

Report Section	Comment (from JBT)	AECOM Response	AECOM Section Response included
GWMMP Report Date 17 March 2017 (First JBT Review) – Comments taken from report text			
1.1 Overview	As a general comment, the document switches in places from past/present tense to future tense, i.e. it is not always clear whether the intent of this document is to present draft triggers to the Department for approval, with a finalised GWMMP to follow. Perhaps clarify that in the introduction and then make sure it is clear throughout the document. A number of other specific examples that occur later in the document have been highlighted.	The document has been updated to minimise tenses utilise; the introduction has been revised to clarify the intent of the report is to present the GWMMP and draft trigger levels.	Section 1.1 and global document updates (tenses)
1.9	Check page numbering - the Introduction covers pages 1 to 14, then reverts to page 1 at the start of Table 1-1 (next page), then reverts to page 1 again at the end of Table 1-1 (start of Section 1.10)	Page and table numbers updated for consistency and clarity.	Global change throughout document
2.1.1 (Rewan Group)	The Nebine Ridge is not mentioned anywhere else. Could the reference be excluded and it just be noted that the unit is regionally extensive?	Sentence revised to reflect comment.	Section 2.1.1
2.1.1 (Permian Sediments)	A bit confusing as the sentence refers to confined conditions in the D coal seam and also at the base of the D coal seam. Do you mean units below the D coal seam?	Sentence revised to reflect comment.	Section 2.1.1

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2.1.1 (Permian Sediments – Bandanna Formation)	laterally continuous?	Sentence revised to reflect comment.	Section 2.1.1
2.1.1 (Joe Joe Group)	For consistency, refer as Joe Joe Group	Sentence revised to reflect comment.	Section 2.1.1; and global change throughout document.
2.1.3 Environmental Values	Include description in the Abbreviations page at start of document (GDEMP)	Abbreviation included in table per comment.	Abbreviations table
2.3.2 Operations (Spring Impacts-Doongmabulla)	Consistency of units (mm vs m)	Revised to reflect comment (m).	Section 2.3.2; and global change throughout document
3.2.2 SWL Data – Dataloggers	Elsewhere in the report it is noted that loggers have been fitted to key monitoring bores – could it be made clearer here what the criteria was for fitting loggers to certain bores?	Revised to reflect comment.	Section 3.2.2 and global
	Also, there are other bores that are just being read manually – could that be discussed as well, with inclusion of the monitoring frequency?	Revised to reflect comment.	Section 3.2.2 and global
	Is barometric pressure correction performed on the pressure transducers from the standpipe bores? (not necessary for fully-grouted VWP bores)	Revised to reflect comment.	Section 3.2.2 and global

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	When reading this I was expecting to see the individual bores identified – do you just mean the number of monitoring bores that have loggers in each groundwater unit?	Revised to reflect comment.	Section 3.2.2 and global
3.2.3 VWPs	Prefer 6-monthly to bi-annually	Revised to reflect comment.	Section 3.2.3 and global
3.3.2 Artesian Bores	Do artesian bores contain data loggers? (not clear). If not, what is the monitoring schedule for these bores. The GWMMP discusses the minimum 12-hourly frequency for data logger readings but not the schedule for manual monitoring of bores without data loggers.	Revised to reflect comment.	Section 3.3.2
3.4 Landholder Bores	The figure 3-3 that was supplied with the GWMMP for review needs to have the title changed to ensure that it matches the description in the text.	Revised to reflect comment.	Figure 3-3
4.2.1 Frequency and Duration	Confusing sentence – please re-word (first paragraph)	Revised to reflect comment.	Section 4.2.1
	Prefer the term “6-monthly”	Revised to reflect comment.	Section 4.2.1
	Could this simply read “automated water level loggers”? – I assume that VWP bores have data loggers installed and standpipe bores have downhole pressure loggers?	Revised to reflect comment.	Section 4.2.1
	Table 4-1 doesn’t show this data – sentence needs to be modified	Revised to reflect comment.	Section 4.2.1

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Table 4-1	Does this only relate to key monitoring bores? Is there a proposed frequency for manual measurement of bores without loggers? Do artesian bores have loggers?	Revised to reflect comment.	Table 4-1 and text above
4.3.2 Methods	My feeling is that the GWMMP should just include commitments and not suggestions of what may occur. Maybe write as a more definitive commitment? e.g. Adani will undertake discussions with landholders and authorities to determine whether permanent spring sampling points can be established that will allow the ongoing collection of representative samples. For example...	Revised to reflect comment.	Section 4.3.2
4.3.3 Parameters	This is a bit confusing – the parameter list in the dot points above includes all of the parameters in EA table E2, with the exception of DO and temperature, which are included for checking of normalisation of field parameters. This section needs to be clear as to what parameters are included in baseline monitoring and what parameters are included in EA monitoring, once mining starts.	Revised to reflect comment.	Section 4.3.3
4.3.4 QA/QC Sampling	Given that this document is stating the commitments, perhaps change references such as “are calibrated” to “will be calibrated” etc. through the document?	Revised to reflect comment.	Section 4.3.4 and global throughout document

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	Include in the abbreviations section at the front – by the time I got here I forgot what GME was.	Revised to reflect comment.	Abbreviations table
	As above – “will be”	Revised to reflect comment.	Section 4.3.4 and global
4.6 Data Reporting	This is stated as a commitment below, so make it a commitment rather than saying “Adani consider”	Revised to reflect comment.	Section 4.6 and global
	Elsewhere in this section, the reference is to 6-monthly reporting. For consistency, change all occurrences of bi-annual to 6-monthly.	Revised to reflect comment.	Section 4.6 and global
	This sentence appears contradictory – needs rewording.	Revised to reflect comment.	Section 4.6
5.2 Draft Threshold Limits	Suggest that “proposed” may be a better word	Revised to reflect comment.	Section 5.2
	It is unclear what this is saying – please reword.	Revised to reflect comment.	Section 5.2
	Figure 3-2 that accompanies the GWMMP data does not show the Early Warning Bores that are listed in Table 5-1 (should it be Figure 3-3?). Also, the figures need to be labelled with figure descriptions that match the text in the GWMMP		

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	Would prefer to see consistent units, i.e. values in mm and cm converted to m (TABLE 5-1).	Revised to reflect comment.	Table 5-1
5.2 Draft Threshold Limits - Notes at end of Table 5-1	Unclear – please reword (second dot point)	Revised to reflect comment.	Section 5.2
	Can all measurements be in metres for consistency?	Revised to reflect comment.	Section 5.2 and global
	I presume that this criteria will be negotiated with EHP, i.e. whether it is permissible to exclude unconfined units from having a trigger threshold, or whether a threshold is set but it is noted that the threshold applies only to mining-induced changes and not changes that are due to climatic variation	Statement	Section 5.2
	proposed as? (last dot point)	Revised to reflect comment.	Section 5.2
5.3 Baseline GWMMP – Table 5-3	The relationship between this table and Table 3-3 is unclear. Table 3-3 lists 91 data loggers, but this table lists 80 loggers.		

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5.3 Baseline GWMMP – Table 5-4	<p>Does the analysis of metals take into account the non-detect (i.e. left-censored) data? From the spreadsheets included in the data package it appears that the non-detect values have been changed to an absolute value (i.e. there are no non-detect values shown). Some discussion and justification of the analysis method would be useful (this comment applies to all tables)</p>	<p>Analytical data revised to include ANZECC guidelines where available for Non-detected analytes</p>	<p>Section 5.3- trigger level tables</p>
	<p>TPH seems unusually high for all groundwater units. Is there a reason for this? Do the proposed levels take into account the non-detects?</p>	<p>Analytical data revised to include ANZECC guidelines where available for Non-detected analytes</p>	<p>Section 5.3- trigger level tables</p>
	<p>These values are very high and may make it difficult to detect impacts of mining on shallow aquifers. I note from the spreadsheets that two bores (C029P1 and C14028SP) record very high EC and that data from these bores are skewing the results. I understand that these trigger levels are proposed and are to be discussed with the Department. I don't have anything to propose, but I would anticipate some discussion on these limits.</p>	<p>Analytical data revised to include ANZECC/NEPM guidelines where available for Non-detected analytes</p>	<p>Section 5.3- trigger level tables</p>

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5.5 Operational GWMMP	<p>There is a mix of tenses throughout the document, for example the previous paragraphs use “will be” and this paragraph uses “have been”. This makes it confusing to understand whether the section contains commitments or statements about what has been done.</p> <p>Please check the tenses used throughout the document to ensure that there is consistency and it is clear whether the document is discussing past activities/analysis or future commitments.</p>	The document has been updated with correct tense application.	Global change
Additional Refinement of the GWMMP	Text updates / added context	Revised Introduction showing State and Federal requirements	Section 1.0
		Clarify objectives – ensuring the current monitoring network / recognising it is in place and not proposed	Section 1.4 revised
		Avoid ambiguity and set – avoid misunderstandings as to what exactly we are to achieve with the GWMMP	Section 1.5 updated to be groundwater related
		Geology revised	Section 2.1
		Update current and future monitoring network details	Section 3.0
		Current and future monitoring reworded	Section 3.2
		Remove loggers and add text	Section 3.2.2
		Fix done and proposed bores	Section 3.3 Augmentation
		Barometric data added	Section 4.2.2 Instrumentation
		Spring Sample text updated	Section 4.3.2
Bi-annual to 6-monthly	Throughout document		
		Revised to detail procedures undertaken to develop baseline	Section 5.0



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		Ongoing ambient groundwater monitoring comment added	Section 5.0
Appendix C	Groundwater contours?	Need to look at data and generate regional groundwater contours – difficulty contouring VWP and standpipe water level data	Section 5.2
Draft Threshold Limits	Proposed or draft	Water level thresholds have been proposed – reworded Includes additional explanation	Section 5.2
	units	Thresholds are converted to metres	Table 11
	Drawdown approved	Added comment that early warning allows for assessment of drawdown before levels drawdown beyond approved drawdown as per the approvals	Section 5.2
Trigger levels		Motivation of 99 <sup>th</sup> percentile added for contaminant limits	Section 5.3.1
		Non-detect issues and approach added	Section 5.3.1
		Update limit tables	Section 5.3
		Alluvium salinity comments added	Section 5.3
GWMMP Report Date 31 May 2017 (Second JBT Review) – Comments taken from letter to SY (Adani), dated 21 July 2017			
Global Comment	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.	The document has been updated to reflect the typographic and reference errors.	Global document updates.

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Section 5.3.1 – Baseline Trigger Levels	For the majority of parameters, the trigger level is based on the 85th percentile of the data and the contaminant limit is based on the 99th 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.	Agree	None
	It is understood that the regulator has adopted a new set of guidelines for assessing groundwater quality (DSITI 2017) 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 80th percentile may not always be applicable and that other statistically based methods may be appropriate or acceptable for some data sets.	The Project's EA Conditions require the utilisation of the 85 <sup>th</sup> percentile for trigger values.	None

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	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.	The adoption of the ANZECC 2000 Marine Protection Guidelines (95% protection) was in lieu of any recognised protection levels for such parameters as Vanadium. While the Project is recognised to not be located within a Marine environment, there are no Nationally recognised guideline values for many EA required parameters, inclusive of vanadium.	None
Appendix C – Groundwater Contour Maps	Reference should be made to the datum used for the contours and water levels (m AHD).	Datum reference applied to groundwater contour maps.	Appendix C – Groundwater Contour Maps
	Reference should be made to the date of the water level data used in the figures.	Date of water levels applied to groundwater contour maps.	Appendix C – Groundwater Contour Maps
	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).	Adani has been added as the source of the data.	Appendix C – Groundwater Contour Maps
	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.	Locations of subcrop boundaries have been incorporated for the referenced groundwater units; groundwater contours have been reassessed to not cross such recognised boundaries for the relevant units.	Appendix C – Groundwater Contour Maps