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Dear Steve

Bylong Coal Project - OEH Response to EIS

I refer to your email of 21 September 2015 inviting the Office and Environment and Heritage (OEH) to provide a submission on the Bylong Coal Project proposal as detailed in the project Environmental Impact Statement (EIS).

OEH understands that the project is to be assessed as a transitional project under the *NSW Biodiversity Offsets Policy for Major Projects* and that the proponent has committed to undertake a full assessment using the Framework for Biodiversity Assessment, although this will not be complete until the Response to Submissions stage of the assessment process. At a meeting between OEH, the Department of Planning and Environment (DP&E) and KEPCO representatives in August 2015, it was acknowledged that there would be deficiencies in the impact and offset assessment and the Biodiversity Offsets Strategy, and that the proponent would continue to work on resolving these with DP&E and OEH. OEH comments in this submission have been made in this context.

OEH understands that the proposed project includes two open cut mining areas and associated overburden emplacement areas, an underground coal mine using longwall mining, associated infrastructure, a rail loop and loading facility and a workforce accommodation facility. This will result in approximately 1,160 hectares of direct surface disturbance and a subsidence area of approximately 1,714 hectares.

OEH recognises that KEPCO has significantly altered the proposed mine plan to avoid or mitigate impacts on Biophysical Strategic Agricultural Land, alluvial land, Critical Industry Cluster areas and the environment. However, OEH has some significant concerns regarding some of the conclusions reached in the EIS. These include:

- the accuracy of the mapping of vegetation within the Project Disturbance Boundary particularly regarding the identification of threatened and non-threatened woodland and derived native grassland
- identification of Regent Honeyeater habitat

- resultant uncertainty in calculating the residual impacts on State and Commonwealth listed Threatened Ecological Communities and threatened species, throwing doubt onto the sufficiency of the proposed Biodiversity Offset Strategy
- resultant uncertainty regarding whether the provisions of the Framework for Biodiversity Assessment have been satisfied
- uncertainty regarding the suitability of Offset Area 5 as an offset property which has yet to be resolved
- impacts on cliff habitats and associated cultural heritage sites subject to significant levels of subsidence

Detailed comments and OEH's recommendations on these and other biodiversity related issues are provided in Attachment A. Detailed comments and recommendations regarding Aboriginal Cultural Heritage matters are provided in Attachment B.

Please note that comments on non-Aboriginal heritage matters will be the subject of a separate submission to be supplied by the Heritage Division of OEH.

If you have any questions regarding this matter please contact Terry Mazzer on 02 6883 5302 or email terry.mazzer@environment.nsw.gov.au.

Yours sincerely

PETER CHRISTIE
Regional Manager North West
Regional Operations

Date: 06 November 2015

Attachment A: OEH Review - Biodiversity - Bylong Coal EIS

Attachment B: OEH Review – Aboriginal Cultural Heritage - Bylong Coal EIS

ATTACHMENT A

OEH Review - Biodiversity
Bylong Coal Project – Environmental Impact Statement

Acronyms

BBCC	BioBanking Credit Calculator
BOS	Biodiversity Offsets Strategy
BVT	Broad Vegetation Type
DNG	Derived Native Grassland
DoE	Department of the Environment (Commonwealth)
DP&E	Department of Planning and Environment
EIS	Environmental Impact Statement
FBA	Framework for Biodiversity Assessment
KEPCO	Korea Electric Power Corporation
NPWS	National Parks and Wildlife Service
OA5	Offset Area 5
OEH	Office of Environment and Heritage
TEC	Threatened Ecological Community
TSC Act	Threatened Species Conservation Act 1995

1. Vegetation Mapping

The Environmental Impact Statement (EIS) has mapped 24 vegetation communities within the study area. OEH accepts the identification of the majority of these. Native vegetation within the Project Disturbance Boundary has not been correctly mapped where a delineation between woody vegetation types and Derived Native Grassland (DNG) is required. Consequently the areas of some of the vegetation types within the impact zone have not been correctly calculated and the quantum of the impact has not been correctly determined.

Maps of the disturbance area were included within the EIS and ArcGIS shapefiles have been provided to OEH, however the vegetation mapping does not reflect the true extent of vegetation communities in the study area. OEH has not attempted to validate the vegetation mapping and condition assessment in the field but has relied on the Proponent's mapping of vegetation. However there appear to be significant problems with the mapping of woodland vegetation types where they adjoin DNG.

In particular, the areas mapped as White Box Woodland, Slaty Box Woodland and Grey Box Woodland and their respective DNG types, do not follow accepted practice. The polygons of these woody vegetation types are drawn using a concave polygon around the canopy of individual trees, or groups of trees, rather than the community as a whole. This has the effect of minimising the amount of woodland which needs to be offset and maximising the amount of DNG, resulting in an underestimate of the expected impact on these vegetation communities and associated flora and fauna. This may also minimise the amount of TECs which are required to be offset. These problems are particularly prevalent at, but not restricted to, the area of the Eastern Open Cut.

Typically woodland and open woodland will have inter-canopy spaces of 1 to 20 times the width of individual canopies (see Walker and Hopkins 1998). Furthermore the draft FBA Operational Manual defines a patch of native vegetation as an area that "includes moderate to good native vegetation that has a gap of less than 100 m from the next area of moderate to good condition native vegetation (or ≤ 30 m for non-woody ecosystems)". This manual was not available to the Proponent but the

methodology is similar to that of the previous BioBanking operational manual. Commonwealth guidelines regarding the derivation of a patch of Box-Gum Woodland should also be consulted. Thus many of the multiple small polygons of trees mapped by the Proponent should be linked together to form larger polygons of open woodland and the dissected polygons mapped by the Proponent should be adjusted to include the gaps between the 'arms' to produce smoother, more credible, polygons.

Once the woodland and DNG areas are remapped then the number of ecosystem and species credits required to be offset will need to be recalculated. It is important that the quantum of the impact is calculated accurately as this is used to inform the requirements of the Biodiversity Offset Strategy.

Recommendations

1.1. KEPCO rectify the mapping of vegetation communities within the Project Disturbance Boundary.

1.2. KEPCO then recalculate the quantum of ecosystem and species credits required to be offset.

1.3. KEPCO do the same to the offset areas and recalculate the quantum of ecosystem and species credits available from the BOS.

2. Regent Honeyeater Habitat

Section 6.6.1 of Appendix J of the EIS states that approximately 229 ha of suitable foraging habitat for the Regent Honeyeater will be removed by the project, of which 169 ha comprises woody vegetation identified by OEH and DoE profiles. From other information provided directly to OEH by the Proponent this 169 ha is made up of the following vegetation communities:

Vegetation Community	BVT	Hectares
Blakely's Red Gum / Apple Riparian Forest	HU714	5
Yellow Box Woodland	HU732	8
White Box Woodland (Grassy)	HU690	54
White Box Woodland (Shrubby)	HU824	71
Coastal Grey Box Woodland	HU690	31
Total		169

Two other vegetation communities mapped by the Proponent are also attributed to the BVT of HU824. These are labelled as Shrubby Regrowth and Cypress Pine Forest (40 ha and 4 ha within the Project Disturbance Boundary respectively). Inspection of the location of these two communities indicates that they are appropriately labelled as forming a subset of White Box Woodland (Shrubby).

As this vegetation community (HU824) is regarded as Regent Honeyeater habitat the area of habitat to be removed by the project should be regarded as 213 ha rather than the 169 ha included in the EIS. Inclusion of this additional habitat will require that the number of species credits for the Regent Honeyeater (and possibly other species) will need to be recalculated for the impact site and for the offset areas.

There is not sufficient information provided in the EIS to justify discounting this 44 ha of potential Regent Honeyeater habitat. If the Proponent can show that these two vegetation communities should not be considered to be Regent Honeyeater habitat then this information should be provided in the EIS.

Recommendations

2.1. KEPCO recalculate the number of Regent Honeyeater species credits required, and those available in the offset areas, by including all woody vegetation assigned to the BVT HU824.

2.2. If KEPCO has information to support a position that these two communities do not conform to Regent Honeyeater habitat then this information should be provided in the EIS. It is also possible that only part of the 44 ha should be considered habitat.

3. Biodiversity Offset Strategy

The EIS indicates likely residual impacts on State and Commonwealth listed Threatened Ecological Communities (TECs) and threatened species, and a proposed Biodiversity Offset Strategy (BOS) is outlined in section 7.3 of the EIS. OEH has some concerns regarding measures used to construct the BOS including the accuracy of the mapping of vegetation within the Project Disturbance Boundary, as dealt with above, and the suitability of Offset Area 5 (OA5) as an offset property.

OEH remains concerned that OA5 is not an appropriate offset property as it will be subject to damage from the surface cracking and subsidence effects of this project proposal. Furthermore, Section 11(1) of the *Threatened Species Conservation (Biodiversity Banking) Regulation 2008* (BioBanking Regulation) indicates that the land in OA5 is not suitable to be designated as a BioBank site.

OEH believes that there are other properties potentially available in the region which may offer suitable EEC and threatened species habitat, which would not be subject to known future mining impacts, and which may be suitable alternative offset areas.

Recommendations

3.1. That KEPCO and DPE continue to liaise with OEH to resolve a suitable BOS for residual impacts from the proposal.

3.2. DP&E, OEH and KEPCO continue to liaise to resolve the issue of the appropriate mechanism(s) to permanently secure offsite areas.

4. Offset Area Management

Table 40 of the EIS lists the vegetation communities found within the offset areas and the amounts in each. At the bottom of this table there are three totals “Total Native Vegetation”, “Total Non-native Vegetation and Cleared” and “Total Area”. It is OEH’s understanding that the intention of the BOS is to manage all the “Total Native Vegetation” as the offset and manage all the “Total Non-native Vegetation and Cleared” for agriculture. Thus there would be 3,791 ha of offset and 292 ha of agricultural land or retained as cleared (dams, roads etc) within these properties. OEH seeks confirmation that this is the case.

Recommendation

4.1. KEPCO confirm that all native vegetation on the six offset properties will be managed for biodiversity conservation within the BOS.

5. Cliffs

Figure 39 of the EIS depicts the location of nine prominent cliffs and a number of smaller cliffs within and adjacent to the subsidence area. The EIS identified three cliffs (C1, C3 and C4) as being of particular importance and the design of the underground extraction area has been modified to minimise impacts to these cliffs. Details of these three cliffs were included in the EIS, however, equivalent details of those cliffs which were likely to be directly affected by subsidence were not included in the same way. OEH requested from the Proponent further information on the remaining prominent cliffs and received this information on 29 October 2015. OEH notes that this information may have been informative to other parties who have made submissions to the EIS.

From this additional information it is apparent that four of the prominent cliffs (C5, C6, C8 and C9) will experience significant subsidence movement (between 2.2 and 2.9 metres maximum predicted total

subsidence). The remainder are predicted to incur small subsidence effects. Two of these cliffs (C5 and C6) have lengths and maximum heights of 273 m and 40 m and 148 m and 34 m respectively. The EIS uses the effects on cliffs of underground extraction at the Ulan Mine to estimate that rock falls will occur along 20% of the cliff length with visible subsidence movement occurring in 50-70% of sandstone formations greater than 3 m high. However, as acknowledged in the EIS, the measured subsidence for Ulan Mine is less than that of Bylong (generally around 1.0 to 1.2 m (Appendix H, Figure 3.6)) and the two cliffs in question are in the upper size range, and may exceed, the heights of those at Ulan. Consequently it is likely that these, and other cliffs within the subsidence area will incur greater effects from subsidence than those at Ulan, as acknowledged in the EIS. Also, the estimates of damage above are averages. Presumably the likely damage at the sites experiencing large subsidence effects will be greater than the average. However the EIS has not attempted to estimate the effects on the cliffs and instead states that "the likelihood of cliff instability is difficult to predict".

Inspection of Figure 39 of the EIS indicates that the cliff designated C5 is above the end point of Longwall 106. This cliff is the longest and highest of those likely to be significantly impacted by subsidence. It would be possible to avoid this cliff entirely by shortening the longwall by approximately 120 m or 6% of its length. OEH recommends that this avoidance mechanism be adopted.

OEH expects that the impact of subsidence on cliff line habitat within the proposed area potentially involves impacts on cave habitats, and therefore potential impact on cave-dependent species, including threatened micro-bat species. Two cave-dependent threatened bats have been recorded in the study area, Large-eared Pied Bat (*Chalinolobus dwyeri*) and Eastern Bentwing Bat (*Miniopterus schreibersii oceanensis*) and another two are listed in the EIS as having potential to occur. The EIS cannot conclusively exclude the potential for breeding and/or roosting of these species in the cliff lines of the proposed subsidence area, and assumes their potential presence by including the known species in the BOS. The EIS states that additional impacts are likely to occur as a result of subsidence which may injure roosting bats, modify cave structures and impact on maternity roosting habitat, if present.

OEH recommends that a bat monitoring program be conducted around the prominent cliffs with particular emphasis given to determination of the presence of roosting or maternity sites. Given that subsidence of the cliffs is not expected to occur until year 7 at the earliest it should be possible to establish a good baseline level of bat activity and determine potential roost sites.

Recommendations

5.1. KEPCO provide more information on the likely impacts and environmental consequences of subsidence on individual cliffs within the subsidence area.

5.2. KEPCO agrees to shorten Longwall 106 so that cliff C5 is not impacted by subsidence.

5.3. KEPCO conduct insectivorous bat monitoring at prominent cliffs within and adjacent to the subsidence area to establish a baseline level of activity and search for potential roost sites.

5.4. KEPCO clarifies the expected effects, if any, of far-field movements on the cliffs it has excluded from the subsidence study area ie cliffs C1-C4.

6. Groundwater and Surface Water

The EIS identifies three potential groundwater dependent ecosystems (GDEs) along the riparian zones of Lee Creek, Bylong River and Dry Creek. Drawdown of groundwater of greater than two metres is predicted adjacent to the eastern open cut, in the lower reaches of Dry Creek and adjacent to the bore field. The EIS considers these GDEs to have a moderate reliance on groundwater although no defining evidence is presented. OEH has concerns regarding the potential impacts of changes to groundwater and surface water on GDEs, in particular in the lower reaches of Dry Creek affected by subsidence. OEH recommends that the Water Management Plan include measures to monitor both the drawdown of groundwater near the GDEs and the condition of the GDEs themselves. The Water Management Plan also needs to include triggers and management actions when remedial actions will be carried out.

Section 7.1.3 of the EIS discusses effects of mine subsidence on Dry Creek including ponding, scouring and changes to stream alignment. It is stated that these effects are appropriately managed as

discussed in section 7.1.4. This section simply states that KEPCO will develop an extraction plan and property subsidence management plans but gives no detail. DP&E will need to ensure that these plans have sufficient detail and rigour to ensure that the effects of subsidence on streams are remediated appropriately.

Recommendations

6.1. That DP&E ensure that the Water Management Plan include measures to monitor the drawdown of groundwater near the GDEs and the condition of the GDEs themselves and include triggers and management actions when remedial actions will be carried out.

6.2. That DP&E ensure that the effects of subsidence on streams are remediated appropriately within the mining extraction plans.

7. Proximity of Subsidence Area to Goulburn River National Park

The north-eastern edge of the underground mining area approaches the boundary of the Goulburn River National Park. Figure 39 of the EIS indicates that the Subsidence Study Area does not encroach the Park but that it abuts the Park boundary. OEH seeks a commitment from the Proponent that there will be no, or negligible, effects on the National Park from underground mining.

In addition the EIS discusses the possibility of far-field horizontal movements which could occur for up to three kilometres, therefore within Goulburn River and Wollemi National Parks. The EIS states that "far-field horizontal movements on natural and built features are not expected to be significant" and that "they only have the potential to affect large structures that are susceptible to small differential movements". Large structures may include the cliffs on the south-western edge of the subsidence area. It is not clear from the information provided whether there are any structures with the National Parks which may also be potentially impacted by far-field movements.

Recommendations

7.1. KEPCO provides a commitment that there will be no, or negligible, effects on the National Park from underground mining.

7.2. KEPCO clarifies whether there are any natural features in the adjoining Goulburn River and Wollemi National Parks which could be affected by far-field horizontal movements.

7.3. Given the uncertainty of subsidence predictions and impacts KEPCO should outline contingency management measures if the effects of subsidence on the adjoining National Parks should be greater than anticipated.

8. Proximity of Offset Areas to National Parks.

In general the management of offset properties is likely to be compatible with the management of adjoining national parks. The National Parks and Wildlife Service (NPWS) requires vehicle access to adjoining areas of Goulburn River and Wollemi National Parks for wildfire suppression, fuel reduction and other management activities. The construction and operation of mining infrastructure and management of offset areas have some potential to restrict access, particularly from the upper Bylong valley. The Proponent and the NPWS will need to liaise regarding access to the parks particularly if the Proponent considers the closing of any access tracks.

Recommendations

8.1. KEPCO and NPWS discuss and formalise access arrangement for NPWS into the national parks from the Bylong and Upper Bylong sides.

8.2. KEPCO and NPWS liaise to ensure that management of adjoining offset areas and national parks is compatible.

9. Potential Impact of Road Widening on Riparian Vegetation of the Bylong River.

In the northern part of the Upper Bylong Road there is a short section where the Bylong River approaches the hillside to the north-east. This narrow section currently includes the Upper Bylong Road and the Sandy Hollow – Gulgong railway. The EIS requires the upgrade of the Upper Bylong Road to a total road formation of 10 m. OEH is unable to determine from the information in the EIS whether this will encroach on the riparian vegetation along the Bylong River.

The Bylong River is regarded in the EIS as a fourth order stream. Section 9.2.3 of the FBA requires consideration of any effect reducing the width of the riparian buffer on fourth, or higher, order streams. If the widening of the road will encroach further on the riparian buffer along the Bylong River then it will require consideration on this landscape feature which may have an effect on the landscape score in the BioBanking Credit Calculator (BBCC).

The Proponent should demonstrate that the widening of the Upper Bylong Road will not encroach further on the riparian buffer or must include consideration of the effect on this landscape feature in the BBCC.

Recommendations

9.1. KEPCO to provide details the effects of the widening of the Upper Bylong Road on the riparian vegetation of the Bylong River.

9.2. KEPCO should detail any effects on the riparian buffer along the Bylong River and include consideration of this within the BBCC.

10. Indirect Impacts.

OEH is concerned about the effects of the mining and infrastructure areas on the flora and fauna of the neighbouring native vegetation areas. OEH notes that section 7.2.5 of the EIS indicates that the effects of dust, noise and lighting will be mitigated within the provisions of a Biodiversity Management Plan (BMP). Other indirect impacts are also potentially damaging, for example pest and weed invasion and inappropriate fire regimes. OEH requests that DP&E ensure measures to minimise the effects of all indirect impacts are incorporated into the BMP.

Recommendation

10.1. DP&E ensure measures to minimise the effects of all indirect impacts are incorporated into the BMP.

11. Potential New Flora Species.

The EIS lists three species found within the study area which may represent new taxonomic entities, *Hibbertia* sp. aff. *acicularis*, *Sannantha* sp. aff. *cunninghamii* and *Grevillea* sp. aff. *patulifolia*/*sericea*. Only very general information regarding their location is given in Appendix J. OEH requires the locality information of these taxa to ensure they will not be affected by the proposed development.

Recommendation

11.1. KEPCO supplies OEH with location details of the three potentially new flora taxa.

12. Apparent Mistakes in the EIS.

Table 12 indicates that an Environment Protection Licence and a Radiation Management Licence will be required from OEH. The correct authority in these cases is the Environment Protection Authority.

Figure 62 Post-mining Land Use has mapped the following areas as cleared grasslands which should have been mapped as heavy timber:

- a large area centred on Tal Tal Mountain,

- western half of Offset Area 1, and
- a small area just to the north of the project boundary.

Recommendation

12.1. KEPCO notes these mistakes and corrects them in later correspondence.

ATTACHMENT B

OEH Review – Aboriginal Cultural Heritage
Bylong Coal Project – Environmental Impact Statement

Acronyms

ACH	Aboriginal Cultural Heritage
AHIMS	Aboriginal Heritage Information Management System
DP&E	Department of Planning and Environment
MSEC	Mine Subsidence Engineering Consultants
OEH	Office of Environment and Heritage
RPS	RPS Australia East Pty Ltd
RAPs	Registered Aboriginal Parties
SEARs	Secretary's Environment Assessment Requirements

The ACH assessment report has been read in conjunction with the attached appendices that provided details of archaeological site descriptions, summaries of Aboriginal cultural sites, arborist's analysis of scarred trees, landform descriptions and the results of the Aboriginal consultation process. OEH has also examined the information regarding the impacts of subsistence on archaeology and cultural sites in the specialist's assessment report (MSEC 2015).

OEH has reviewed the ACH assessment against the SEARs listed for the Bylong Coal project and the OEH guideline documents that have been used and cited by the investigation team, RPS (2015).

As a result of this review OEH has made several recommendations to improve some of the weaknesses of the assessment report and because of the overall harm to Aboriginal sites. OEH has also responded to the RPS discussion of Aboriginal cultural heritage offsets and, although a number of issues have been identified, OEH is willing to discuss the matter further with DP&E as way of promoting the RPS concept of ACH offsets for the Bylong Coal project.

1. Impacts to Aboriginal sites from subsidence

The RPS assessment of areas to be affected by underground mining identified 51 Aboriginal sites. The majority of these sites are low scatters of stone artefacts and isolated finds located in in the Bylong State Forest where timber harvesting has had an effect on site integrity. OEH points out that as in all forest environments ground surface visibility is not optimal for sighting stone artefacts and other archaeological surface features, consequently surveys in forests are restricted to vehicle tracks and local surface erosion. Therefore it is a reasonable assumption that the RPS results of low site density may be a conservative estimate.

In considering the potential of harm to Aboriginal sites in the forest areas OEH accepts the specialists subsidence report conclusion that impacts to artefact scatter sites and isolated finds in the subsidence areas will be minimal from underground mining (MSEC:2015:70).

2. Ochre site OQ0001

Site OQ0001 is described by RPS as an ochre site located in rugged terrain of the State Forest in the vicinity of the proposed underground mining. OEH understanding of the RPS site description is that it comprises a layer of varied coloured mineral deposits and that there is evidence of extraction warranting RPS to categorise it as an archaeological site. RPS has also remarked on the significance of the colours based on gender interpretation. The site has been reported as high in significance.

OEH assumes that the RPS interpretation of OQ0001 is accurate. RPS provide limited information about the site and the source of information regarding the gender use of ochre colours is not cited.

RPS has selected the site for research and detailed recording but there are reported concerns that it may be affected by subsidence (MSEC 2015).

Recommendation

2.1. OEH supports RPS management proposals for site OQ0001. However, due to the reported significance of the site, OEH recommends that, prior to approval of the project, a rock art specialist with expertise in management of ochre sites is involved in its recording and be available to contribute to management and mitigation of the site.

3. Axe grinding groove sites

RPS has recorded several axe grinding groove sites in good preservation. RPS has reported concerns regarding one of the axe grinding groove sites, GG004, which has been assessed by the subsidence specialist as likely to be impacted from underground mining but may equally be affected by putting in place physical measures to lessen harm from subsistence (MSEC 2015). RPS has identified the site of high significance and recommended detailed recording.

Recommendation

3.1. OEH supports the RPS recommendation for detailed recording of GG004 if it is not possible to modify the mine plan to avoid impact.

4. Impacts to Aboriginal sites in the disturbance footprint

RPS reports that 95 Aboriginal sites will affected by the mine proposal within the disturbance boundary. The majority of these comprise stone artefacts.

The RPS assessment report contains no interpretive lithic analysis of any of the artefacts discovered during the field survey. Coarse descriptions about the artefacts present only limited descriptions of the sites generally. The authors have ranked the significance of the artefact scatter sites based primarily on presence of multiple raw materials, artefact estimates and land use disturbance history. There is no organised data in the report that provides context to understanding the RPS summary descriptions. RPS has recommended salvage of all artefacts but do not refer to an analysis of the artefacts.

The RPS report shows that stone artefact sites are more frequent and more representative of the evidence of Aboriginal occupation across the variety of landforms within the mine lease. The interpretation of Aboriginal heritage across the mine lease will therefore hinge significantly on identifying what patterns of stone tool manufacture, use and discard can be drawn from analysing the artefacts to support identifying the mode of Aboriginal occupation especially when differences in land use that maybe drawn from interpreting the relationships of Aboriginal sites among the varied landforms that intersect the mine easement. The RPS statements of significance have been reached by examining the heritage values on a site by site basis.

OEH recognises that the disturbance history recorded at each site has altered the appearance of each site but information from studying the stone artefacts remains available for developing insights into Aboriginal occupation of the Bylong Valley. The distribution of a large number of artefact scatters across the various landforms (RPS 2015:40-52) presents an interesting investigation result which needs to be explored further.

Recommendation

4.1. Develop a lithic analysis program as part of the artefact salvage exercise for artefacts. The analysis must be adequate in producing interpretative insights into Aboriginal land use.

5. Cumulative impact assessment

OEH understanding of the RPS assessment of cumulative harm to Aboriginal sites is that it is based on a method designed from the RPS site distribution model and a prediction of site frequency across a regional parameter selected by RPS.

RPS concludes that the proposed harm to 144 sites within the mine easement is less than 1% cumulative impact based on a single record of an Aboriginal Heritage Impact Permit and that regionally the proposed cumulative harm is estimated to be less than 7%.

OEH recognise the effort by RPS in attempting to assess the cumulative harm to Aboriginal sites within the mine easement especially in lieu of no guiding material. However OEH views the results of the RPS exercise with caution because the main components of the RPS model are built on subjective interpretations and this potentially weakens the logic inferred from the RPS exercise. For example the RPS method is built on models it produced for predicting sites and interpreting site and landform relationships without discussion on the robustness of those predictions or interrogating the data. The RPS model is also silent on the cumulative impacts on Aboriginal heritage from pastoral and agriculture land use, nearby major mining precincts, nearby commercial forestry land use and major utilities and infrastructure.

6. Regional archaeological context

The regional archaeological context is introduced on pages 29 and 30 and involves the results of the RPS AHIMS search of previously recorded sites (118). RPS has also undertaken a summary of previous archaeological investigations for the region which have been used to summarise archaeological context for the region. OEH identifies limitations for example, RPS has made no reference to archaeological data of investigations available from the nearby Ulan, Wilpinjong and Moolarben coal precinct which has over the years exposed a rich data base of archaeological information.

The RPS summary of the adjacent Mt Penny Coal project has been limited due to reasons of access. RPS was able to access a summary of key results of the Mt Penny project which include the identification of 24 archaeological sites of high significance among a population of 215 sites recorded for the project. The RPS discussion on the relevance of the 24 sites to the Bylong Coal project is constrained by limited access to all assessment information from the Mt Penny project and differences in landform interpretation.

7. Landform analysis

Overall, RPS has produced an adequate presentation of the landform variation and distribution across the mine easement and this has been useful for measuring the frequency and distribution of Aboriginal sites for each landform type. The identification of landform categories has proven to be successful in aiding the RPS sample survey of the mine easement. The RPS landform descriptions and photographic record show the physical setting of the study area and how this has influenced the RPS site survey method and landform site analysis. OEH notes:

- The study area is flanked by rugged terrain (landform units 2&3) (OEH appreciates the difficulty this has presented for the field survey teams),
- Aboriginal sites are distributed across all landform types (bar one),
- The landform descriptions although generally course in description provide a suitable unit of analysis to be later used when detailed analysis of sites are likely to take place post approval.

OEH considers that an estimated percentage of land use disturbance per landform type would have assisted in understanding the extent of disturbance across the easement.

8. Landform and site analysis

The landform and site analysis section of the report (RPS 2015:57) divides landforms (11) into two general environments, the Dry Creek Catchment (affected by subsidence) and the Bylong River Valley (project disturbance boundary) and used each to identify patterns of Aboriginal sites distribution. Elsewhere in the report (pp83 – 84) landforms are divided across the alluvial valley and ridgelines. This is confusing for the reader but it is assumed that the category alluvial valley is the same as that described as the Bylong River Valley and likewise the ridgelines are representative of the Dry Creek Catchment.

The decision to rationalise the total number of landforms from 11 to 2 broad types (alluvial and ridgelines) for analysis purposes is a reasonable approach for highlighting the highest density of sites (Bylong Valley) and because of the complexity and variation of landform diversity. However this approach can over-simplify results and as a consequence the interpretation of Aboriginal sites can be equally over-simplified in regards to developing significance statements. The landform site analysis is yet to provide an insight of Aboriginal land-use across the areas affected by the mine easement other than common generalisations about Aboriginal site distribution patterns.

OEH is of the view that additional archaeological site research including stone artefact analysis will substantially improve knowledge of Aboriginal occupation by overlaying the results of artefacts analysis with each landform category. This will also better inform Aboriginal people when they are forming a cultural view point on the archaeological findings overall.

Recommendation

8.1. Incorporate artefact analysis with spatial landform data to support analyses in recommendation 16.1

9. Aboriginal consultation

OEH has examined the consultation section of the RPS report that details the engagement and consultation with the Registered Aboriginal Parties (RAPs). OEH has also examined the detailed responses by the RAPs which appear in Appendix 1. The consultation is consistent with the procedures set out in the OEH consultation guidelines (2010) which is listed in the SEARs as the means for identifying Aboriginal people affected by the mine proposal and the method of engagement.

OEH has noted a consistent theme of issues raised by the RAPs in their written responses about inadequate survey coverage. This issue relates to the sampling strategy used by RPS and which likely includes factors of landform diversity, size of area and whether the sample coverage has been sufficient for adequately investigating ACH. OEH has not sighted an adequate written response to the RAPs concerns and believe that a response is warranted.

Recommendation

9.1. Prepare adequate response to the RAPs regarding issues on survey coverage and include OEH in that response.

10. Identification and assessment of cultural significance (section 7.1 and Appendix 4).

OEH is not satisfied with the cultural significance sections of the report for the following reasons:

- The method used by RPS to seek information of cultural places offers little in way of understanding how places of Aboriginal importance (cultural significance) were identified.
- The application of OEH guidelines (2011) has not been executed well with respect to the identification and assessment of cultural significance (OEH 2011:7).
- A significant number of sites (29) described as cultural features are listed as likely to be impacted by subsidence. The sites comprise mostly of exposed sandstone bedrock with varying degrees of weathering and which are prone to cracking from underground mining (MSEC 2014, STC 2014). RPS has documented that that there is a disparity of views among the RAPS on the cultural significance of the features and this is confirmed by the written responses from RAPs (Appendix 1).
- OEH believes that the problems associated with how the cultural values assessment was conducted will present challenges on determining the appropriate mitigation needed for safeguarding the sites given the ambiguity surrounding the claims of cultural importance.
- OEH also note that the RPS report recommends further recording of the features during the post approval management plan process but RPS does not provide what information will be recorded and how it will be recorded and used for what purpose, given the first two points above and notably OEH (2011:7).

Recommendation

10.1. Engage suitably qualified expertise to progress the identification of Aboriginal cultural values for those areas affected by the proposed mine but which draws in the regional context of documented cultural values.

11. Management options

OEH notes the proposal to test excavate 9 small sandstone bedrock shelters with varying degrees of cavernous weathering as a way of mitigating potential impacts from subsidence. Based on the information made available to OEH the shelters show nil to scant evidence of Aboriginal objects and shelter floor deposits do not exceed 30cms. It is therefore likely that exposing datable features is expected to be low. The survey assessment has documented that an inspection of each shelter for cache burials, art and other items of cultural importance has been completed but with nil result. The reason for further detailed excavation lacks a clear rationale. OEH makes the assumption that RPS archaeological field judgements are appropriate for the proposed test excavations of the rock shelters. OEH makes comments based on the information contained within the assessment report.

OEH raises this matter because the OEH review of the ACH assessment has not identified a clear rationale for excavating select areas of the valley floor where the bulk of the sites to be impacted by the mine will occur. Despite the RPS results recording surface erosion at each of the surface valley sites there maybe merit in test excavating a selection to determine if surface observation are confirmed or, if a greater number of artefacts are revealed. Either result would assist in reaching an interpretation of the intensity of Aboriginal land use. OEH supports the proposal to test excavate the two foot hill sites.

Recommendation

11.1. Develop a test excavation program for suitable localities on the valley floor incorporating an analysis of results with 16.1 and 20.1.

12. Aboriginal cultural heritage offsets

The RPS report discusses cultural offsets which has been raised in consultation with the RAPs (RPS 2015: 99-100). OEH view is that the proposals are not offsets they are actions commonly used to mitigate harm in major projects.

Mitigation refers to the sequence of steps required to avoid or mitigate harm to sites and objects at threat from the mine proposal. The RPS recommendations to manage Aboriginal heritage at the Bylong Coal project are mitigation and includes the salvage of all archaeological material in addition to RPS recommendation for further detailed recording and investigation. The Aboriginal cultural offsets proposed in the RPS report (2015:99) continue within the same mitigation hierarchy where by the proposed actions concern the management of salvaged artefacts and further information gathering for example, oral history. These are not offsets but actions to mitigate harm.

The idea of Aboriginal offsets is slowly taking root across major coal producers but the concept of offsets for ACH has had no exposure to the same rigour and set of principles that underpin biodiversity offsets. In lieu of no formal policy in this area, but supportive of RPS effort, OEH recommend that ACH offsets be a consideration for further discussion for the Bylong Coal project despite the late timing of raising this topic.

Offsets for ACH must follow some of the guiding principles for biodiversity such as like-for-like exchanges, assessed against the full range of values possessed by Aboriginal Cultural Heritage, and which must aim at net gain or net improvement in these full range of values.

Aboriginal Cultural Heritage offsets for the Bylong project should follow a landscape theme building on the RPS survey results where a range of evidence based values can be captured and re-produced into a landscape outcome. This is also in sync with comments from the RAPs on ACH assessment and their preference to view significance assessments based on landscape interpretation and not rely solely

on a site by site basis (RPS has documented the RAP refusal to consider significance for sites singularly).

Permanent protection of Aboriginal sites is under-represented among the valleys of the central west of NSW. OEH advises that ACH investigations across areas selected as biodiversity offsets may later be suitable for Aboriginal Place nomination. Such an outcome would also provide for additional Aboriginal community expectations of keeping places, cultural camps and educational opportunities.

13. Significance assessments (archaeological)

RPS has concluded that 90% of the archaeological sites in the survey area have been assessed as low in significance on a regional level. RPS has measured each site discovered during the field survey on the educational potential, research potential, representativeness and rarity.

OEH accepts that many of the sites recorded within the Bylong Coal project easement represent common examples of site types that are situated in varying levels of ground disturbance. The lack of site content analysis undertaken during the ACH assessment and the limited response to the Mt Penny project ACH assessment which identified 24 highly significant archaeological sites in a neighbouring valley, has presented challenges for OEH to provide concise advice on the merits of RPS significance assessment. In addition to the mixed responses from the RAPs of the assessment, RPS conclusions on site significance are less than robust.

14. RPS mitigation measures

Recommendation

14.1. The RPS recommendations for mitigating harm to Aboriginal sites are supported for inclusion in an Aboriginal Cultural Heritage Management Plan (ACHMP). However, the ACHMP should also include an adequate research program that addresses the issues raised in this submission.