendix C, the Draft EIS notes that eleven threatened species could occur in the project area. Of those two are known to occur – Brush-tailed Mulgara and Greater Bilby) and one ‘may’ occur – Great Desert Skink. Eight others are assessed as ‘unlikely’ to occur. Given the developer cannot rule out the potential for up to eight further threatened species (including three endangered species – the crest tailed mulgara, the southern marsupial mole and the central rock-rat) to inhabit the site, priority should be given to areas of the site that are likely to provide habitat to those species. The approved conservation advice for the crest-tailed mulgara requires: “Ensure there is no disturbance in areas where the crest-tailed mulgara occurs, excluding necessary actions to manage the conservation of the species”.	Comment 10 and 11, 12

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
		It is noted that no accurate picture is given by the Draft EIS about the actual presence or otherwise of threatened species due to “the results of the surveys are only a snapshot in time, and do not allow for temporal variations or species migration”. <u>Recommendation</u> Section 139 of the <i>Environment Protection and Biodiversity Act</i> 1999 (EPBC Act) requires a Minister to take into account a recovery plan, threat abatement plan or approved conservation advice for the species. In light of the constraints and uncertainties of the survey included in the EIS, the principle of ecologically sustainable development, as outlined in section 3A of the EPBC Act should apply. All areas of habitat that could potentially support threatened species should be adequately protected from threats, notably clearing.	

ABM is committed to the preservation of biodiversity. Over the project planning phase three flora and fauna surveys have been completed during the wet, early dry and dry season to ensure seasonal variations in fauna diversity were accounted for and to optimise the potential for identifying threatened species across the project area with particular focus on the Great Desert Skink (refer to Comment 11). A systematic methodology was adopted for the surveys that included

- Database searches to determine lists of species known to occur, or potentially occurring in the area, particularly with reference to species of conservation significance.
- Literature reviews to obtain background or historical information on the biodiversity of the area.
- Targeting of surveys in habitats that could support species of conservation significance.
- Field surveys incorporating quantitative and opportunistic sampling in the proposed areas of disturbance and an assessment of fauna habitats and current conditions.
- An assessment of potential impacts on fauna and flora undertaken and the associated risks

The adoption of this methodology was used to minimise the likelihood of previously unrecorded species being present in the area (Appendix C – Early dry season Flora and Fauna Report 2013, Draft EIS).

In relation to the crest tailed mulgara, the southern marsupial mole and the central rock-rat the following comments are made. Identification work was undertaken to define the species of mulgara present at the site as detailed in comment 10, this documented that the mulgara was the brush tailed mulgara and was also confirmed by the indicative range of the crest tailed mulgara (as defined by (Wooley et al. 2013)). The closest point of its range is approximately 650km to the south east of the project. The southern marsupial mole was not identified at the project. Due to the lack of appropriate soft sand substrates characterised by sand dunes, sand plains and river sand plans the southern marsupial mole's preferred habitat is not present within the project area (Benshemesh 2004). The soil profiles underlying the proposed project area are characterised by a thin veneer of sand underlain by semi consolidated gravels and sandy loams that would prevent the southern marsupial mole from moving freely and as such would prevent individuals from occupying the area. The central rock rat has been observed and trapped in the rock outcrops along the MacDonnell ranges and was recorded at the Granites in 1952 (McDonald 2012) located approximately 130km to the south east. The immediate landscape surrounding the Twin Bonanza project does not have large rock ridges or boulder fields that could support a population of central rock rats.

When formulating the environmental management measures, environmental offsets and the site layout, consideration was given to the national recovery plan for the greater bilby resulting in:

- The modification of procedures and processes to ensure consistency with conservation objectives.
- Modifying the design and location of infrastructure to manage and minimise the project's impact on preferred greater bilby habitat.

Further detail, on elements of the planning process with examples are provided in comment 12.

ABM has invested extensive time in the planning, design and assessment of the project to date, fully considering the potential impacts and associated risks to biodiversity from the development. In response to the concerns raised on the principle of ecologically sustainable development, as outlined in Section 3A of the *Environmental Protection and Biodiversity Conservation Act 1999*, the decision-making process at a company level has included the following element:

- The conservation of biological diversity and ecological integrity is a fundamental consideration.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
88	Risk Assessment – Biodiversity Threatened Fauna Species – Vegetation clearing activities clause 6.3.7.1	The Draft EIS assesses the gross risk ranking to threatened fauna species as 17. Without mitigation, the report says it is likely that two threatened species (greater bilby and brush-tailed mulgara) will suffer injury/ mortality of individuals, destruction of burrows and loss of suitable breeding and foraging habitat. There is potential for losses of species at a local level due to high burrow intensity in close proximity to the proposed mine. Mitigation measures are based on field surveys and habitat mapping. The report finds: <i>“Brush-tailed mulgara appeared to occur in a wider variety of habitats within the project area (albeit in relatively low numbers) and are therefore difficult to confidently avoid. Therefore risk mitigation for this project gave priority to reducing impact to greater bilby, as this species has a higher conservation status, is longer lived, and could more easily be avoided...”</i> The Brush-tailed Mulgara is listed as a vulnerable species under the <i>Territory Parks and Wildlife Conservation Act</i> (TPWC Act). There is no doubt that mining is a threatening process the species, and vegetation clearance is an acknowledge threatening activity. The NT Threatened Species Information Sheet advises that Conservation objectives and management priorities in the NT include:(iii) <i>to prevent harmful disturbances (e.g. mining operations) within lateritic areas...</i> http://www.lrm.nt.gov.au/data/assets/pdf_file/0016/10825/brushtailed_mulgara_vu.pdf Extract from the Mulgara Management Plan – Appendix D EIS: <i>“In 1994 biological surveys by Ecologia at the Jundee Gold Project (Wiluna WA) captured two adult females. These individuals were re-trapped the following two years and showed no signs of breeding, indicating that they may have become isolated from other mulgaras due to the proximity of mining (Pearson 2003).”</i>	NA

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
		<u>Recommendation</u> In the context of a high risk of potential loss of species at a local level, it is not acceptable that risk is not mitigated because the species was “difficult to avoid”. The principle of ecologically sustainable development, as outlined in section 3A of the <i>Environment Protection and Biodiversity Act</i> 1999 should apply. All areas of habitat that could potentially support threatened species should be adequately protected from clearing.	

The purpose of carrying out an environmental risk assessment is to identify the key project impacts on the relevant environmental receptors thus ensuring adequate resourcing for environmental protection. By undertaking the assessment, areas of the environment that require further management and mitigation are identified. The gross risk ranking of 17 highlighted that the management of threatened species was of key concern in the implementation of the proposal. Subsequent to this more detailed work has been completed including:

- A number of traverses/surveys across the Twin Bonanza project area to record the location of fauna activities to better define areas of higher habitat value (including areas of higher brush-tail mulgara activity).
- Moving of infrastructure to avoid certain habitats including lateritic areas; this resulted in the majority of proposed vegetation clearing located in vegetation communities that are more regionally extensive.
- Redesign of the minesite layout to make it more compact to reduce habitat fragmentation.

Through these processes and footprint redesign, the risk has been reduced to a net risk of 9 after controls. At a local level rather than traditional clearing, consultation with fauna specialists have highlighted that the use of fire prior to clearing may encourage the movement of species away from the area via habitat modification to non-burnt areas. Prior to and during vegetation clearing for infrastructure development, if it is identified that brush-tailed mulgara are present within the clearing area ABM will liaise with the Department of Land and Resources Management on the best measures to minimise the impact. As highlighted by Figure 6.6 of Chapter 6 – Biodiversity, the siting of infrastructure, extensive discussions have taken place with a range of fauna specialists (Chapter 15 – Environmental Offsets, Draft EIS), specifically around the topic of wildlife conservation to ensure the proposed measures maintain biodiversity and ecological integrity around and through the project area.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
89	Risk assessment – Biodiversity Threatened Fauna species - Vehicle movements Clause 6.7.3.4	The Draft EIS assesses the gross risk ranking to threatened fauna species as 12. Without mitigation, the report says it is likely that there will be a small number of significant species affected (<10%). <i>The National Recovery Plan for the Greater Bilby</i> identifies road mortality as a significant cause of bilby mortality at a local scale because of a combination of vehicles operating on these roads throughout the night and the location of mining operations adjacent to favoured bilby habitat. “Collisions with vehicles on haul roads at night have been a cause of bilby mortality in the Tanami Desert. Bilby mortalities from collisions with private vehicles have also been recorded on public roads including the Stuart Highway (NT) and Peron Peninsula, where at least 6 mortalities have been recorded (C. Simms personal communication). <u>Recommendations</u> Section 139 of the EPBC Act requires a Minister to take into account a recovery plan, threat abatement plan or approved conservation advice for the species. • Nighttime driving should be prohibited. • Off road driving should be prohibited on basis the majority of the project area constitutes potential habitat for the species. The draft EIS (Appendix D) claims a correlation between speed and mortality rates. In any event, speed limits should be lower than 60kph The principle of ecologically sustainable development, as outlined in section 3A of the <i>Environment Protection and Biodiversity Act 1999</i> should apply.	Comment 6

The gross risk ranking of 12 highlighted that the interaction of vehicles and fauna had the potential to result in fauna fatalities or injury. As detailed in Chapter 5 – Risk Assessment further work to reduce the likelihood of this occurrence has involved a precautionary approach with the following measures to be adopted:

- Imposing an onsite speed limit of 60km/hr (details on the speed limit are presented in comment 6).
- All site staff are to be inducted on speed limit restrictions and the presence of threatened species.
- Impose restrictions on off road driving that includes no off road driving at night when most threatened species are active and restrict access to areas of known bilby and brush-tailed mulgara burrows.
- Redesign of the minesite layout with the majority of roads surrounded by pits, waste rock dumps and stockpiles to reduce fauna and vehicle interaction.

Through these measures and footprint redesign the risk has been reduced to a net risk of 5 after controls. When considering these measures, where a recovery plan was available for specific species, this plan was consulted to ensure the management measures reflect the desired outcome of the recovery plan. During the operation, the performance of the above measures will be monitored to ensure all measures are being consistently applied. Considering the measures put forward, ABM believes that the restrictions suggested in this comment would not necessarily improve the intended environmental outcome.

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
90	Risk assessment – Biodiversity - Sensitive vegetation communities - Paleochannels Clause 6.7.2	The plan involves clearing for establishment of water supply bores and access tracks in paleochannels. The report identifies a gross risk score of 17, assessing that without mitigation likely outcomes are habitat fragmentation and reduced ecological function. The paleochannel environment is regarded to have refuge values to biodiversity. Clearing involving removal of deep-rooted trees would have lasting effects on the local environment. Mitigation includes avoiding deep- rooted trees ‘where possible’ and ‘limiting’ disturbance. Further extraction of groundwater ‘may’ impact on deep-rooted	Comment 21, 24 and 83

Comment Number	EIS Section	Comment	Related Comment and/or Appendices
		trees by lower ground water leading to potential tree death. Again the risk score is 17. Habitat modification as a result of clearing and establishing bores in paleochannels will create a major risk of hot fire burns, injury or death of fauna, and erosion. The risk score is 21. Implementation of mitigation strategies will lower the score to 14 – likelihood will decrease however impact will remain at major. It is noted many of the mitigation strategies are administrative in nature (rules and permits) and therefore of lower value. <u>Recommendation</u> More robust fire prevention strategies should be implemented. For example a prohibition on smoking or carriage on the person of lighters or matches. In addition, alternative water supply sources should be used to prevent habitat fragmentation, weed growth and damaging groundwater extraction.	

It is acknowledged that the palaeochannel systems in the Tanami Desert have refuge value for biodiversity. For this reason ABM believes that this risk needs both senior management focus and the setting of mitigation measures to ensure the risk is continually managed. To further control and manage the potential risks to the palaeochannel systems:

- Evaluation work will be undertaken to define the palaeochannel aquifer characteristics and parameters in relation to the ecosystem (as detailed in Comment 20).
- A preliminary ground water dependent ecosystem assessment has been completed (As detailed in Comment 24).
- During extraction tree health monitoring will be undertaken to assess the effect of water extraction (Appendix D – Biodiversity Management Plan, of the draft EIS)
- ABM has already implemented weed management and control measures across site to prevent weed establishment in the palaeochannel.

- Implementation of a palaeochannel management plan as detailed in (Appendix D – Biodiversity Management Plan, of the draft EIS).

To ensure fire management strategies are robust and acceptable the fire management plan was independently reviewed with feedback incorporated into the document (Comment 83). In relation to the management of smoking, carriage of lighters and matches, and the potential for fires to be started the following applies:

- The lighting of fires is banned across the site, with the lighting of fires only allowed under controlled conditions (Appendix Z - Fire Management Plan of the Draft EIS). This is aimed at preventing the workforce from lighting fires using either a lighter or matches.
- The site induction includes a section detailing areas where smoking is prohibited and that cigarette butts are to be extinguished and disposed of appropriately.
- If a welding, grinding or cutting activity is undertaken there is the requirement in the fire management plan to obtain a hot work permit that requires an assessment of the work area to ensure that any potential for an ignition source is removed.
- Whenever a new task is undertaken on site a Job Safety Analysis (JSA) is completed, this is used to identify task risks including the potential for fire. By identifying a potential fire risk, site specific operational measures are implemented to mitigate and prevent a fire from starting.

ABM is fully aware of the concerns raised by these comments and managing these risks is of paramount focus to the company.

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Acronyms

ABM	ABM Resources NL or Proponent or Company
ANCOLD	Australia National Committee on Large Dams
ANZECC	Australian and New Zealand Environment and Conservation Council Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration (ANZECC 1990) provides guidance when dealing with potential blasting noise and vibration.
APR	Acid Potential Ratio
CRD	Concentrate Residual Dam
CLC	Central Land Council
CRD	Concentrate Residual Dam
DEIS	DRAFT Environmental Impact Statement
DoE	Department of Environment
EIS	Environmental Impact Statement
EMP	Environmental Protection Plan
EPA	Environmental Protection Authority
ESCP	Erosion and Sediment Control Plan

<i>EPBC Act</i>	<i>Commonwealth Environment Protection and Biodiversity Conservation Act 1999.</i>
<i>GSE</i>	<i>Groundwater Sensitive Ecosystems</i>
<i>IECA</i>	<i>International Erosion Control Associations</i>
<i>MRM</i>	<i>Mineral Resources Management</i>
<i>NWRD</i>	<i>Northern Waste Rock Dump</i>
<i>NRETAS</i>	<i>Natural Resources, Environment and the Arts</i>
<i>NT</i>	<i>Northern Territory</i>
<i>PMP</i>	<i>Probable Maximum Precipitation</i>
<i>ROM</i>	<i>Run-of-mine storage pad for mixing of ore prior to input into plant</i>
<i>SEIS</i>	<i>Supplementary Environmental Impact Statement</i>
<i>SWRD</i>	<i>Southern Waste Rock Dump</i>
<i>TD</i>	<i>Tailings dam</i>
<i>WRD</i>	<i>Waste Rock Dump</i>

Appendix A – Commitments Summary

Appendix B – Waste Rock Dump Design Assessment

Appendix C – Hydrogeological Works

Appendix D – Desktop Assessment of Groundwater Sensitive Ecosystems

Appendix E – Assessment of Groundwater Bore Locations

Appendix F – Geotechnical Conceptual Design – Stakeholder Comments