Our ref: DOC20/899366
Your ref: SSD-10269

Philip Nevill
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Dear Phillip

Exhibition of the Narrabri Underground Mine Stage 3 Extension Project Environmental Impact Statement

Thank you for your email dated 29 October 2020 to the Biodiversity, Conservation and Science Directorate (BCS) of the Department of Planning, Industry and Environment inviting comments on the Environmental Impact Statement (EIS) for the Narrabri Underground Mine Stage 3 Extension Project.

BCS notes that the project involves an extension to the south of the Narrabri Underground Mine to gain access to additional coal reserves, an extension of the mine life to 2044 and development of supporting surface infrastructure components including internal service corridors, service boreholes and goaf gas drainage infrastructure (the project).

Based on the information provided within the EIS, the flood inundation extent of the Namoi floodplain extension is expected to remain consistent with the existing conditions. Also, the expected changes in hydrologic conditions (catchment size and river morphology) were found to be minimum. As such, BCS has no specific comment to make regarding the project and its potential effect on flood behaviour or hydrology.

A component of the BDAR for the project was inclusive of a proposal to apply the *Ancillary rules: use of mine site ecological rehabilitation as an offset* (the ancillary rules) under the Biodiversity Offsets Scheme (BOS). The ancillary rules have yet to be published and finalised under Clause 6.5 of the *Biodiversity Conservation Regulation 2017,* as such, BCS cannot provide review on this component of the BDAR. However, the final credit obligation for the project is defined by its total residual impact and is exclusive of methods to offset this obligation. Thus, once the ancillary rules have been finalised and published by the Environment Agency Head, BCS can provide post-consent review and advice to the proponent on a proposal to satisfy the final credit obligation in accordance with the published method.

BCS would like to highlight that several requirements of the BAM were not met at the time of lodgement. In order to facilitate a thorough and timely assessment of a development, the BAM requires the assessor to provide digital shape files for all maps and spatial data as well as plot field data. It is also a requirement of the BAM that the credit calculator be submitted at the time the BDAR is lodged. The shapefiles and access to the calculator were subsequently provided at the request of BSC on 2 December 2020. The plot field data sheets were not provided.

BCS's biodiversity recommendations are provided in **Attachment A** and detailed comments are provided in **Attachment B**. If you require any further information regarding this matter, please contact Ben Ellis, Senior Conservation Planning Officer, via ben.ellis@environment.nsw.gov.au or (02) 82751838.

Yours sincerely

Sarah Carr
Director North West
Biodiversity, Conservation and Science Directorate

16 December 2020

Attachment A

BCS's recommendations

Narrabri Underground Mine Stage 3 Extension Project – Environmental Impact Statement

BAM	Biodiversity Assessment Method 2017
BAM-C	Biodiversity Assessment Method Calculator
BDAR	Biodiversity Development Assessment Report
BC Act	*Biodiversity Conservation Act 2016*
BC Regulation	Biodiversity Conservation Regulation 2017
BDAR	Biodiversity Development Assessment Report
EEC	Endangered Ecological Community
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
HBT	Hollow bearing tree
HTE	High threat exotic
MNES	Matters of National Environmental Significance
PCT	Plant Community Type
SAII	Serious and Irreversible Impacts
TEC	Threatened Ecological Community
TBDC	Threatened Biodiversity Data Collection
VI score	Vegetation Integrity Score

Recommendations

1.1. Certify the BDAR in accordance with Clause 6.15 of the BC Act.

2.1 Finalise all associated BAM-C credit cases and submit to consent authority within 14 days of certifying the BDAR.

2.2 Update Attachments G-S of the BDAR with finalised BAM-C generated credit reports.

3.1 The field data sheets for each BAM plot should be provided in the BDAR.

4.1 Provide a comprehensive definition of all the surface infrastructure components, which will result in surface disturbance, required for the project.

4.2 Confirm that all components have been included within the overall development footprint for the proposal and have been addressed in Stage 2 of the BDAR.

5.1 Identification of the previously approved development footprint as a measure to avoid and minimise impacts to biodiversity values should be removed from the BDAR.

6.1 Recalculate the final credit obligation without manual reductions to ecosystem and species credits so that the BDAR is BAM compliant.

6.2 Discuss the rational and justification of the proposed Impact Reduction Area with PAG.

7.1 Remove the proposal to apply the ancillary rules in Section 10.5 of the BDAR.

8.1 Clarify which IBRA-subregion each vegetation zone occurs within.

8.2 Justify the selection and assignment of IBRA subregion(s) to vegetation zones in accordance with Section 6.4.1.6 of the BAM.

9.1 Provide a TEC equivalence assessment for the State Listing of Box Gum Woodland.

10.1 Species credits for the Glossy Black-Cockatoo are confirmed prior to project approval.

11.1 For the unnamed rocky outcrop, which is expected to be impacted by subsidence, a full assessment of the extent of these impacts should be conducted in accordance with Section 9.2.1.1 of the BAM.

12.1 SMART principles and triggers for adaptive management are included within relevant post-consent management plans.

13.1 Provide further justification to support the adequacy of targeted field survey and the conclusions made for species that were considered to have a low detection probability.

14.1 Section 6.2.12 of the BDAR should be inclusive of discussion and proposed mitigation measures to reduce the likelihood of threatened flora tramping resulting from surface crack and erosion remediation works.

15.1 An assessment of the potential indirect impacts affecting threatened Microchiropteran bats should be conducted in accordance with Section 10.2.3.1 of the BAM 2017.

15.2 Mitigation measures specifically designed to mitigate indirect impacts for Microchiropteran bats should be implemented.

16.1 The assessor should note that the Coolabah Bertya has now been approved as an SAII entity.

16.2 Further information should be provided to justify why the development footprint of the north western portion of Phase 6 cannot be redesigned to avoid the loss of Coolabah Bertya individuals and its habitat.

16.3 A translocation and propagation management plan should be prepared for Coolabah Bertya in consultation with BCS and species experts.

16.4 An assessment of the potential indirect impacts affecting Coolabah Bertya should be conducted in accordance with Section 10.2.3.1 of the BAM 2017. Further assessment should focus on the potential indirect impacts occurring from surface cracking and associated soil moisture loss, groundwater drawdown and edge effects.

17.1 Assess and or clarify the potential for underground mining works in the vicinity of identified fault lines to result in greater than expected subsidence impacts to overlying biodiversity values.

17.2 Clarify if subsidence impacts via surface cracking will be limited to the identified 180m depth of cover subsidence area. If cracking impacts have the potential to occur across the entirety of the subject site an upper quantum of potential impact should be assumed.

17.3 Provide the monitoring report(s) as an attachment to the BDAR so assumptions on potential subsidence impacts to overlying biodiversity values can be verified.

18.1 The BDAR should outline the method used to determine non-native vegetation and provide a description of the compositional, structural and functional attributes of this vegetation zone.

19.1 Correct topology errors in vegetation zone mapping and all spatial data layers that have been derived from this dataset, including (but not limited to) species polygons.

19.2 Revise all BAM-C credit calculations that rely on the spatial accuracy of vegetation zone mapping.

19.3 Update the BDAR to reflect revised area calculations.

20.1 Include PCT 404 within the species polygon for the Squirrel Glider.

21.1 Provide justification and evidence that only a partial loss in VI will occur for ETL management zones. If adequate justification and evidence cannot be provided to support this assumption, beyond reasonable doubt, assume a total loss in VI for these zones.

Attachment B

BCS's detailed comments

Narrabri Underground Mine Stage 3 Extension Project – Environmental Impact Statement

1. The BDAR should be certified as BAM compliant within 14 days of the submission date

Clause 6.15 of the BC Act states *'a biodiversity assessment report cannot be submitted in connection with a relevant application unless the accredited person certifies in the report that the report has been prepared on the basis of the requirements of (and information provided under) the biodiversity assessment method as at a specified date and that date is within 14 days of the date the report is so submitted'.*

The BDAR that has been submitted has not been certified in accordance with Clause 6.15 of the BC Act.

Recommendation

1.1 Certify the BDAR in accordance with Clause 6.15 of the BC Act.

2. The assessor should finalise all associated BAM-C credit cases and submit to consent authority within 14 days of certifying the BDAR

The BAM-C generated credit reports for the project (Attachment G- S of the BDAR) have not been finalised. BAM-C credit cases associated with the project were submitted to BCS for review outside of the 14-day deadline defined in Clause 6.15 of the BC Act.

Recommendations

2.1 Finalise all associated BAM-C credit cases and submit to consent authority within 14 days of certifying the BDAR.

2.2 Update Attachments G-S of the BDAR with finalised BAM-C generated credit reports.

3. The plot field sheets for the project should be submitted so PCT identification can be verified

The field data sheets for each BAM plot undertaken to inform the BDAR were not provided to BCS during submission of the EIS. Appendix A of Attachment 2 of the BDAR contains a full species list for the entire subject site but the plots in which the species were present is not specified.

Submission of relevant field data sheets is detailed within Table 25 of Appendix 10 of the BAM as forming part of the minimum requirements for a BDAR. Without field data sheets BCS is unable to assess whether the PCT conclusions are appropriate.

Recommendation

3.1 The field data sheets for each BAM plot should be provided in the BDAR.

4. Confirmation is required that all surface impacts from the proposal have been included in the development footprint

Figure 5 of the BDAR provides spatial detail of the surface infrastructure components required for the project. Subsequent Figures within the BDAR detail an overall development footprint inclusive of components identified in Figure 5.

Various additional components, requiring surface disturbance, are mentioned in the BDAR which have not been identified within Figure 5 i.e. ventilation shafts, electricity transmission line (ETL) management corridors and other utility services. In addition, identification of temporary surface infrastructure i.e. construction compounds, material laydown areas etc. have not been addressed within the BDAR.

It is unclear if all surface infrastructure components required for the project have been included within the development footprint.

Recommendations

4.1 Provide a comprehensive definition of all the surface infrastructure components, which will result in surface disturbance, required for the project.

4.2 Confirm that all components have been included within the overall development footprint for the proposal and have been addressed in Stage 2 of the BDAR.

5. The identified Impact Reduction Area should not be considered as a form of avoidance

Section 5.2 of the BDAR details a previously approved development footprint, in proximity to the project footprint, where no clearance has yet taken place (identified within the BDAR as the Impact Reduction Area). This development footprint is associated with the Narrabri Underground Mine Stage 2 development approval and has been identified within Section 5.2 of the BDAR as not being required for the project.

BCS believes that as the identified Impact Reduction Area is remnant of a separate development application there is no applicability between this area and proposed measures of avoidance for the project. As such, the proponent electing not to act on prior approvals and clear this area does not demonstrate a valid measure of avoidance of biodiversity values e.g. the modification of required surface infrastructure components or overall development footprint layout to avoid potential impact to biodiversity values.

BCS would be supportive of the proponent realigning the proposed project footprint to make use of areas previously approved for surface clearance to avoid the requirement for additional disturbance to biodiversity values.

Recommendation

5.1 Identification of the previously approved development footprint as a measure to avoid and minimise impacts to biodiversity values should be removed from the BDAR.

6. The final credit obligation for the project should be re-calculated without manual deductions to ecosystem and species credits

The Impact Reduction Area has been included within the BAM-C calculations to manually deduct ecosystem and species credits from the final credit obligation of the proposal. The Impact Reduction Area development footprint is associated with the Narrabri Underground Mine Stage 2 development approval. In addition, a proposal to undertake mine site ecological rehabilitation has also been included within BAM-C calculations to pre-emptively offset ecosystem and species credits.

The assessor should note that the final credit obligation for the project will be defined by its total residual impact, and that the BAM does not allow for manual deductions to be made to a final credit obligation based on proposed measures of avoidance or proposed offset strategies.

If the proponent wishes to relinquish their application to undertake vegetation clearance for the abovementioned Narrabri Underground Mine Stage 2 development approval, BCS recommend that a more appropriate pathway would be via a formal Development Modification request to the Planning and Assessment Group (PAG). The modification request can then be independently assessed on its own merits and applicability to the pre-existing conditions of consent and associated offset liability to which the area relates. BCS recommends that the proponent discuss the rational and justification of the Impact Reduction Area with PAG separate to this project approval.

Recommendations

6.1 Recalculate the final credit obligation without manual reductions to ecosystem and species credits so that the BDAR is BAM compliant.

6.2 Discuss the rational and justification of the proposed Impact Reduction Area with PAG.

7. The proposal to apply the use of mine site ecological rehabilitation as an offset should be removed from the BDAR

A strategy and method for interpreting and applying the *Ancillary rules: use of mine site ecological rehabilitation as an offset* (the ancillary rules) has yet to be finalised and published by the Environment Agency Head under Clause 6.5 of the *Biodiversity Conservation Regulation 2017.* As such, BCS cannot provide advice or review on the proposal to apply these rules in Section 10.5 of the BDAR.

Once the ancillary rules have been finalised and published by the Environment Agency Head BCS can provide review and advice on a proposal to satisfy the final credit obligation of the project in accordance with the published method.

Recommendation

7.1 Remove the proposal to apply the ancillary rules in Section 10.5 of the BDAR.

8. Clarification should be made regarding which IBRA-Subregion has been used within the BAM stage 1 assessment

Section 2.1 and Figure 8 of the BDAR identifies that the subject site is intersected by a boundary between two IBRA Subregions. In accordance with Section 6.4.1.6 of the BAM *where a vegetation zone is across one or more IBRA Subregions the IBRA subregion in which most of the proposal occurs must be used*. It is unclear in the BDAR which IBRA-subregions vegetation zones occur within.

The selection of IBRA-Subregions assigned to inform Stage 1 of the assessment should be identified within the BDAR and its selection should be justified giving reference to Section 6.4.1.6 of the BAM.

Recommendations

8.1 Clarify which IBRA-subregion each vegetation zone occurs within.

8.2 Justify the selection and assignment of IBRA subregion(s) to vegetation zones in accordance with Section 6.4.1.6 of the BAM.

9. An equivalency assessment should be provided for the state listing of *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland*

Section 9.1.3 of the BDAR states that '*Eco Logical Australia (ELA) mapped the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Box Gum Woodland) present within the Project area. More detailed surveys were subsequently undertaken by AMBS (2020a) (Attachment B), and it was confirmed that the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland is not present. Therefore, the Project would not have a significant impact on the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland and no further assessment is required.'*

Review of Section 3.2 of Attachment B of the BDAR states that '*the exclusion of Box Gum Woodland being present within the subject site was made on the basis of reviewing the definitions within Commonwealth Listing Advice for Box Gum Woodland'.*

BCS supports the determination that the TEC is unlikely to be representative of the Nationally listed definition of Box Gum Woodland. However, BCS requires that similar consideration be given to an equivalence assessment of the community against the definition given in the communities' State Listing Advice and Final Determination.

Recommendation

9.1 Provide a TEC equivalence assessment for the State Listing of Box Gum Woodland.

10. Revisions to credit calculations for the Glossy-black Cockatoo post-consent will require a modification application

Table ES-1 of the BDAR contains a clarification in regard to the projects credit obligation for Species Credits of Glossy-black Cockatoo, as follows:

The methodology for mapping a species credit polygon for the Glossy Black-Cockatoo was revised since the surveys for this Project, therefore it is reasonable for the biodiversity credit requirements for the Glossy Black-Cockatoo to be reduced if NCOPL obtain an Expert Report (in accordance with the BAM) or undertake additional targeted surveys as required by DPIE.

It should be noted, that if consent is granted prior to either the provision of an expert report or additional survey effort, the final credit obligation will be set within the conditions of consent for the project and any revisions of this credit obligation post-consent will require submission of a modification application.

Recommendation

10.1 Species credits for the Glossy Black-Cockatoo are confirmed prior to project approval.

11. Further information is required regarding the likely prescribed impacts of the proposal on geological features of significance

Section 6.3.1 of the BDAR identifies an unnamed rocky outcrop which was confirmed as providing habitat to Microchiropteran bats including the threatened species, Large-eared Pied Bat. It is identified in Section 6.2.1 of the BDAR that subsidence impacts to this geological feature are expected to occur.

Section 9.2.1.1 of the BAM details requirements for assessing prescribed biodiversity impacts on the habitat of threatened species or ecological communities associated with karst, caves, crevices, cliffs and other features of geological significance. An assessment according to these requirements has not been undertaken for the identified unnamed rocky outcrop.

Recommendation

11.1 For the unnamed rocky outcrop, which is expected to be impacted by subsidence, a full assessment of the extent of these impacts should be conducted in accordance with Section 9.2.1.1 of the BAM.

12. The assessor should note the requirement for post-consent management plans to appropriately mitigate operational risks and residual impacts to resident fauna

It is noted in Table 20 that a low risk of indirect impacts via vehicle strike on resident fauna has been assigned given the speed limit of 40 km/h applied to roadways within the subject site. BCS believes that the risk for vehicle strike on resident fauna may still be high given that all internal roadways within the subject site will be narrow, heavily vegetated and trafficked with large machinery.

Table 20 of the BDAR has assigned a low risk of resident fauna becoming displaced or injured given the mitigation measures proposed in the vegetation clearance protocol. BCS believe that further mitigation measures would be required to assign a low risk likelihood to this residual impact.

If consent is granted, BCS will provide detailed review and comment on relevant post-consent vegetation clearance, traffic and biodiversity management plans and associated strategies for impact mitigation. BCS requires that strategies for residual and indirect impact mitigation adhere to SMART principles and are inclusive of triggers for adaptive management in accordance with Section 2.6 of the BAM Operational Manual Stage 2.

Recommendation

12.1 SMART principles and triggers for adaptive management are included within relevant post-consent management plans.

13. Further justification is required for targeted flora surveys conducted during drought conditions

Section 2.2.1 of Attachment B of the BDAR states that '*below average rainfall and above average temperatures for most of 2017- 2020 and the lack of recent fire, may have limited the ability to detect some potentially occurring threatened plants, including Cyperus conicus, Diuris tricolor (Pine Donkey Orchid), Monotaxis macrophylla (Large-leafed Monotaxis), Polygala linariifolia (Native Milkwort), Pterostylis cobarensis (Cobar Rustyhood), Swainsona murrayana (Slender Darling Pea) and Tylophora linearis'.*

Further justification will be required to provide, beyond reasonable doubt, that the field survey undertaken for the species above was adequate to determine the absence of these species from the subject site.

Where limitations on the detection of species are still significant an expert report or assuming species presence will be required in accordance with Section 6.4.1.21 of the BAM.

Recommendation

13.1 Provide further justification to support the adequacy of targeted field survey and the conclusions made for species that were considered to have a low detection probability.

14. The potential for trampling of threatened flora species requires revision

Section 6.2.12 of the BDAR states that '*Threatened flora species known to occur adjacent to the Development Footprint (i.e. Coolabah Bertya, Scant Pomaderris and Tylophora linearis) are unlikely to be at risk of trampling during construction or operation, as access to ML 1609, MLA 1 and MLA 2 is controlled and generally restricted to authorised personnel'.*

BCS is concerned that the potential for trampling of threatened flora species is still possible given that surface cracking and erosion remediation will potentially be required to be undertaken across the subject site, in some cases via heavy machinery.

Recommendation

14.1 Section 6.2.12 of the BDAR should be inclusive of discussion and proposed mitigation measures to reduce the likelihood of threatened flora tramping resulting from surface crack and erosion remediation works.

15. The SAII Assessment for threatened Microchiropteran bats will require further consideration of indirect impacts

Section 10.2.3.1 of the BAM details additional impact assessment provisions for threatened species to be undertaken inclusive of *the likely impact (including direct and indirect impacts) that the development, clearing or biodiversity certification will have on the habitat of the local population* (of threatened species).

BCS believe that Section 8.1.2 (d) of the BDAR has not adequately considered and addressed all the indirect impacts to the Large-eared Pied Bat and Eastern Cave Bat with the potential to occur as a result of the project, especially considering the immediate adjacency of surface infrastructure components to significant habitat features for the species within the subject site.

Further assessment of indirect impacts will be required, this assessment should be inclusive of (but not limited to) the indirect impacts occurring from noise, increased human activity and light spill occurring adjacent to identified Microchiropteran bat habitat. It is recommended that further mitigation measures, specifically designed to reduce the potential indirect impact on the local populations, are implemented.

Recommendations

15.1 An assessment of the potential indirect impacts affecting threatened Microchiropteran bats should be conducted in accordance with Section 10.2.3.1 of the BAM 2017.

15.2 Mitigation measures specifically designed to mitigate indirect impacts for Microchiropteran bats should be implemented.

16. The assessment and justification of avoidance and mitigation measures for Coolabah Bertya require revision

Section 8.1.1 of the BDAR states that '*Coolabah Bertya is being considered for inclusion on the list of 'potential SAII entities'*. The assessor should note that the Coolabah Bertya has now been approved as an SAII entity.

The population of Coolabah Bertya extending from Jacks Creek State Forest represents the most significant population of Coolabah Bertya in NSW. This species meets Principle 3 set out in Clause 6.7 of the *Biodiversity Conservation Regulation 2017*, being representative of a species which has a very limited geographic distribution.

Section 8.1.2 of the BDAR states that '*the project would result in the direct clearance of approximately 6 ha of known habitat for the Coolabah Bertya, comprising an estimated 25,939 individuals'.*

This would represent a significant loss for a population which is geographically confined to a small area of habitat comprising of the subject site and its surrounds. Impacts to this population will be further exacerbated by the recent approval of the neighbouring Narrabri Gas development directly adjacent to the subject sites west, which will result in the loss of an additional 10,309 individuals and 6.37 ha of occupied habitat. As such, it is strongly recommended that removal this SAII species and its habitat should be one of the highest priorities for avoidance.

Further information should be provided to justify why the development footprint of the north western portion of Phase 6 cannot be redesigned to avoid the loss of the dense population of Coolabah Bertya from within the subject site and its habitat, described in Attachment B of the BDAR as '*a hillside below a prominent ridge'.*

Section 7 of the BDAR details that '*a propagation and translocation trial would be implemented for the Coolabah Bertya. This would involve collection of vegetative material from the local population (either above-ground parts and/or soil seed bank) and use of that material to re-establish individual plants in rehabilitation areas'.*

BCS questions the potential for the proposed propagation and translocation trial to succeed given that the seed viability and germination cues for Coolabah Bertya have not been investigated to date and current knowledge indicates that seeds from this species may contain a form of conditional dormancy.

To provide adequate mitigation of potential impacts to this species a translocation and propagation management plan should be prepared for this trial with input provided by species experts and the BCS Accountable Officer for the species. This plan should be inclusive of targets for collection and propagation and an annual monitoring schedule to track survival of propagated individuals.

Section 10.2.3.1 of the BAM details additional impact assessment provisions for threatened species to be undertaken inclusive of *the likely impact (including direct and indirect impacts) that the development, clearing or biodiversity certification will have on the habitat of the local population* (of threatened species).

BCS believe that Section 8.1.2 (d) of the BDAR has not adequately considered and addressed all the indirect impacts to Coolabah Bertya with the potential to occur as a result of the project. Further assessment will be required to analyse the potential indirect impacts occurring from surface cracking

and associated soil moisture loss, groundwater drawdown and edge effects affecting the viability of the populations of Coolabah Bertya within the subject site.

Recommendations

16.1 The assessor should note that the Coolabah Bertya has now been approved as an SAII entity.

16.2 Further information should be provided to justify why the development footprint of the north western portion of Phase 6 cannot be redesigned to avoid the loss of Coolabah Bertya individuals and its habitat.

16.3 A translocation and propagation management plan should be prepared for Coolabah Bertya in consultation with BCS and species experts.

16.4 An assessment of the potential indirect impacts affecting Coolabah Bertya should be conducted in accordance with Section 10.2.3.1 of the BAM 2017. Further assessment should focus on the potential indirect impacts occurring from surface cracking and associated soil moisture loss, groundwater drawdown and edge effects.

17. Further assessment and clarification is required regarding the potential for subsidence impacts to affect overlying biodiversity values

Section 6.2.1 of the BDAR addresses the potential impacts resulting from mine subsidence to overlying biodiversity values. This impact assessment has been conducted according to a predicted 20 millimetres (mm) subsidence contour provided by the Subsidence Assessment undertaken by Ditton Geotechnical Services within Appendix A of the EIS.

Figure 3a and 3b of Appendix A of the EIS identifies several fault lines transecting through the subject site. The potential for underground mining works within the vicinity of these fault lines resulting in greater than expected subsidence impacts to overlying biodiversity values has not been addressed in the BDAR.

The expected extent of subsidence impacts, via cracking and root shear, have been limited to a small area within the south east of the subject site (identified as the 180 depth of cover subsidence area). However, additional surface cracking impacts are mentioned in the BDAR as potentially affecting biodiversity values outside of the identified 180m depth of cover subsidence area e.g. the unnamed rocky outcrop within the centre of the subject site.

The subsidence assessment identifies that "*typical crack widths are estimated to range from 100 mm to 400 mm, up to approximately 390 mm in sand or loam and approximately 780 mm in clay or rock"*. If this expected cracking was to occur across the subject site this would likely have a significant impact on overlying biodiversity values.

The BDAR should clarify if subsidence impacts as a result of surface cracking will be limited to the identified 180m depth of cover subsidence area. If cracking impacts have the potential to occur across the entirety of the subject site an upper quantum of potential impact should be assessed within Stage 2 of the BDAR and included within BAM-C calculations.

Section 6.2.1 of the BDAR details that surface cracking resulting from mine subsidence has been identified to potentially affect large trees. The nature and extent of the expected surface cracking impacts has been estimated and assessed based on experience and monitoring results of the existing mine. Investigations of the existing mine were conducted in 2014 to assess the extent and cause of subsidence impacts after several large trees were observed to be dead or highly stressed in subsidence zones.

BCS supports the use of monitoring pre-existing subsidence impacts to inform analysis of the expected subsidence impacts of the project. However, without review of the monitoring report(s), it is unclear what the scope, extent and limitations of the investigations within the pre-existing mine site were.

As an example, the main monitoring report referenced within the BDAR, when considering subsidence and cracking impacts, is a tree health assessment report conducted across phases LW101-103 (ELA 2014). It is unclear if any monitoring has been conducted for all vegetation growth forms across the pre-existing mine site or if monitoring was limited to just the canopy trees within these phases.

As the monitoring report(s) informs major assumptions within the BDAR regarding the potential extent and severity of cracking impacts to overlying biodiversity values BCS request that a copy of the report(s) is appended to the BDAR for review.

Recommendations

17.1 Assess and or clarify the potential for underground mining works in the vicinity of identified fault lines to result in greater than expected subsidence impacts to overlying biodiversity values

17.2 Clarify if subsidence impacts via surface cracking will be limited to the identified 180m depth of cover subsidence area. If cracking impacts have the potential to occur across the entirety of the subject site an upper quantum of potential impact should be assumed.

17.3 Provide the monitoring report(s) as an attachment to the BDAR so assumptions on potential subsidence impacts to overlying biodiversity values can be verified.

18. Adequate justification is required to support stratification of non-native vegetation

Attachment 2 of the BDAR describes the method used to determine best-fit candidate PCTs within the subject site and contains a description of all vegetation zones stratified within the subject site. However, the method used to determine the occurrence and extent non-native vegetation is not clearly described in the BDAR. In addition, no description of zones assigned to non-native vegetation have been provided.

Recommendation

18.1 The BDAR should outline the method used to determine non-native vegetation and provide a description of the compositional, structural and functional attributes of this vegetation zone.

19. Vegetation zone mapping should be revised to correct significant spatial errors

A topology check of the vegetation zone mapping for the project was conducted by BCS via GIS techniques. It was found that the vegetation zone mapping contained a significant amount of polygon gaps and polygon overlaps (>700 instances). In many cases the gaps and overlaps between vegetation zones were minor, however cumulatively this could cause significant errors to the final area calculations for the project and thus affect its final credit obligation.

Recommendations

19.1 Correct topology errors in vegetation zone mapping and all spatial data layers that have been derived from this dataset, including (but not limited to) species polygons.

19.2 Revise all BAM-C credit calculations that rely on the spatial accuracy of vegetation zone mapping.

19.3 Update the BDAR to reflect revised area calculations

20. The species polygon for Squirrel Glider should be inclusive of PCT 404

Attachment 2 of the BDAR states that '*the woodland dominating PCT 404 in the study area is very sparse, with a dense mid-storey of Acacia burrowii (Burrow's Wattle) being the dominant component. The trees that are present offer few suitable roosting hollows for the species. Given the structure of PCT 404 in the study area, it is concluded that most of this community is not suitable for the species'.*

BCS does not agree that PCT 404 should be excluded from the Squirrel Glider species polygon, based on the evidence provided, given that:

- the species was recorded as present within contiguous habitat
- although, comparatively, PCT 404 may contain a lesser amount of roosting resources; suitable foraging and roosting resources would still be present
- the Squirrel Glider can occupy vegetation with an open canopy structure, including paddock trees, and;
- a population of the species can be supported by relictual habitat.

Recommendation

20.1 Include PCT 404 within the species polygon for the Squirrel Glider.

21. A total loss of VI should be assumed for ETL management areas

Section 3.1 of the BDAR states that trees, shrubs and regeneration would be removed for construction and maintenance of the ETL management zones. Credit calculations for this management zone have assumed only a partial loss in Vegetation Integrity (VI), limited to the vegetation growth forms and functional aspects proposed to be selectively cleared.

BCS questions the assumption that no loss in vegetation integrity will occur for the remainder of the native vegetation within the ETL management zones given that key structural layers and functional aspects within these zones would be selectively removed.

Further justification and evidence is required to support the assumption, beyond reasonable doubt, that only a partial loss of vegetation integrity will occur within ETL management zones. If adequate justification and evidence cannot be provided to support this assumption, beyond reasonable doubt, a total loss in VI for these zones should be assumed.

Recommendation

21.1 Provide justification and evidence that only a partial loss in VI will occur for ETL management zones. If adequate justification and evidence cannot be provided to support this assumption, beyond reasonable doubt, assume a total loss in VI for these zones.