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To whom it may concern,

Watermark Coal Project SSD4975: adequacy of Environmental Impact Statement (EIS) Part K (Ecological Impact Assessment) and Part L (Koala Plan of Management)

I write to provide comment on the above components of the EIS prepared by Cumberland Ecology to accompany the development application for the Watermark Coal Project SSD4975.

While both the Ecological Impact Assessment and the Koala Plan of Management generally provide a comprehensive assessment of the likely impacts of this development on the flora and fauna of the site, there are several areas which need improvement. These include:

1) Identifying the significance of semi-evergreen vine thicket on the project site and in nearby Biodiversity Offset areas
2) The assessment of potential impacts of noise disturbance on fauna
3) Identification of preferred koala food trees in the study area and proper consideration of the success of translocating koalas from the Disturbance Area on the project site

Below I address each of these issues in turn.

Please do not hesitate to contact me should you have any further queries.

Kind Regards,

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Lecturer

1) Identifying the significance of semi-evergreen vine thicket on the project site and in nearby Biodiversity Offset areas

The SEVT found on Mt Watermark, while small in total area, is of great conservation significance, being the most southerly recorded stands of this endangered ecological community in Australia (see the location of Floristic Group 5 in Figure 18 of Curran et al. 2008). This should be acknowledged in the EIS and extra effort made to conserve these stands from any indirect effects of the mining.

It is also likely that the SEVT on Mt Watermark is more extensive than shown in Figure 3.1 of the Ecological Impact Assessment. Throughout the North West Slopes, SEVT commonly grades into nearby shrubby eucalyptus communities (per. obs.; Keith 2004), resulting in intermediate forms which are often mapped as vine thicket (Keith 2004). During my doctorate I sampled three 20 x 20 m quadrats on Mt Watermark (Curran 2006). Two of these plots were immediately below the cliffs on Mt Watermark, where the majority of the SEVT is likely to be, but one was in a gully on the mid-slope of the north-facing slope of the mountain. I am happy to provide further details of these sites if requested.

Finally, there are extensive tracts of SEVT on the north-eastern facing slopes of Long Mountain, which is part of Offset Area 6 for the Watermark Coal Project. This has not been recognised in the Ecological Impacts Assessment, possibly due to a lack of floristic quadrats in this area. It appears to be mapped as Whitewood Woodland (light green in Figure 8.2). These stands of SEVT occur below the sandstone cliffs on the north-east slopes of Long Mountain. They can be seen clearly from aerial photographs (1:2,250 scale found at http://maps.six.nsw.gov.au/) and have the characteristic bright green colour of many stands of SEVT. Again, I have sampled three quadrats from this area. Two of those plots grouped with the Mt Watermark stands in a dendrogram based on cluster analysis using the UPGMA clustering strategy, the other site was grouped with SEVT stands from Black Jack Mt (Curran 2006). Again, I can provide more details upon request.

It is heartening to see that these larger stands of SEVT will be protected as part of the Offset Strategy; these are among the most important patches of SEVT in the southern Liverpool Plains (they are among the most southerly and are relatively extensive).

2) The assessment of potential impacts of noise disturbance on fauna

The section on noise (section 6.3.3) is inadequate and out of date. It relies on a single reference from the grey (non-peer reviewed) literature which is now eight years old (AMEC Americas Limited 2005). Since the publication of that report in 2005 there has been a rapid increase of studies which examine the impacts of anthropogenic noise on fauna, particularly birds (Francis and Blickley 2012). This rapidly expanding literature provides a clear counterpoint to the claims made in the Watermark EIS regarding the potential impacts of the project on fauna due to anthropogenic noise. Furthermore, the section on noise in the Watermark EIS is virtually identical to that prepared by Cumberland Ecology for the Whitehaven Coal Mine at Maules Creek. This suggests that there has been little effort by Cumberland Ecology to tailor their assessment of noise impacts on fauna to the unique noise environment of the Watermark Shenhua Coal Mine.

The Watermark EIS suggests (p. 6.12) that '*it is likely that most animal species will habituate to the periodic noise disturbance (AMEC Americas Limited 2005), and the construction and operational phases of the Project are likely to only cause temporary disturbance to fauna. Furthermore, the impacts from noise emissions are likely to be localised close to the active mining area (up to 100m) and are not likely to have a significant, long term, impact on wildlife populations.*'

There is mounting evidence that counters the argument by Cumberland Ecology that anthropogenic noise is 'only likely to cause temporary disturbance to fauna' (e.g. Francis et al. 2009; Barber et al. 2010; Ortega 2012). In fact, anthropogenic noise can include pervasive effects to fauna communities (Francis et al. 2011) and to the ecosystem services they provide (Francis et al. 2012).

Cumberland Ecology contends that impacts of noise will localised to within 100 m of the active mining area. However, they provide neither data nor citations to support this suggestion. The distance to which noise impacts are felt will likely vary across species and could be substantially greater than 100 m (Francis et al. 2009; Barber et al. 2011).

There is a clear need for more thorough consideration of the potential impacts of noise on fauna at the Watermark mine site, beginning with a more thorough review of the scientific literature. At its most basic this could include spatial modelling of likely noise signatures across the project site, overlaid with the habitat and observations of threatened fauna. This would give a clearer picture of the likely impacts. Other approaches to consider include those outlined by Barber et al. (2011), Villanueva-Rivera et al. (2011) and Reed et al. (2012). Most importantly, potential impacts of noise should be incorporated into the on-going monitoring program for this mine.

3) **Identification of preferred koala food trees in the study area and proper consideration of the success of translocating koalas from the Disturbance Area on the project site**

The KPoM prepared to accompany this development is thorough and comprehensive. There are two suggestions that I would make which would improve this document. First, rather than relying on the list of potential koala feed trees for the Western Slopes and Plains KMA, Cumberland Ecology should make use of their extensive data set obtained via Spot Assessments to identify the tree species preferred by koalas in the Project Area. In fact, given the involvement of Dr Steve Phillips in both this KPoM and the Gunnedah CKPoM it would be good to use the data generated for the latter project to better inform our understanding of the tree species preferences in the Project Area.

Finally, it would be helpful to include a discussion of any preliminary data that have come out of koala translocation programs in other parts of Australia, e.g. Gold Coast City Council, to provide a better understanding of the likelihood of success of this program. This is hinted at when discussing the need for predator control, but should be elaborated on.

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