

Groundwater Issues Associated with the Vickery Extension Project Supplementary Advice

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Environmental Defenders Office on behalf of North West Alliance have asked me to review additional material provided to the Independent Planning Commission (IPC) in the form a letter from Whitehaven Coal to the IPC dated 29 July 2020. I provide the following comments in relation to those matters that are within my expertise.

As I understand this document, it contains an updated estimate of the volume of groundwater that may be required to be pumped from the borefield during dry years – 2190 ML/year, on a temporary basis. This is more than three times the volume of borefield extraction modelled in the EIS (maximum of 600ML/year), for which the original drawdown predictions were provided in the groundwater assessment.

Some updated modelling results using the higher extraction rates have been provided, in Whitehaven's response to DPIE (Attachment G6-5 of the DPIE Assessment report). The results appear to show significantly greater drawdowns occurring within the alluvial water source; however, not at levels that would exceed 'Acceptable levels of Impact' under the Water Resource Plans Fact Sheet's guidelines. In providing these comments I have assumed the criteria against which these predictions are assessed is correct and in line with the NSW Aquifer Interference Policy.

There are some important issues with this model-based assessment:

- a) The pumping at the higher rate of 3 ML/day for two proposed borefield bores occurs with significant breaks in time between events (e.g. it occurs in years 1, 5, 9, 13 etc. of the operation). If the higher volume of extraction is required for longer periods – e.g. in multiple successive dry years (such as have recently been experienced), then greater levels of drawdown are likely to occur. This is not captured in the modelling results shown. According to the water balance analysis by Mr Watt, there is a significant likelihood that much higher rates of extraction from the borefield will be required to meet the project's water demand on a more ongoing (as opposed to temporary) basis.
- b) The hydraulic parameters that are used in the modelling of drawdown impacts from the borefield remain uncertain in the specific area in question. As discussed in my expert report and evidence to the IPC, the IESC pointed out that Specific Storage coefficients in the Namoi Alluvium adopted in the modelling may be over-estimated, in which case drawdown magnitudes would be under-estimated in the modelling predictions. Similarly, if hydraulic conductivity values differ from those used in the modelling, the drawdown magnitude and extent may differ from what has been presented. As such, a range of drawdown predictions, shown as contour maps, are needed to show the full predicted patterns of drawdown under the following scenarios:
 1. Where pumping at the higher rate (i.e., 2190 ML/Year) from the borefield is required for successive years (e.g. three consecutive dry years and/or for the full operation of the project, in order to be conservative)
 2. With variations in the hydraulic conductivity and relevant storage coefficients (e.g., order of magnitude increases and decreases in K and Ss values) applied in the model, to account for the typical uncertainty and heterogeneity in these parameters.