Attachment 1: Response to Public Submissions on the Kookaburra Gully Mining Proposal

As per section 35A of the *Mining Act 1971* the Mining Proposal (MP) submitted by Australian Graphite Ltd (AGL) underwent a period of statutory consultation commencing on 17 September 2015. Submissions received from the public during the formal consultation period raise a broad spectrum of issues regarding the proposed mining operation.

Please review each of the issues raised in the public submissions and respond to each specific issue using the table format given below as guidance.

In relation to common issues within a single submission, AGL is free to group these issues in your Response Document to prevent duplication. Please ensure each response to an issue is clear and easy to follow should you chose to group issues.

In relation to common issues between different submissions (or a government question), where the issue is identical in nature, AGL is free to reference a previous response to prevent duplication. Please ensure each response to an issue is clear and easy to follow should you choose to use references.

Issue #	Topic	Technical Issues Raised in Public Submissions	AGL Response
Submission 1 – Unique identifier			
1			
2			
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Attachment 2: Issues raised by the South Australian Government

During the consultation period the mining proposal (MP) was circulated to a number of SA Government departments that were deemed relevant based on the information provided. Please find below a table providing issues raised that require points of clarification and/or additional information to enable a comprehensive assessment of the proposal, prior to final consideration by the South Australian government.

#	Topic	MP Section	Description of issue raised by SA Government	Requirement for applicant in Response Document
Description of Environment				
1	Groundwater - baseline quality assessment	Section 3.11.1.2, Page 59	The groundwater quality data presented in the MP is localised to one region of the proposed operations (the southern end of the open pit) and is isolated to a single pump test. There is uncertainty in the description of groundwater quality. A baseline groundwater quality assessment should be undertaken in accordance with the ANZECC prior to any operations occurring (should a lease be granted). The quality of groundwater obtained from the baseline assessment should be used to determine the potential uses of the water.	Please comment on the assumptions and uncertainties of the baseline groundwater quality assessment. Based on the current baseline groundwater assessment categorise the existing groundwater in accordance with fresh and marine water quality ANZECC guidelines.
2	Groundwater Dependent Ecosystems	3.12.3, page 75	It is suggested that the following sentence is reviewed. 'It is likely that the root systems of these species would be accessing groundwater, however definitive evidence was not clear whether the source of this water is from underground, but a proportion of the overall volume originates as runoff from the surrounding catchment'. Without evidence to demonstrate that vegetation is not supported by groundwater, it should be assumed that some reliance on groundwater exists.	Clarify the uncertainties relating to this assessment. Clarify whether this will have implications on vegetation not identified for clearance.
3	Groundwater Dependent Ecosystems	3.12.3, page 77	It is suggested that the following sentence is reviewed. 'The Sedgeland communities have mostly rhizomatous root systems that would probably extend to depths of 400 mm to 500 mm. Given that natural groundwater occurs at greater depths it is unlikely that these plant communities would be accessing groundwater'.	Clarify the uncertainties relating to this assessment. Clarify whether this will have implications on vegetation not identified for clearance.

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			There are no wells with available water level data located near Pillaworta creek or the sedgeland communities (Veg association 14, Gahnia filum Sedgeland); so the assumption that groundwater is below the root zone gives rise to uncertainty. At this stage it should be assumed that some reliance on groundwater exists.	
4	Site Hydrogeological Assessment	3.11.1.2; Pages 61-63; Appendix H	While the groundwater contours show an east-west gradient (Fig 3.26, based on Fig 3.27 and Appendix H) any mounding under the TSF may alter this regime and seepage may flow radially from the TSF and towards the southern valley and to the east into Rock Valley. It is noted that the TSF is located close to the boundary of Pillaworta and Rocky valleys (a probable groundwater divide) (Figure 3.20).	Provide clarification on the likelihood that mounding under the TSF will result in a changed flow regime for seepage from the TSF.
Description of Operations				
5	Construction of water pipeline from the Tod Reservoir to the Mine site	4.10.3.1	It is not clear under what authority the water pipeline is to be constructed. Clarify if the pipeline is to be permanent or removed following completion of the project. Consideration needs to be given to the process and the timing for obtaining approvals and construction of the water pipeline.	Clarify the authority under which the water pipeline is to be constructed. Clarify whether the pipeline will be permanent or temporary for the life of the project.
6	Proposed Exploration Program	4.4.2; Page 126-7	The Response Document should make clear the tenement under which exploration activities are to be conducted. The MP refers to exploration activities currently approved under exploration lease EL4998 and described within E-PEPR2013-038. Based on the work described within EPEPR 2013-038, one of the objectives of the program is to gather geotechnical and metallurgical information that may be required to complete a Mining PEPR. The MP states that this EPEPR was extended to 25 August 2015 however it has since been extended to 5 May 2016. A new EPEPR will need to be submitted using the new exploration templates if this exploration program is not finalised prior to the expiry date of the existing EPEPR (5 May 2016). For activities to be conducted on the EL, a section 80 agreement must be in place with all parties (EL holder, Lincoln Minerals, ML Holders) to allow exploration. The alternative is that the exploration activities are conducted on the ML (should a lease be granted). If this option is chosen, the	Clarify the intent and timing of exploration activities. Clarify whether exploration activities are to be conducted on EL4998 under the authority of EPEPR 2013-038 or under the authority of the proposed ML (should a lease be granted), or both.

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			Response Document must make this intention clear and the activities can only commence once the exploration activities are authorized through the approval of a Mining PEPR.	
7	Proposed Exploration Program	4.4.2; Page 126-7	It is unclear if additional exploration activities are planned which would occur under the authority of the Mining Lease (should a lease be granted).	Describe any future exploration activities planned to be conducted on the proposed ML. Ensure that all potential impacts, control strategies and outcomes cover these activities.
8	Proposed Exploration Program	4.4.2; Page 126-7	It is expected that aspects of exploration will be rehabilitated (e.g. drillhole decommissioning, capping of drillholes, backfilling pits and other hazards). If rehabilitation is not to be completed under the authority of the EPEPR (as the activities occur within the footprint of the pit), impacts must be factored into SEB payments, and bond calculations for the mining PEPR (should a lease be granted).	Clearly articulate within the response document whether all exploration activities have been rehabilitated to prevent any future confusion as to what tenement the impacts are associated with. If rehabilitation of all exploration activities is completed, indicate this in the response document and that there is no outstanding exploration liability.
9	Groundwater Modelling	4.5.9; Main document: Pages 143 to 160 7.4.7 & 7.4.8.2; Pages: 293 & 299 Appendix D – Groundwater modelling report pg. 5 to 9	The numerical groundwater model has only been designed to include the fractured rock aquifer, and has not included the alluvial aquifer that exists in creek lines. In addition the model has assumed uniform hydraulic and transmissivity values which are unlikely to represent in-situ conditions of the two aquifer types. The numerical model includes assumptions and uncertainties relating to impacts on Pillaworta Creek and associated groundwater dependent ecosystems such as EP Blue Gums. In addition, uncertainty exists in the model outputs such as the potentiometric surface and drawn-down maps (Figures 4.45, 4.50 & 4.51). As such the numerical modelling work completed is consistent with a Class 1 numerical groundwater model as defined by the Australian groundwater modelling guidelines. Further work has been completed to improve the confidence in the model however it is still considered at best a Class 1 model. A Class 1 model is suitable for 'Developing coarse relationships between groundwater extraction locations and rates and	Identify the limitations, uncertainties and assumptions of the groundwater model in the response document particularly where relevant to the impact assessment for groundwater and GDEs. Consider improving the design of the numerical groundwater model to include • Include a layer for the alluvial aquifer, and assign appropriate hydraulic and transmissivity values to reflect the alluvial aquifer's properties • Include nodes in MODFLOW model to determine drawdown impacts for each individual EP Blue Gum within the model's existing boundaries. • Calibrate river bed conductance values that considers the alluvial aquifer DSD may require the groundwater model to be updated to a class 2 model before submission of a PEPR should a lease be granted.

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			associated impacts'. Increasing the model classification level to Class 2 would require further field work and possible re-conceptualisation of the model. Additional field work would include but not be limited to: • Drilling and pump testing at more than one location • Collection of regional water levels for model calibration • Improving the understanding of groundwater-surface water interactions • Understanding variations in river bed conductance, river bed elevation and river stage height Other improvements would include inclusion of TSF seepage into the numerical model.	Should the aforementioned modelling be undertaken, it suggested that the risk assessment for impacts K19 & K20 should be reviewed.
10	Potential impacts to groundwater - Groundwater Modelling	Pages 152-3	Sensitivity/uncertainty analysis was previously requested by Government to provide a range of potential drawdowns impacts that could be expected based on realistic aquifer parameters. It is unclear how the sensitivity/uncertainty analysis has been interpreted to confirm that the input parameters used in the model are the most appropriate for modelling at Kookaburra Gully. The sensitivity analysis included a higher k scenario of 0.08 m/d (10 x base case). This scenario indicted that drawdown of 0.5 m is possible at the permanent pools located 2 km southwest of the pit (approximate coordinates 581409, 6191263, WGS84 Z53) however under the base case modelling parameters it is not predicted. In your proposal you have committed to conducting groundwater monitoring prior to and during operation to validate the base case modelling predictions.	Clarify why the input parameters are the most appropriate for the model. The sensitivity analysis indicates there could be an impact on the pools and groundwater users, however this has not been discussed or analysed in the proposal or appendices. Provide in the response document analysis and discussion on the results from alternative case modelled (k = 0.08 m/d).
11	Groundwater Modelling	Pages 160 and 285	Page 160:The text states that the 'Two large pools about 2 km southwest of the proposed pit are sited outside the modelled cone of depression, which means that groundwater feeding them (if any) will be unaffected by dewatering associated with mining, both during operations and post closure'.	As above, provide discussion on the results from alternative case modelled (k = 0.08 m/d).

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			Page 285: The modelling indicates there would be no impacts or zero drawdown at the ponds. These statements are only correct for the model base case.	
12	Groundwater	Page 145	In relation to the groundwater model the following sentence is incorrect: 'It has been assumed that all inflows to the model are derived from rainfall'. River recharge is the largest contributor to the model.	Clarify the inflows to the model.
13	Groundwater	Page 148 Figure 4.44	Steady state SRMS. This does not match the data presented in Figure 4.46 where the range of modelled heads is 148.64 - 159.88 mAHD and the range for the observed heads is 145.7 - 164.4. mAHD. It appears that the point 159.88, 164.4 is missing from the graph.	Provide an update of Figure 4.46 in the response document with the excluded point or provide reasons for its exclusion and how is the overall SRMS affected by the exclusion of the point, 159.88, 164.4, from the calculation.
14	Groundwater	Page 156	It does not appear that the locations of the wells in Figure 4.52 have been specified in chapter 4.5.9 or in Appendix D.	Provide locations in a map or table.
15	Groundwater	Page 156	What is the basis for input (65.5 ML/d) and outputs (66.2 ML/d) values from river leakage in the transient model runs documented in Table 4.21.	Clarify the basis for the inputs and outputs relating to leakage from the ephemeral creek in the transient model.
16	Low-grade Stockpile	4.7.6	Some low-grade ore samples have been identified as PAF (4.3.6.2). In section 4.7.6 it is stated that low-grade ore will be stored on the ROM pad (in between the plant and Pillaworta Road) and in Table 8.5 it is stated that if the low-grade material 'has not been processed at completion of operation the material will be incorporated into the waste rock storage with appropriate cover material to minimize any potential for AMD'. However the TSF is the only PAF storage facility designated in the MP. There are no design considerations presented for PAF material in the waste rock storage facilities. Management of the low grade stockpile is unclear particularly in relation to AMD given that PAF material could be stored here for a number of years.	Provide strategies to manage the potential for AMD generation from the PAF in the low-grade ore stockpile to demonstrate that groundwater and surface water outcomes are achievable. Clarify the management of this material at closure and post closure should it not be processed.

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17	Geotechnical stability/ foundation material for the TSF	4.7.7.2; pages 192-3	Testing of foundation materials (clays) for the TSF is recognised as of a preliminary nature however no process is provided for ensuring that the foundation material will provide a competent liner and adequately manage seepage from the TSF. No materials balance has been provided for construction of the TSF. It has not been identified where additional clay material would be sourced from if required for the liner of the TSF.	Provide an estimate of the volume of clay material required for construction of the TSF and where it will be sourced. Provide strategies for addressing in-situ areas that do not have adequate material properties to act as a liner if there is a shortfall of clay material.
18	PAF tailings	4.7.7.2; Page 193	It is stated that: "*All PAF tailings would be disposed directly into the TSF supernatant pond which, combined with the low permeability of the unconsolidated tailings material (1.00E-6 m/s for surface tailings) will maintain the tailings in a fully saturated state. Maintaining the tailings in a saturated state will generate an oxygen free environment and hence limit the potential for acid to be generated during operations. Management of the supernatant pond will be a high priority during the operation of the TSF to ensure that the PAF tailings remain saturated*." The above statement contradicts the typical method of sub-aerial tailings deposition from at or close to the TSF wall which will be required to create tailings beaches. As per Appendix H page 19, creating tailings beaches is necessary to maximise storage of the TSF. Depositing tailings directly into the supernatant may inhibit the creation of beaches and may not achieve the required consolidation and density of tailings. Disposal of PAF tailings directly into the supernatant will require a different deposition strategy and is likely to require a different spigoting system (or other mechanism) to non-PAF tailings. It is not clear what the anticipated volume of PAF tailings is. It appears that there is a potential for the supernatant to become acidified under certain conditions.	Provide an estimate of the total volume of PAF tailings. Clarify how PAF tailings will be deposited directly into the supernatant and clarify implications of such a strategy for operation of the TSF. Consider implications (if any) of the supernatant becoming acidified for return water to the plant and seepage (to the pit and groundwater).
19	PAF (waste rock) Cell	4.7.7.2; page 193-195	It is unclear how the TSF PAF cell will operate, for example how the cell will be accessed to place the waste rock considering no	Provide clarity in relation to how the PAF cell will operate within the TSF.

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	operation		method to inhibit the intrusion of the supernatant is proposed. It is not clear how the PAF cell will be kept open until it is required for use (PAF disposal). Keeping the PAF cell saturated may increase evaporation and therefore water use and increase the potential for seepage. Acid generation may occur unless the PAF cell is saturated in which case it is not clear how placement of PAF material would occur. Figure 4.68 shows PAF exposed at the surface during operations. It is stated that the PAF cell will be saturated to limit acid generation however it is not clear how this will occur and it is not reflected in diagrams (ie Figure 4.67). Specific tailings management practices would be required to avoid acid generation.	Describe uncertainties and assumptions in the operation of the PAF cell and in the impact assessment relating to the TSF.
20	Seepage analysis	4.7.7.2; page 192-196 and 301	The scope of the seepage modelling is not clear, ie whether it is for the entire TSF footprint or just the embankment and embankment foundation.	Clarify if the scope of the seepage analysis is for the entire TSF footprint or just the embankment and embankment foundation.
21	Potential for AMD	4.3.6; Appendix I, Pages 107-122	The risk of AMD is noted and found to be associated with ore deeper than 120 mAHD (4.3.6.3 Figures 4.20 to 4.24). The location of tailings samples listed in Table 4.9 is not described. Later reading of 4.8.1.1 (page 201) suggests the tailings are not from the deeper PAF ore.	Clarify whether the tailings samples are representative of the tailings from ore in the PAF zone.
22	Air Quality Model - Background concentrations	Appendix C. Section 5.3.7 (page 20)	The background PM10 concentrations used for the air quality model contains assumptions and uncertainty because it was collected 6km from site and was collected in 2013 which is considered an atypical year (2009 is a more typical year) and are therefore lower than expected.	Conduct a sensitivity analysis on the air quality model by varying the background concentration data inputs and reporting on the change in the number of days of exceedances at Receptors.
23	Air quality/dust modelling	Appendix C Table 8.1	In Table 8.1 of the Air Quality Assessment report (Appendix C) it is not clear whether maximum PM10 values provided for each receptor are 95th percentile values or true maximums. The indication from the heading of Table 8.1 is that the highest 5% of days (18 days out of 365 days) have been removed from the analysis. This is further supported by the isopleth figure (Figure	Provide a justification for using the 95th percentile in the air quality modelling for PM10. Provide in the response document a new version of Table 8.1 and Figures 8.1 and B.1 including 100% of the data for PM10.

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			8.1) which shows higher concentrations at the receptors than provided in Table 8.1 and which appears to be based on 100% of the data. In Figure 8.1 concentrations at R1, R2 and R13 appear to be higher than presented in Table 8.1. There is no further information provided or justification for removing the highest 5% of values from the analysis. It is not clear in Figure B.1 (Air Quality Assessment Appendix C; Appendix B) whether the highest 5% of values in the dataset have been removed from the analysis.	Provide evidence and justification that the air quality outcomes will be achieved (given that DSD will expect measurement criteria to be 50 µg/m^3 over a 24 hour average) and propose new control strategies if they are required to ensure achievement of the outcome. Clarify that Figure 8.3 (PM2.5) is for cumulative impacts rather than incremental impacts as indicated in the heading.
24	Air quality/dust modelling – emission factors	Appendix C; B1	The emissions factors used do not provide enough clarity on what was modelled. The actual emission value (grams/hectare) is not provided, for example, what dust generation parameter was used for areas of exposed soil or waste rock? Some of the emission factors used contain control measures and some do not appear to. It is not clear that potential dust generation from the TSF has been included as an input to the model. Under some climatic and operational scenarios the TSF would be expected to generate dust and it should be included as a source of dust in the air quality model. It is not clear which mine dust sources are the largest contributor to dust concentrations at the closest human receptors. It is not clear what the Annual Scenario numbers are referring to in Table B.2.	Provide more clarity on the emissions factor assumptions for each input to the model. Provide the actual emission factor inputs to the model in grams/ hectare (or equivalent) in a revised Table B1. Emission Factors. Clarify where control measures are contained in the emission factor parameter inputs to the model. Clarify if the emissions from the TSF are included in the Air Quality model. If not please justify why. Based on the outcome of your response to Issue 22, consider conducting a sensitivity analysis on the air quality model by varying relevant emission factor data inputs and reporting on the change in the number of days of exceedances at Receptors. Based on the modelling, describe the mine dust sources that are the largest contributors to mine generated dust concentrations at the closest human receptors. Provide full references for all of the abbreviated references (ie. NPI EET (2012)) given in Table B1 (Appendix B to Appendix C: Air Quality Assessment) so we can review the basis for emission inputs.

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25	Air quality/dust modelling	Appendix C; Page 31	It is stated that that the highest annual incremental concentration predicted for PM10 was 4.4µg/m3 (R1). Does this mean that the increase to the background on an annual average basis 300m from the mine is only 4.4µg/m3?	Justify that the annual incremental concentration predicted for PM10 at R1 is 4.4µg/m^3.
26	Air quality/dust modelling		Impacts from burning of fuels for the diesel generators, haul trucks and other on-site equipment is not modeled as the report does not consider these emissions to have an impact on air-quality off site. However the diesel generators' fuel rate of 12,500 litres per day and likely emissions from mobile equipment is not insignificant and therefore the potential impacts from NOx, particulate matter, CO and SO2 should be considered.	Provide an assessment of potential air quality impacts from the diesel generators, haul trucks and other on-site equipment.
27	Air Quality - NEPM Exceedances	7.6.3, page 321	DSD does not apply 5 exceedances to PM10 air quality measurement criteria (Table 7.22) as a result of mining operations.	Provide an update of Table 7.22 in the response document and remove 'Exceedances allowed per year' column.
Closure/Mine Completion				
28	TSF Closure Strategies	8.6.4	It is not demonstrated that the strategies for closure will appropriately manage potential closure risks for the long term. A post mining land use of grazing or arable land or pasture has been proposed. It is not clear if the closure strategies will achieve this post mining land use.	Clarify how the closure strategies (conceptual cover design and final land form design) will achieve the relevant environmental outcomes and the proposed post mining land use.
29	TSF – PAF Cell closure and Rehabilitation	4.7.4; Table 4.31; Pages 178-179 8.6.4; 8.6.4.1, Table 8.6; Pages 398-399	Neither the TSF rehabilitation (4.7.4) section nor the closure section for Domain 3, including the TSF, (8.6.4) mentions the PAF cell and no measures are proposed to close the PAF cell specifically. The lack of information regarding the PAF cell raises a number of queries and issues: • Figure 4.68 shows PAF exposed at the surface for periods 2 and 3. However the TSF closure strategy does not appear to maintain the PAF cell in a saturated state. How will this be managed during closure? • Will the PAF cell need to be allowed to dry out to achieve consolidation? What is the potential for acid generation during this phase of closure? • Will the store and release cover provide adequate	Provide clarification on all of the issues raised. Clarify where the materials identified in Tables 4.31 & 8.6 will be sourced from.

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			protection to mitigate the potential for PAF seepage? • The slope of the store and release cover is designed to drain inward. Will this promote ponding on the TSF leading to seepage from the TSF/PAF cell and promote continued wetting and drying of the TSF/PAF material? • PAF material is generated mostly late in the life of the pit when less waste rock is being mined and is available for closure and encapsulation without double-handling. • Diagrams and information provided does not identify the source of materials needed for closure.	
30	WRSF Closure Strategies	8.6.4	There is no consideration of the potential for Neutral Metalliferous Drainage (NMD) from the WRSFs post closure. This is relevant considering run-off and seepage from the WRSF will ultimately report to Pillaworta Creek.	Provide an assessment of the potential impacts and strategies (if required) to manage NMD from the WRSFs post closure.
31	Closure Domain 1 - Open Pit - Pit lake Modelling	8.6.2; Pages 392-395; 8.6.2; Page 408	The final pit lake water level will determine whether the pit becomes a sink for groundwater or a flow-through system with pit water reporting to Pillaworta Creek. This will determine the impacts post closure (if any) to groundwater. Section 8.6.2 does not identify the modelling uncertainty of pit lake water level return post closure. The report describes 4 runoff scenarios for which the results of only 3 are stated hence it is not clear what happens under the fourth scenario. Is it possible that in the fourth scenario the pit lake rises above the potentiometric surface and if so what are the implications of this. The pit lake model chosen in the report for the closure strategy (Table 8.1) is for the pit to “remain an evaporative sink with groundwater flowing towards it throughout the modelled interval.” The modelled pit water level is about 144 m AHD or higher with increasing salinity over time (through evaporation). The identification of a preferred scenario in the report is appropriate however it is not clear what the basis for the chosen model scenario is. Is it because it is the most realistic with the most support from the data or is it the scenario with the least environmental impacts. While it is agreed that a scenario where the pit is a sink (below 144 m AHD) is preferable the most realistic	Identify the uncertainties related to modelling (as a whole) of the rate of pit water recovery and the final pit water level post-closure. This will inform the process to improve future modelling. Identify the uncertainties specific to the model scenario presented in Table 8.1. Clarify the management strategies that are required to achieving this scenario (placement of the abandonment bund, maintaining integrity of diversion drains and dewater diversion bunds etc). These must be relevant and not rely on active management post surrender of the mine lease. Clarify in the response document the pit lake level at which it becomes a flow through system resulting in discharge from the pit towards the creek. This is understood to be at about 150 m AHD. The lowest point of the pit crest should be identified (ie the elevation that will result in surface water discharge from the pit).

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			scenario should be presented and used as the basis for refining the model. A number of specific uncertainties relating to this scenario are evident as follows: • Given that groundwater heads west of the pit (Figure 4.46) are 145 to 146 mAHD it is conceivable that the pit could easily transition to a flow through system. • It is not clear how the modelled pit lake level relates to the lowest point of the pit crest (ie the amount of freeboard). • It is not clear what the seasonal variation in the pit lake level is and whether this will be significant or not (i.e. the winter seasonal high will need to be considered). There is a potential for connectivity between the pit and groundwater due to possible fractures in the local pit geology and effects of mining and blasting even if the pit is an evaporative sink through leakage. The model does not recognize the potential for a solute flux between the pit and surrounding groundwater. Contaminants in the pit lake (including salts) may not remain contained in the pit in perpetuity if there is connectivity between the pit lake and groundwater. This should be recognized as a potential impact to groundwater in the closure risk assessment. An understanding of the geology underlying the pit, and an understanding of the likely hydro-geochemistry of the pit and surrounding groundwater will inform the potential for seepage from the pit.	The fourth model scenario should be provided in the response document. Clarify the potential for seepage from the pit post closure even if the pit remains an evaporative sink. Identify this as an uncertainty in the pit lake closure modelling. In light of the requests above, review the closure impact events, outcomes and measurement criteria.
32	Pit lake water quality	8.6.2 page 397 , 7.4; Page 289 & Page 35; Appendix D – Groundwater Modelling Report,	There is a period of approximately 10 years directly after closure where the pit water level will be below 120 m AHD and PAF material may be exposed to the atmosphere. While most of the sulphide material is to be mined some will remain and a level of acid generation is expected to occur during this period. Consideration may need to be given to expediting the pit lake recovery in the first few years to bring the water level above the 120 m AHD base of oxidation.	Consider the potential for acid generation from the pit post closure in the period until the water level is consistently above the level where most of the sulphide material is present in the pit.

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		Section 7		
Impact Assessment and Management Strategies				
33	Impact Assessment	Section 7	Limitations (including uncertainties) deriving from assumptions made in the impact assessment are not clearly provided (as required by 6.3 of MD006). For example groundwater uncertainties should be described in relation to the assumptions in the seepage analysis and groundwater drawdown model. Many of the judgments made about risks to groundwater in this section are dependent on key assumptions.	Describe any significant degree of uncertainty pertaining to the evaluation of environmental impacts, including limitations to modelling and quality of data. Provide a description of the assumptions and uncertainties contained in the groundwater model which informed the impact assessment. The uncertainties will guide whether additional hydrogeological data needs to be collected should a lease be granted.
34	SEB ratio for native vegetation clearance	Page 271 of MP	An SEB ratio has been provided for all of the areas that will be subject to disturbance. However, it's noted that a comprehensive survey of MC4372 (northern end of the open pit) has not occurred, or not been included in this report. Accordingly, the SEB ratio that has been applied will need to be reviewed once further survey information has been provided.	Should a lease be granted, an acceptable SEB must be described in the PEPR based on a thorough understanding of all vegetation to be cleared, including that contained on MC4372.
35	SEB ratio for native vegetation clearance	Page 271 of MP. Page 44 and 80 of Appendix E – Flora and Fauna	Association 2 – *Eucalyptus cladocalyx* (Sugar Gum) Woodland has been assigned an SEB ratio of 4:1. In particular, this relates to the 6.54 ha of clearance for the Open Pit as specified in Table 7.11 – SEB calculation. The ratio was assigned to the vegetation association due to the 'moderate to low species diversity' in the understory which has resulted from a history of stock grazing. However this association contained 22 native plant species within the impact area (including 3 threatened species) which would be considered moderate – moderately high. It also contained only 5 introduced species, which would be considered low. Additionally, this vegetation community is naturally low in understorey species diversity and is often dominated by leaf litter. Accordingly, this vegetation association is in a condition that would be considered good and it should have a ratio that is reflective of this. Further, as stated in the report from EBS Ecology (Attachment E), the *Eucalyptus cladocalyx* Woodlands and associated communities provide high habitat values for a range of species by providing valuable habitat within a variety of vegetation strata.	Should a lease be granted, it expected that the SEB described in the PEPR will have an appropriate SEB ratio assigned to Association 2 of at least 6:1.

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			Accordingly, a ratio of 4:1 is considered insufficient to offset the impacts of clearance on this vegetation.	
36	SEB offset for scattered trees	Page 271 of MP. Page 66 of Appendix E – Flora and Fauna	The Mining Lease proposal identifies 10 scattered trees that will be impacted. The 10 trees are considered to have a combined canopy cover of 0.95 ha. Table 7.11 – SEB Calculation, states that the SEB requirement for the 10 trees will be 0.95ha or a payment into the fund of $2,750.25. However, this is not the proper application of the scattered tree assessment method. EBS has undertaken a full assessment of the trees and provides each tree with a corresponding score (Table 34 of Appendix E). Based in this information, the scattered trees would receive a total combined point score of 2266. If the SEB is to be achieved through a payment into the fund, this would require a payment of $9,391.40 (equivalent to 4.12ha)	Should a lease be granted, the SEB calculation in the PEPR should appropriately apply the scattered tree assessment method as discussed.
37	SEB Contribution	Page 223 of MP	It's stated that the SEB contribution will be achieved by paying into the Native Vegetation Fund or equivalent approved fund (e.g. Nature Foundation SA). Please note, an SEB can be achieved on ground by protecting and managing an area of remnant vegetation or re-establishing an area of vegetation. If an on ground SEB cannot be achieved, then the proponent may make a payment into the Native Vegetation Fund. However, making a payment into a fund of any other kind (other than the Native Vegetation Fund) is not supported.	If Kookaburra Gully chooses to deliver their SEB through a means other than paying into the Native Vegetation Fund, the proposal should be discussed with the Native Vegetation Management Unit to ensure that it aligns with Native Vegetation Council policies.
38	Entrapment of fauna in trenches, dams and pits	7.3.5.4, Page 275	Control strategies could be strengthened in regards to exploration operations.	The following is an acceptable control strategy: 'All drillholes will be securely capped immediately after completion of drilling.'
39	Potential impacts from drilling	7.4.5	Groundwater impacts associated with drilling not included (depends if future drilling is planned). Potential impacts as a result of drilling could include: 1. Groundwater contamination: • contamination of aquifers through entry of pollutants from the surface • interconnection between aquifers (only if multiple aquifers exist) • degradation of natural hydrostatic conditions (maintain	Where ongoing drilling is proposed, an assessment of these particular impacts is to be provided.

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			pre-drilling pressures). 2. Discharge of groundwater into the surrounding environment.	
40	Groundwater – Pillaworta Creek		The cone of depression from dewatering will extend beneath Pillaworta Creek and the modelled losses from the Creek are expected to be less than 1 L/s and therefore applicant concludes that the impact on groundwater feeding the Creek, pools and their ecosystems will be minimal. However, the effect is still only quantified in terms of a volumetric flow reduction and not water level (assumed by applicant that water levels will not be affected measurably). Additionally, the applicant has not described the potential or likely downstream impacts in sufficient detail. Groundwater is clearly identified as a contributor to water flows in Pillaworta Creek. Consequently an indicative range of potential water level changes throughout the year due to mining operations must be provided (even if it is assumed to be minimal). Given small flows, focus on extremes i.e. as per original feedback, will groundwater drawdown potentially result in complete stream dry out in sections? And what effect might this have on downstream pools and flow given a reduced and interrupted groundwater contribution?	Further information is required regarding potential impacts of proposed mining activities on this section of Pillaworta creek, including: • An indicative range of potential water level changes throughout the year due to proposed mining operations • An assessment of whether there is the potential for complete stream dry out in sections due to proposed mining operations • An assessment of potential impacts on downstream pools and flow due to reduced and interrupted groundwater contribution to stream flow caused by proposed mining operations
41	Groundwater – Seepage from TSF	7.4.8, pages 299 - 301	Control measures proposed for seepage from the TSF embankment (7.5.5.6) are not sufficient to manage the risks to groundwater. The seepage analysis in Appendix H (Page 28-29) states that the seepage collection system will capture all the seepage through the embankment but this is only 30% of the seepage modelled. There is currently no management measures proposed for the remaining 70% of the seepage modelled. Appendix H states that it may be necessary to consider groundwater interception wells to capture up to 60% of the seepage. The risk acceptance in relation to management of seepage from the TSF relies in part on the 'presence of a reasonable thickness of clay materials in the TSF foundations' however no site	Provide information on how the seepage not captured through the seepage collection system will be managed. Conduct a sensitivity analysis of the seepage flow rates (0.7 l/s) by varying the parameters used in the seepage assessment described in Appendix H, including sensitivity to changes in the assumed permeability of the in situ clay.

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			characterization work has been conducted and there is no indication of where clay material will be sourced from. Permeability values used in the seepage analysis are theoretical only and there is no supporting information or validation that these rates will be achieved, consequently a sensitivity analysis should be conducted on the parameters used in the seepage analysis.	
42	Groundwater	Page 297	Impact ID K_25. Residual likelihood requires revision (typo).	Provide a statement of the residual likelihood.
43	Groundwater	Page 298	Impact ID K_27. This impact ID is assessing quality not quantity (water supply) as indicated.	Clarify the statement '*provide alternative water supply'* is a control and management strategy for this impact, given this is not mentioned in Section 7.4.6.5
44	Air quality		The air quality impact assessment does not include 100% of data for PM10 with the highest 5% (18 values) removed.	Provide an updated air quality impact assessment, air quality model and analysis usin 100% of the data for PM10.
45	Impact analysis -*Gahnia filum* Sedgeland	7.4.6.2; Page 306	Please define significant species or communities. Vegetation association 14 (*Gahnia filum* Sedgeland) will potentially be impacted by 0.5 m of drawdown under the base case scenario. As detailed in the EBS report 'The community is considered a vulnerable ecosystem under the Provisional List of Threatened Ecosystems (DEH, 2005)'.	Provide a new impact event analysis (source-pathway-receptor) for the potential impact of mine induced groundwater drawdown on vegetation association 14. Provide a definition or explanation for what is meant by the term 'significant species or communities'
46	Impact Assessment: Low grade stockpile:	7.4.58; 7.4.6.7; Appendix M (Risk K_26 and K_33), also see 7.5.5.5	The impact assessment arrives at a low primary and residual risk of acid generation from the low grade stockpile and this risk is not covered by any proposed outcome. It is identified as PAF with no management measures proposed to mitigate acid generation from the low grade stockpile. The low grade stockpile could be exposed to water and oxygen for a number of years. The measures proposed do not adequately manage the potential to impact surface waters, GDEs, groundwater and adjacent land.	Additional information must be provided on how it is proposed to manage the generation of AMD from ore and low grade stockpiles in order to achieve the relevant environmental outcomes.
47	WRSF run-off management		It is understood that there will be drains surrounding the WRSFs to capture any drainage, runoff and seepage and divert this into sedimentation ponds. Once settled and following monitoring this will be released off-lease and will report to Pillaworta Creek. The sediment dam will reduce sediment loading of runoff however no measures are proposed to manage neutral metalliferous drainage (NMD) should it occur. NMD may have an impact on stock use of this creek, GDEs and fauna if it occurs. Monitoring is only relevant	Provide clear control and management strategies for waste rock placement to address potential impacts of contaminants entering groundwater, surface water and water dependent ecosystems during operation and post mine completion. Provide strategies for managing run - off from waste rock dumps should monitoring find it contains NMD.

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			if there is a strategy to channel this water elsewhere if dissolved metals are present.	Provide clarity on the likelihood of NMD occurring in drainage from the WRSF.
Environmental Outcomes				
48	Environmental Outcomes:		The trigger for inclusion of an Outcome is not clear, is it the Primary Risk rating?	Clarify in the Environmental Components methodology what the trigger is for inclusion of an Outcome.
49	Outcome relating to K_61	Page381	Competition for labour is not regulated under the Mining Act. This outcome is not necessary.	This comment is for noting
50	Outcome for K_06 and K_07	Pages 262-3	Impact events for dust deposition on crops and native vegetation have been identified but have not lead to an environmental outcome.	Include an environmental outcome and draft measurement criteria for dust impacts on crops and native vegetation.
51	Groundwater Quality Outcome (K_25)	Page 384	It should reflect no adverse impact to the quality of groundwater compared to baseline as a result of mining operations.	Update groundwater quality outcome.
52	Visual Amenity Outcome (K_53)	Page 365	This outcome only relates to visual amenity impacts to nearby residents. The public should be included.	Review this outcome to include visual amenity impacts to the general public.
53	Closure Outcomes:	Pages 411-2	The following closure outcomes are required for mine completion but have not been included: • public safety (K_82) • visual amenity (landforms) (K_83) • soil quality (K_80) • post mine land use (K_70) • surface water quantity Outcome for K_79 is related to surface water (which is appropriate) but the impact event given is related to soil.	Provide closure outcomes for these environmental aspects, together with a summary of control and management strategies, and draft completion criteria for demonstrating the achievement of this outcome.
54	DRAFT outcome measurement criteria - Groundwater	Various Table 7.18; Page 320	The groundwater monitoring program should start at least 1 year prior to operation to capture seasonal variations. A similar approach is recommended for the surface water monitoring program. This is required to differentiate between natural seasonal variations and potential impacts associated with mining.	These comments should be considered for any future updates to measurement criteria and water monitoring programs.

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			Monitoring wells should be considered along Pillaworta creek to demonstrate no impact to the creek outside of the current predicted zone of influence. Monitoring wells should also be considered by the permanent pools southeast of the pit and the significance Blue Gum communities.	
55	DRAFT outcome measurement criteria – Surface Water	7.5.9; Page 335	It is recommended that additional criteria be provided for surface water flow and quality monitoring upstream and downstream of the pit along Pillaworta creek to demonstrate achievement of the relevant outcomes. It is recommended that surface water that is to be redirected to Pillaworta creek is monitored (flow and quality) upstream of the pit and just before it is discharged of lease.	Review the draft measurement criteria and provide clarification in the response document.
56	DRAFT outcome measurement criteria – Air Quality	Page 382	Annual averaging of PM10 measurements is not an acceptable measurement criteria. Leading indicator is not adequate. This would require real time data reviewed on an ongoing basis informing a trigger and response plan.	Review and provide updated draft Measurement and Leading Indicators which are consistent with NEPM standards. One component of the measurement criteria for the air quality human health outcome must be; the background plus mine contribution PM10 concentration is less than 50 µg/m^3 as a 24 hour average.