DE GREY MINING LTD

MEMO

TO: Sarah Thomas, Manager Environment
Jonathon Barker, Principal Environment Approvals

FROM: Shawan Dogramaci, Hydrogeology Manager

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SUBJECT: Conceptual Long-term Drawdown at 200 Years

Within the Definitive Feasibility Study Conceptual and Numerical Groundwater Model (Geowater 2023) the Yule and Turner Rivers were simulated as simple 'gaining' streams. This was done by setting drain cells at the basal riverbed elevations along the reaches of each river within the models domain. The influences of actual river recharge to the surrounding shallow aquifer (i.e. 'losing' streams) was approximated in the steady state model by applying estimates of average recharge to the water table within the confines of the existing river channels. As such the surface water record was not required to simulate the river flow by either the Yule or Turner River in the model.

However, using average recharge from rainfall events over the model domain underestimates stream recharge from both the Yule and Turner River when flowing, particularly during high rainfall events that can produce in the order of hundreds of Gigalitres and flows up to six months through the model domain. This is appropriate for the operational phase groundwater model due to the distance of groundwater drawdown from each river, however for closure phase modelling it has been determined that the application of estimates of average recharge to the water table is not appropriate and more detailed information should be included.

As such the 40-year surface water record from two gauging stations (Jelliabidina and Pincunah gauging stations) on the Yule and Turner Rivers located approximately 4 km north (downstream) and 35 km south (upstream) respectively of the modelled domain have been used to ensure the model takes into account accurate stream flows.

The Yule River, with a mean annual flow of 240 GL/a (1984–2024) and a maximum yearly flow of approximately 1,820 GL in 2000 at the Jelliabidina gauging station (Figure 1), plays a significant role in the overall water balance. The Turner River, although smaller, also contributes to the balance with its long-term mean flow of 28 GL at the Pincunah gauging station (Figure 1). The long-term climatic record shows that both rivers flow to the ocean 80% of the recorded years (32 years out of 39 year records) for an average duration of approximately 42 days. This data underscores the substantial contribution of these river flows to the overall water balance within the model domain.

The above information has been included in the preliminary closure model developed for the Proposal using a stream package (Stream (STR) in MODFLOW) to simulate streams and route flow instantaneously to downstream streams, which enhances the model's adaptability and relevance.

The long-term 1 m drawdown contour at year 200 post closure is shown in Figure 2. This contour represents the predicted maximum long-term drawdown for the Proposal.

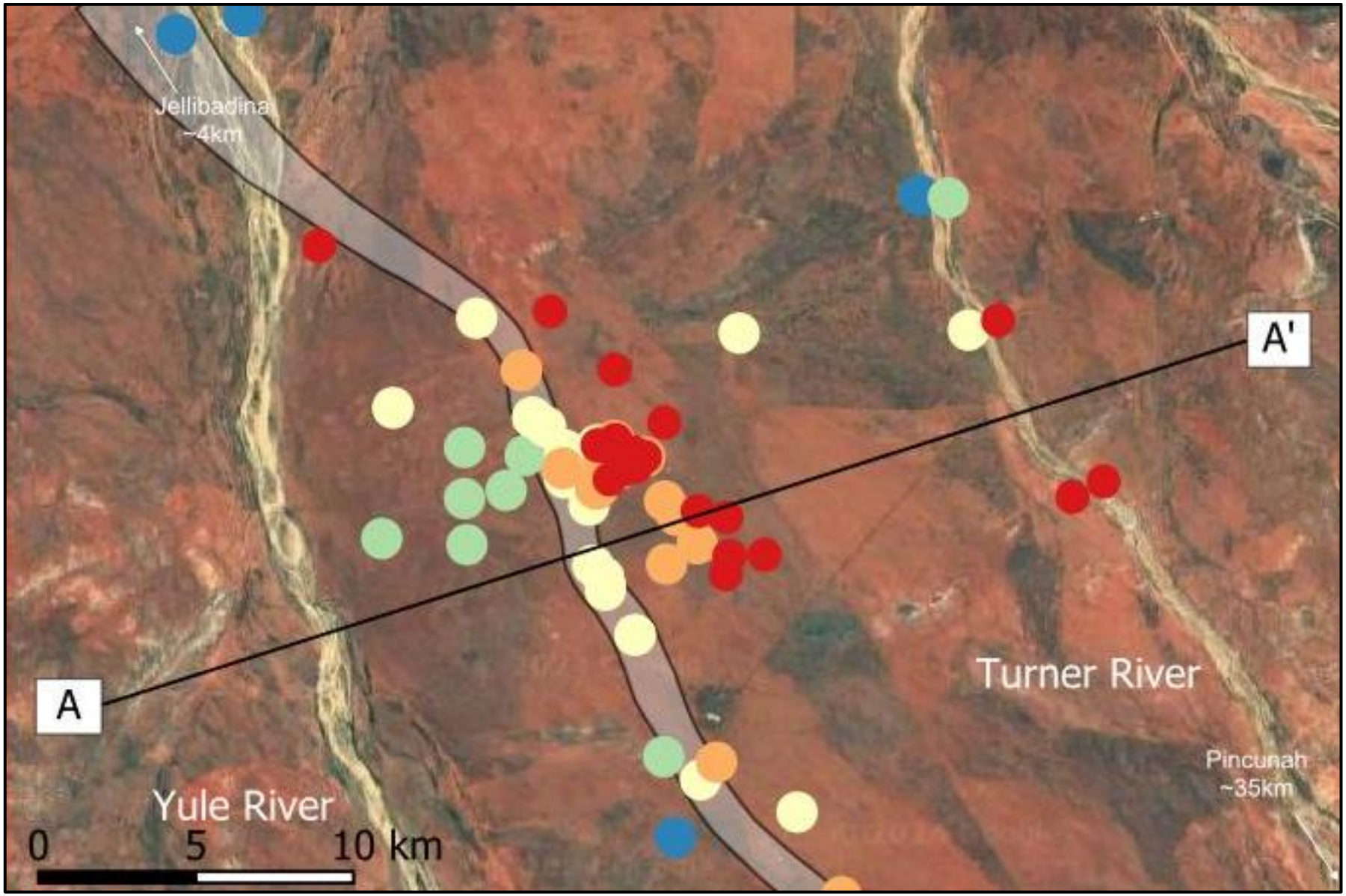

Figure 1: Location of Jelibadina and Pincunah Gauging Stations, 4 km North and 35 South of the Proposal

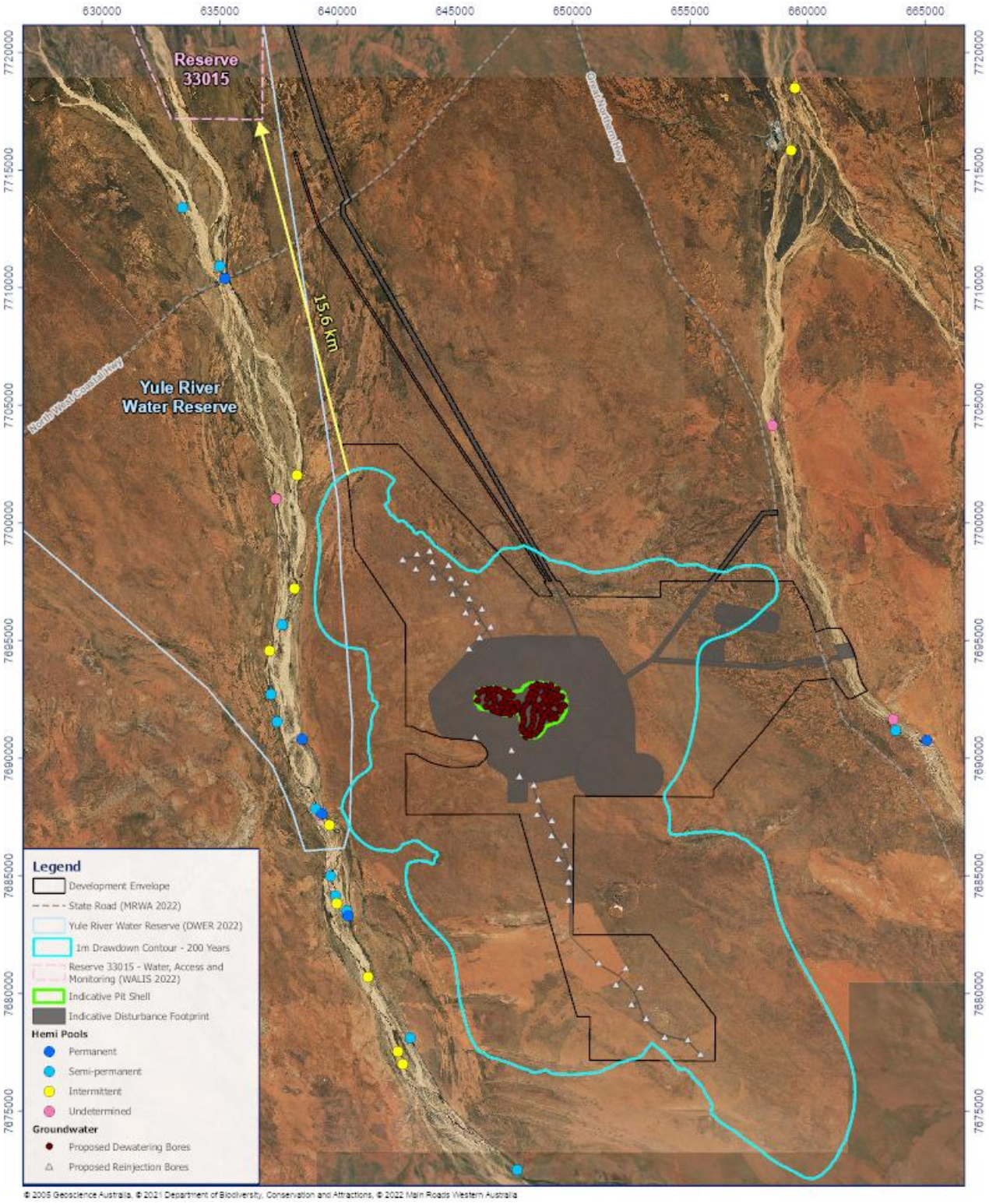

Figure 2: Long-term 1m Groundwater Drawdown at 200 years