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Via email: regina.flugge@leic.com.au
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Dear Client,

Re: Peer Review of CDM Smith Groundwater Effects Assessment Model

1 Introduction

Leichhardt Salt Pty Ltd (Leichhardt) engaged Geosyntec Consultants Pty Ltd (Geosyntec) to conduct a peer review on the CDM Smith Site Setting and Groundwater Baseline Update as part of the support for the Eramurra Solar Salt Project (ESSP) site southwest of Karratha in the Pilbara region of Western Australia.

The CDM Smith *Eramurra Solar Salt Project – Site Setting and Groundwater Baseline Update* dated 15 November 2024 Referenced Geosyntec 1001852-RPT-001-1 Final Draft provides updates to the previous groundwater effects assessment with new data from recent field programs. It aims to refine the hydrogeological conceptualisation by detailing sabkha-like groundwater flow conditions, supporting the anticipated lack of connectivity for Noorea Soak and Devils Pool to groundwater and providing more information on the distribution and thickness of geological units.

Geosyntec has provided comment on the report in accordance with the scope outlined in *Re: ESSP-EN-14-SOW-0047 Eramurra Solar Salt Project Groundwater Reporting 2024 Variation 02 and Variation 03* dated 15 April 2025 (Geosyntec Reference AU424012 P02 GMMP Variation 02). This letter pertains to Task 3 of the variation with the completion of the following scope of works:

- Commissioned and provided independent peer review by Fred Cosme of Geosyntec (an experienced coastal sabkha environment specialist) of Eramurra Solar Salt Project – Site Setting and Groundwater Baseline Update prepared by CDM Smith Referenced Geosyntec-1001852-RPT-001-1 Final Draft Revision 1, dated 15 November 2024.
- Reviewed responses and revisions amended from initial comments, to finalise the report referenced Geosyntec-1001852-RPT-001-3 Revision 3 dated 21 March 2025.

Based on the works completed, the comments provided by Geosyntec and a summary of report changes and responses from CDM Smith are summarised in Table 1.

Table 1 Peer review and comments for the Draft Site Setting and Groundwater Baseline Update

Report Section	Geosyntec Comment	CDM Smith comment and revision
Section 1.2 Previous Studies	Request to remove superlative language.	Acknowledged and removed.
Section 2.2.2 Hydrology	Please clarify the frequency to which surface water monitoring sites are monitored.	Acknowledged and amended
Section 2.4.4.1 Hydrostratigraphy - Overview	Please clarify the role of the eluvium deposit and its ability to transmit groundwater (i.e. aquifer/aquitard). Whilst mentioned in the table 2-2, additional details in the text would be important to note.	Comment Acknowledged comment and clarified that the hydrostratigraphic unit (HSU) was already acknowledged in the conceptual site model and had previously been classified as "Tertiary sediments". It was identified in the 2024 drilling program that this unit was comprised of gravels originating from highly weathered basement rock. Actions Text was clarified as follows: *"The monitoring bore drilling completed within the Project area between 2023 and 2024 (CDM Smith, 2024[1]) identified the presence of an extensive covering of eluvium comprising of highly weathered crystalline basement rocks belonging to undifferentiated volcanics and the Dampier Granitoid Complex. Drilling indicates the eluvium acts as an aquifer of low to moderate permeability and likely forms the main water bearing unit over the Project area (refer to Section 2.4.1.3 for further detail). Differences in geological interpretation has meant this HSU was previously classified as "Tertiary sediments, extremely weathered/residual soil" in prior assessments. The hydrostratigraphy presented in Table 2 2 has therefore been adjusted to rename this HSU as eluvium."*
Table 2-2 HSU categorisation "4. Eluvium (highly weathered basement)"	Please clarify the classification and stratigraphy of this unit. Uncertainty remains around the formation and classification between the tertiary sediments and underlying basement rock. Provided this is expected to be the main water bearing unit over the project area (CDM Smith 2024), it would be best to clarify these points.	Comment There is some uncertainty surrounding the geological age of this HSU. The term eluvium was borrowed from the 1:250k scale geological map for the area which describes eluvial sands with rock fragments as overlying and being derived from granitoid rock. This fits with the drilling observations which indicate this layer overlying basement in fragments comprising the dampier granitoid complex. A reference has also been added to granitoid units under the stratigraphy section for this HSU to make clearer. Recommend having a look at the chip photos in the appendix of the 2024 drilling report which shows this clearly in some bores

[1] CDM Smith, 2024. Eramurra Solar Salt Project – Groundwater Drilling 2023/2024, prepared for Land and Water Consulting, 28 March 2024.

Report Section	Geosyntec Comment	CDM Smith comment and revision
		Actions Clarified the name change of the HSU rather than classifying a new HSU. Clarified Eluvium Stratigraphy as: "*Quaternary sediments [Qrg] ,* *Undifferentiated Volcanics [d/o],* *Dampier Granitoid Complex [Ag] "*
Section 2.4.1.2 Hydraulic Properties	Please provide further detail on what is meant by this: *Groundwater modelling by CDM Smith: –Developed a density driven groundwater flow model for the Project using an ensemble of 100 model realisations."*	Comment/Action Added an additional sentence to clarify: *"The 100 realisations are designed to explore the potential model outcomes based upon a range of hydraulic property combinations with each realisation containing a different set of parameters and calibrated to hydraulic head observations."*
Section 2.4.1.3 Updates to hydrostratigraphy	Suggest removing the following as the statement would be valid and pertain to most sites: *"Variable ground conditions between sites noted by differences in clay content, depth and extent of weathering."*	Comment/Action Acknowledged and removed
Section 2.4.1.3 Updates to hydrostratigraphy	Doesn't this mean that the hydraulic properties across the site are going to be variable?: "*Boundaries between the cover stratigraphy generally remain poorly defined."*	Comment Absolutely, a degree of heterogeneity is expected spatially and this is accounted for in the modelling that has been completed.
Table 2-4 Monitoring Bores Drilling and Construction Summary (CDM Smith, 2024)	"N/A" denotes that there is information missing. Please provide clarification in this table. It is noted that Table 2-5 contains some clarification but it would be better for this to be clear when introducing Table 2-4.	Comment Acknowledged Actions Footnote has been added to Table 2-4 and an explanation to the introductory paragraph to the table stating: *"Bores that were either not drilled or backfilled after drilling are denoted in Figure 2 9 and represented in Table 2 5 as N/A.*"
Table 2-5 Drilling observation summary (CDM Smith, 2024)	Please provide an introduction to Table 2-5 with key highlights that supports the section on hydrostratigraphy (Section 2.4.1.3)	Comment Acknowledged Actions An introduction has been added to this Table 2-5. Key highlights are summarised already as part of the bullets preceding Table 2-5.

Report Section	Geosyntec Comment	CDM Smith comment and revision
Section 2.4.2 Groundwater levels and flow	Please provide more clarification on the following text: *"CDM Smith (2024) suggested the difference in groundwater heads measured after drilling at nested site MB33s (~6.5 m bgl) and MB33d (~23 m bgl) could be suggestive of downward movement of groundwater (recharge) deeper into the basement HSU."* Were these wells developed? Is that because of the low-yielding nature of the granite? Or is the text referring to groundwater strike?	Comment/**Action** Text references low to no yields from granite during drilling. Following well construction and development in January 2024 the wells were gauged in February where MB33d had a SWL of 23 mbgl. Following monitoring in June, the water levels in this well recovered to around 6.5 mbgl to be within 20 cm of MB33s. The text has been amended to mention development and make this clearer: *"Water levels taken from the Project's monitoring bores indicate little difference in groundwater heads between the shallow sedimentary cover and deeper basement HSUs. This is supported by groundwater heads at nested site MB33 where recent monitoring by LWC in July 2024 (Figure 2 10), found water levels within MB33d (basement) have recovered to be within around 20 cm of MB33s (sedimentary cover). Following bore construction and development in January 2024, water levels within MB33d measured around 23 m bgl, some 16.5 m deeper than MB33s and is now understood to have represented water levels that had not fully recovered within the bore. Although additional nested sites are recommended to better understand the hydraulic gradient with depth, the latest water level monitoring from nested site MB33 may suggest a degree of connection between the sedimentary cover sequence and the underlying basement"*
Figure 2-10 Project monitoring bore locations	What is the difference with previous Figure 2-9? This is confusing.	Comment/**Action** Earlier figure shows the bores drilled and constructed during the 2024 program, this figure shows ALL monitoring bores (those constructed in 2021, 2023, and 2024). SWL has been added to bores in this figure to help link to discussion in under this section (2.4.2.1)
Section 2.4.2.2 Groundwater flow direction	It seems that a critical component missing in this section is the potential interaction between groundwater and the creeks. What are the differences between the creek RLs and the groundwater levels? Are the groundwater levels several meters below the creek level? If so, what are the potential implications?	Comment/**Action** Rearranged section slightly to discuss elevations and then flow and added paragraph to discuss water levels beneath creeks.
Figure 2-12	It is still difficult to understand the RLs along the creek and understand how deep the water table is in relation to the creek RLs. This will help in adding another conclusive line of evidence about the nature of the groundwater/surface water interaction.	Comment/**Action** The creeks have been digitised and added to this map to assist with the discussion of water level depths beneath these features
Section 2.4.3 Groundwater quality (salinity)	Can we say something about the potential freshwater recharge from the loosing creeks (when flowing) and the potential to reduce the salinity?	Comment/**Action** Amended and clarified in the following text: *"This observation supports the conceptualisation of shallow recharge occurring through the ephemeral drainages and may also suggest*

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		groundwater salinity increases with depth, either as a function of longer residence times of recharging groundwater or MB33d intersecting deeper fractures hosting saline groundwater."
Section 2.4.3 Groundwater quality (salinity) *Paragraph 2*	The objectives of the two paragraphs are unclear. The phrase *"the density component is static (does not vary over time)"* needs clarification, particularly regarding how it accounts for fresh recharge events and what it specifically refers to. I am open to discussing this further to better understand and refine these points. Additionally, I agree that more salinity data and profiling are necessary for a site of this magnitude, as the current baseline is too crude to capture finer nuances. However, this point should be conveyed differently to ensure clarity and precision.	Comment/**Action** These paragraphs outline the temporal variability of groundwater salinity. This is important because while the prediction model is transient and incorporates seepage and infiltration processes, the predicted change in salinity is relative to the starting concentration (i.e. the baseline salinity) that is used in the model. Higher baseline concentrations in theory would result in a lower salinity increase as a result of the project development than a low salinity baseline. The baseline salinity that is used in the model was taken from TDS concentrations in earlier groundwater monitoring events that are higher than concentrations measured recently. It is therefore, unlikely the current model appropriately predicts the full range of possible salinity increases expected from the project as the baseline concentration has been proven to vary. The first paragraph discusses the salinity results and variability while the second paragraph touches on the latter point regarding the model results and the implications not understanding how the salinity varies over time has on the model predictions. This is important to convey as it informs the approach that might be required to address the conceptual uncertainty. Have updated the second paragraph to remove the term static and make clearer how the starting salinity concentrations affect model results
Section 2.4.4 Groundwater recharge/discharge	1) *"Groundwater recharge in the Project area is thought to occur primarily through diffuse rainfall recharge and as leakage beneath ephemeral streams"* Did we really need modelling to prove this? There is significant merit in articulating conceptually why this is the case. Please provide further details, as this is a key component of the CSM. 2) *While a component of groundwater inflow has been predicted from the ocean (~1.2 ML/d), groundwater modelling predicts a smaller quantity of outflow (~0.25 ML/d) may also occur towards to the coast"*	Comment/**Action** 1) No, however, this concept was first realised after model calibration and provided further insights into how the groundwater discharges. Further information has been added to support this process based on site data 2) Added sentence to clarify it is the net outflow and that it is controlled by a several hydrogeological processes incl. groundwater and surface water interaction 3) This is mentioned in Section 2.4.1.3 Updates to Hydrostratigraphy. Have clarified distance of bores to creeks and

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	It would be beneficial to clarify that this will be the net outflow. Additionally, discussing the exchange between groundwater and surface water in the hyporheic zone, which tends to further "dilute" the outflow of groundwater, could be useful. 3) *"Groundwater drilling completed in the Project area between December 2023 and January 2024 typically encountered groundwater between 10 and 12 m when drilling adjacent to creeks (CDM Smith, 2024). This observation suggests groundwater is unlikely to discharge to creeks directly….."* Refer to previous comments. This should be mentioned much earlier. Can we clarify the distance between the creek and the nearest bores?	added further discussion to the groundwater levels section with respect to groundwater levels beneath creeks
Section 2.4.5 Groundwater and surface water interaction	1) *"This interpretation is generally consistent with the saline interface predicted by the Project's density dependent groundwater flow model (CDM Smith, 2023b) albeit some differences in salinity concentrations and extent of the saline interface inland."* Again, can we deemphasize the focus on the model here? My issue with the model is that we may not have enough wells to better understand the finer nuances of the salt distribution, hence why there are differences between the model and we expect for the monitoring. 2) *"Further drilling along the coastal areas is planned as part of further environmental baseline studies to support the Project's ERD which will provide additional data and information to support the understanding of the sabkha-like environment."* Agreed. Hence why we need to deemphasize the focus on the model. The model will be better when we have more data. This should be a key conclusion of this report. We need a better understanding of the finer TDS distribution near the receiving environment and possible the impact surface water runoff may have a long the ephemeral creeks	Comment/**Action** 1) Model was referenced here at request of Karen and also to make it clear to the regulator that not only has this been conceptualized but also modelled with these results further assessed against our conceptualisation for relevance 2) No Comment
Section 2.5.8.2 Noorea Soak	1) *"While groundwater contributions to this feature are possible, depth to water from the nearest groundwater monitoring bores (MB06 at ~1 km and MB09d at ~1.5km, Figure 2 9) measures around 8.5 and 9 m below top of casing respectively"*	Comment/**Action** 1) Leichhardt is planning to drill a bore adjacent to Noorea Soak, this was originally planned as part of the 2023/24 campaign, however, was aborted as cultural approvals were not obtained in time. Absolutely agree a bore here is necessary and this was recommended in the second paragraph below. In the meantime,

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	Isn't 1 km an unreasonable distance to draw conclusions on the interaction between the soak and groundwater? Why not recommend a bore adjacent to the soak for more conclusive results? This is a crucial point and requires more lines of evidence to be proven. Compared to the detailed methods used by large mining companies, such as adjacent bores and isotopes, very little evidence has been gathered. 2) *"In order to obtain additional data to inform the conceptual understanding of this feature, a monitoring well closer to Noorea Soak is planned. Future monitoring events should also aim to collect a surface water sample from the soak (should water be present) such that a comparison with groundwater can be made."* Why not recommend drilling a bore adjacent to this point?	we have sought to use all available data to inform the current understanding of this soak which includes (i) remote sensing, (ii) seasonal water level data from nearby bores, (iii) model predictions and (iv) understanding of underlying stratigraphy 2) As mentioned here, Leichhardt is already planning this which agreed is crucial to round out the conceptualisation of this soak
Section 2.5.8.3 Devils Pool	How far is MB21S from Devils Pool? Please clarify the distance.	Comment/**Action** Amended: *"Drilling of MB21s, located around 150 m adjacent to Devils Pool"*
Section 2.6 Conceptual hydrogeological model	Could this be organized in order of importance? It would be beneficial to address the points that directly affect the receptors first, particularly those involving groundwater and surface water interaction. The presence of eluvium does not seem to significantly alter this understanding, unless it is believed that there should be a larger outflow of freshwater discharge due to the permeable nature of the eluvium.	Comment/**Action** The bullet points have been reordered as requested. Regarding the eluvium: Agreed that it does not significantly change the understanding and therefore it has been removed from these points.

2 Closure

Should you have any queries or wish to discuss any points, please do not hesitate to contact us.

Yours sincerely,

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Karen Mackenzie
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