
From: Brian Cole [REDACTED]

Sent: Wednesday, 2 October 2019 4:11 PM

To:

Subject: FW: Vickery - Rail spur and regional groundwater flow

Kane,

In regard to the potential compaction of clays due to the construction of the Vickery Extension Project rail spur (should the Project be approved), the following explains why impacts to regional groundwater flow and storage would not occur:

- Should the Project be approved, the rail spur will be designed and built to be stable over the life of the Project.
- During detailed design the most suitable substructure design and construction method to achieve this will be determined, and this will take into consideration the potential for any compaction of the clays associated with the Narrabri Formation.
- In regard to potential effects to the aquifer please note:
 - . While there are clays associated with the Narrabri Formation, the main water bearing alluvial aquifer is the underlying Gunnedah Formation.
 - . The attached Figure 4-5 from the EIS shows drill chips from both the Gunnedah and Narrabri Formations, showing the difference in composition (i.e. sand/gravel vs clay, respectively).
 - . The Gunnedah Formation is up to 120 m thick in the vicinity of the Project rail spur (refer to the attached Figure 10 from the GW Assessment).
 - . On the western side of the Namoi River:
 - The Project rail spur will be an elevated structure with approximately 95% open space (e.g. elevated on pylons some 20 to 30 m apart to allow the flow of flood water).
 - Therefore, depending on the final design and construction methodology adopted for the substructure, while some limited compaction of the clays may occur directly beneath the pylons, the compaction would not extend laterally to effect the all of the remaining 95% of the alignment not directly affected by pylons.
 - In addition, compaction could not have a material affect the entirety of the Gunnedah Formation (given its composition of sands/gravels and depths of up to 120 m) such that regional groundwater flow or storage would be affected.
 - . On the eastern side of the Namoi River:
 - Groundwater flow in the alluvium is controlled by topography and the Maules Creek Formation.
 - The direction of groundwater flow is approximately east-north-east to west in the vicinity of the rail spur (see attached Figure 19 from the GW Assessment).
 - This is approximately the direction of the short section of the rail spur located on

Whitehaven land that may be embankment (see attached Figure 12 from the Submissions Report).

- Therefore any compaction of the clays underlying the rail spur would not form a barrier that constricts groundwater flow.
- Other sections of the rail spur on the eastern side of the Namoi River would be elevated (i.e. to cross South Creek and the Namoi River itself).
- As above, the sands/gravels of the underlying Gunnedah Formation (up to approximately 90 m deep in this area) are less susceptible to compaction than the overlying clays.

Should you require any further clarification please do not hesitate to contact me.

Regards,

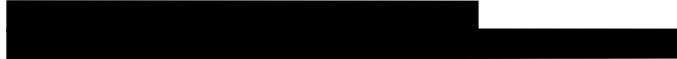
Brian Cole

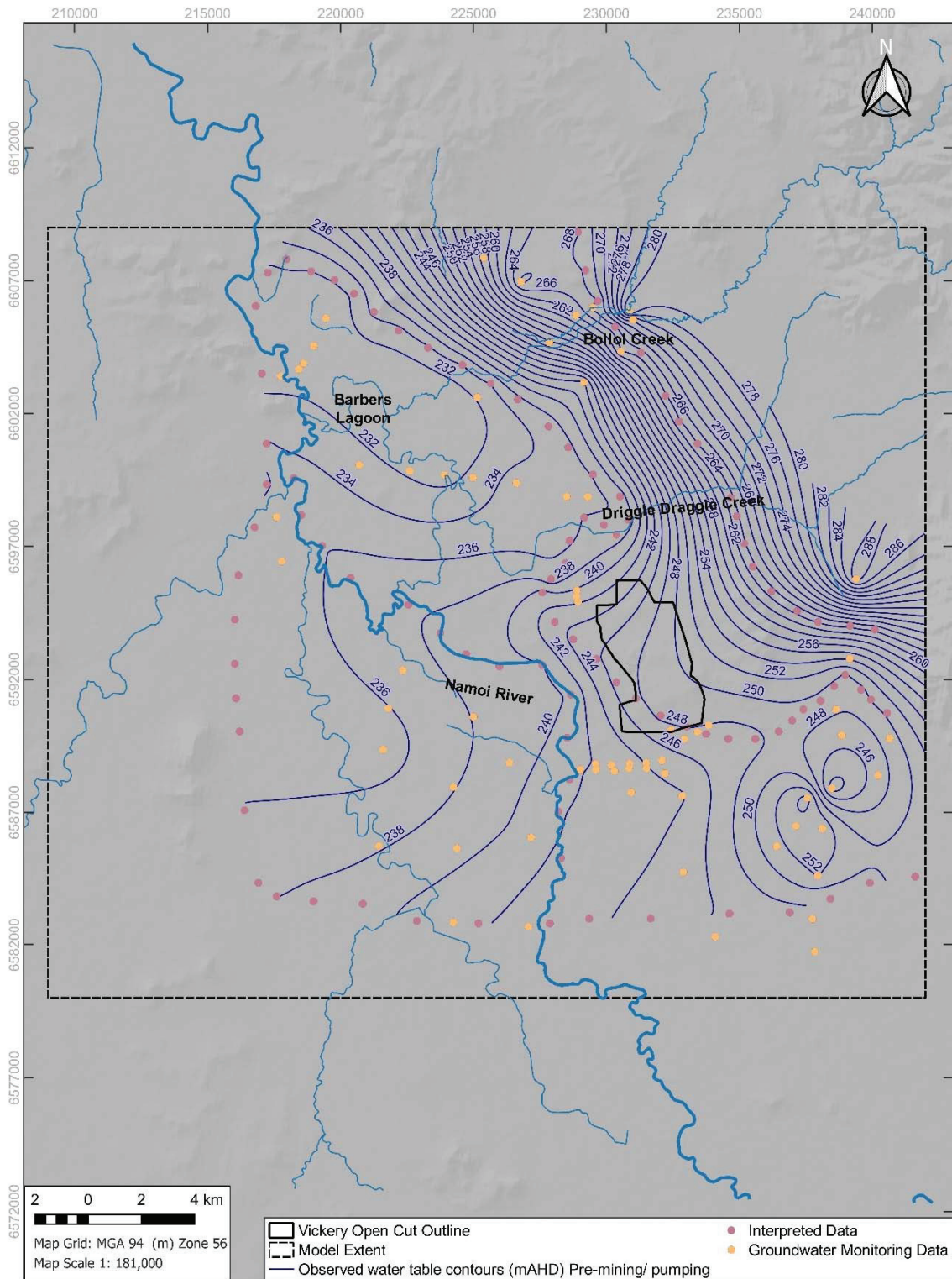
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**HYDR
SIMULATIONS**

Vickery Extension Project
Regional observed water table contours (mAHD) pre-mining/pumping

Figure 19

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Figure 19 Regional Observed Water Table Contours (mAHD) Pre-Mining/Pumping

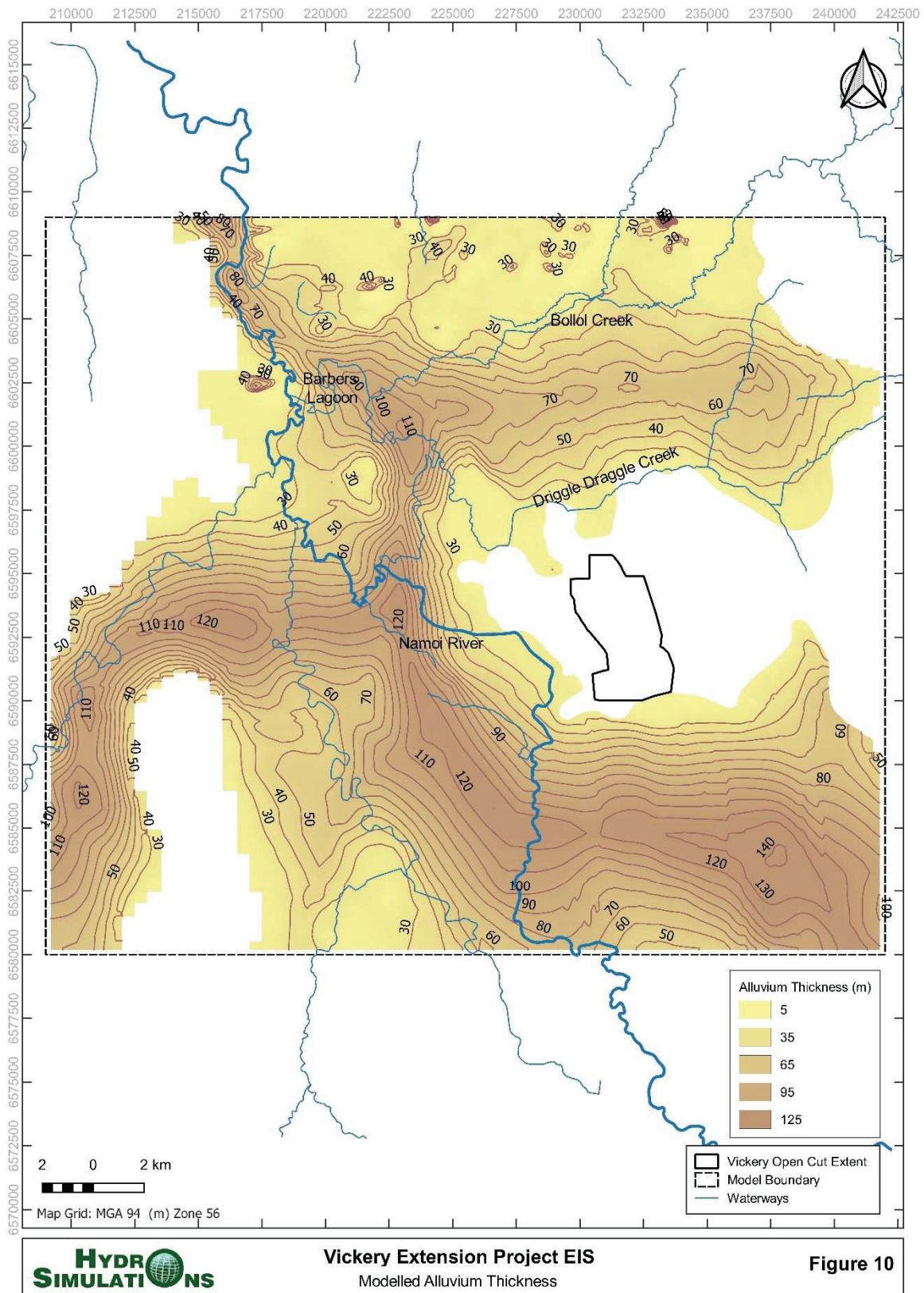


Figure 10 Modelled Alluvium Thickness (m)

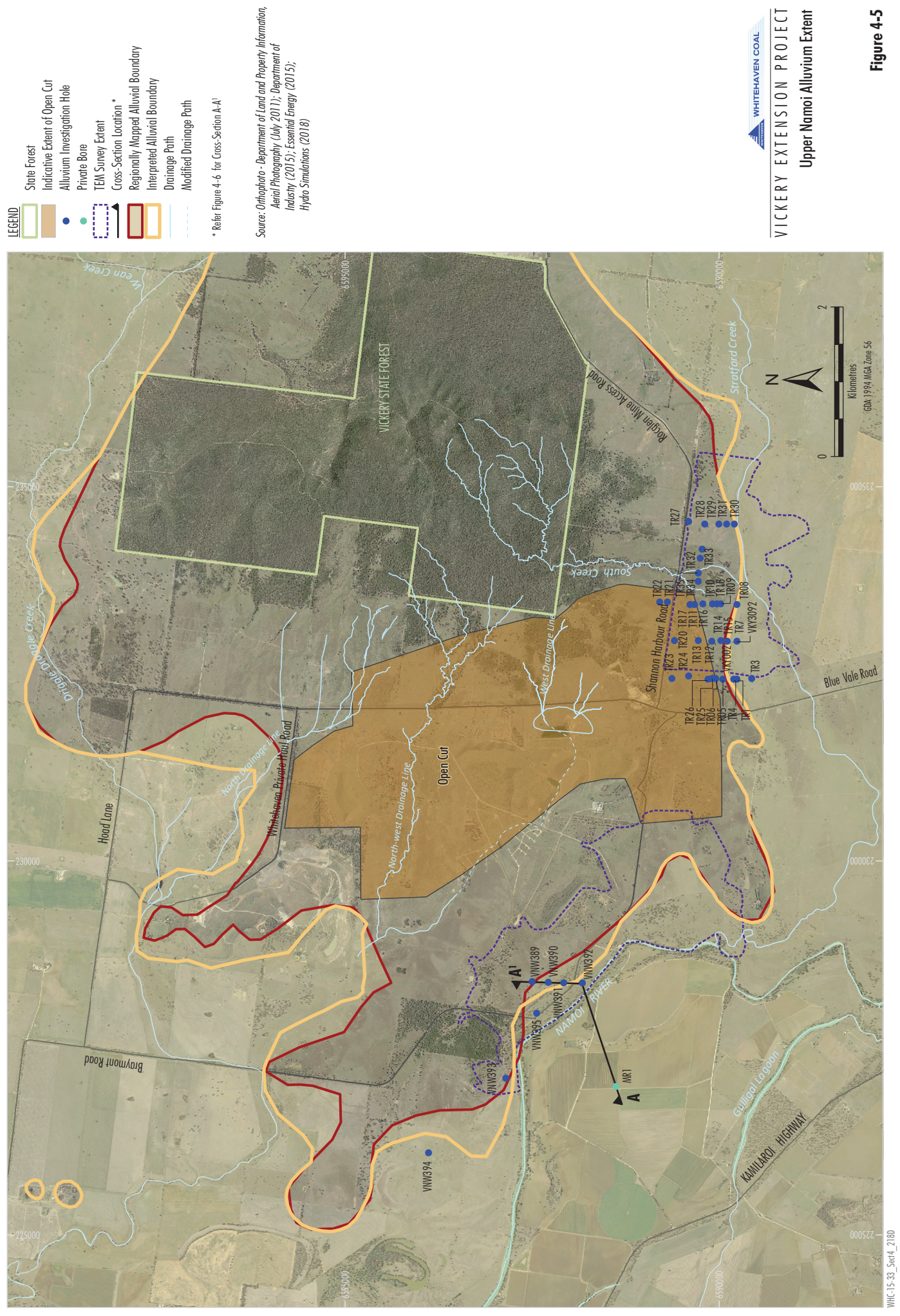


Figure 4-5