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### **Independent Review of Groundwater Management and Monitoring Program – Carmichael Project**

Adani Mining Pty Ltd (Adani) have requested that John Bradley of JBT Consulting Pty Ltd (JBT) conduct an independent 3<sup>rd</sup> party review, as required under Condition 39(h) of the EPBC approval for the Carmichael Coal Project (the Project), of the Groundwater Management and Monitoring Program (GWMMP) that has been prepared for the Project by AECOM Australia Pty Ltd (AECOM).

A draft GWMMP was provided to JBT for review on 3 April 2017. JBT provided review of the draft GMMMP (as track changes and comments within the MS Word version of the report), with comments provided to Adani on 21 April 2017. The JBT comments have been summarised within the comments register, which is to be included with this letter in Appendix F of the GWMMP. The comments register lists the JBT comments, the AECOM responses and the section of the GWMMP referred.

Adani supplied a revised version of the GWMMP to JBT for review on 30 June 2017 and included a copy of the comments register. The comments register included reference to figures of groundwater contours that are to be included in Appendix C of the GWMMP, with the comments register noting that the contours were yet to be generated. The groundwater contour figures were supplied to JBT for review on 20 July 2017.

Following review of the revised GWMMP and the groundwater contour figures, it is our conclusion that the GWMMP is suitable for release, subject to the following:

- The GWMMP, which was provided to JBT as a MS Word document on 30 June 2017, contains a small number of typographic errors and referencing errors; these, where found, have been corrected using the “track changes” feature of MS Word and should be reviewed by AECOM and Adani and accepted (as appropriate) prior to the finalisation of the document. The corrections are minor and there is no requirement for JBT to undertake further review of these corrections;
- A number of minor recommendations are made for modifications to the groundwater contour maps (Appendix C). These include:
  - Reference should be made to the datum used for the contours and water levels (mAHD);
  - Reference should be made to the date of the water level data used in the figures;
  - Corrections should be made to the sources of data for the figures (currently Adani are not named as the source for the data, though the data obviously originates from Adani); and,
  - The location of subcrop boundaries should be provided for the referenced groundwater units and it should be ensured that the groundwater contours do not cross these boundaries.



- In Section 5.3.1 of the GWMMP (Baseline Trigger Levels), proposed trigger level/ contaminant limit tables are presented for each groundwater unit. This section, including the trigger level/ contaminant limit tables, has been substantially amended and improved from the first draft report (provided for review on 3 April 2017), in part based on review comments by JBT and in part based on further analysis of the data by AECOM. The following observations are made with respect to the proposed trigger level/ contaminant limit tables:
  - For the majority of parameters, the trigger level is based on the 85<sup>th</sup> percentile of the data and the contaminant limit is based on the 99<sup>th</sup> percentile of the data; however, for parameters where there are a large number of samples below the laboratory limit of reporting (LOR), or for parameters where there is no ANZECC 2000 freshwater protection guideline (e.g. vanadium), then other approaches have been used for the setting of trigger levels/ contaminant limits;
  - It is understood that the regulator has adopted a new set of guidelines for assessing groundwater quality (DSITI 2017)<sup>1</sup> and it is noted that these guidelines tend to suggest the use of the 80<sup>th</sup> percentile for trigger values. However, it is also noted in DSITI (2017) that the 80<sup>th</sup> percentile may not always be applicable and that other statistically based methods may be appropriate or acceptable for some data sets;
  - The proposed trigger levels for vanadium and chromium are based on the ANZECC 2000 marine protection guidelines 95% protection limit. While it is accepted that it can be difficult to propose trigger values for parameters such as vanadium where no freshwater guideline trigger values exist, it is considered doubtful that marine ecosystem protection trigger values will be acceptable to the regulator as the Carmichael Coal Project is not located in a marine environment;
  - Acknowledging the observations made above, there are a number of approaches that could be made and that I would consider acceptable. These include:
    - Continue the analysis of data and refinement of the trigger level/ contaminant limit tables (e.g. for parameters such as vanadium and chromium, assessment that the GWMMP conforms to the DSITI (2017) guidelines where possible) and then re-submit the document for further review; or,
    - Submit the GWMMP to the regulator and accept that there will be discussion around the choice of some proposed trigger values/ contaminant limits and discussion around the degree of conformance between the proposed values and the DSITI (2017) guidelines.
  - It is noted that, whichever approach is adopted to proposing trigger levels/ contaminant limits, it is likely that discussions/negotiations will be required with the regulator in any case prior to finalisation of the GWMMP and acceptance by the regulator.

Please contact me if you have any further queries.

Yours Faithfully,



John Bradley  
Director/ Principal  
JBT Consulting Pty Ltd

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<sup>1</sup> DSITI (2017) Using monitoring data to assess groundwater quality and potential environmental impacts, Version 1. Department of Science, Information Technology and Innovation (DSITI), Queensland Government, Brisbane.

