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Memo

To	Emma McGivern	Company	RTC
From	Kathryn Rozlapa & Jon Hall	Job No.	238F
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Subject	Rimfire Water Supply - Peer Review		

1. EXECUTIVE SUMMARY

AQ2 has reviewed ongoing progress with hydrogeological investigations and modelling for the Rimfire Borefield and the final report on all work completed – the Rimfire H3 Assessment report prepared by Worley.

Key findings from our review are summarised below:

- The groundwater model developed to predict the water supply capacity of (and impacts of pumping from) the Rimfire area is consistent with the local and regional hydrogeology and is well calibrated to available data. The model is considered to provide reliable predictions subject to the inherent uncertainties associated with any such investigation.
- The model predicts that a borefield comprising nine production can sustain pumping rates of 2.8 GL/a for 32 years, with predicted drawdowns (2 m) extending up to 15 km radially away from the borefield.
- The model also predicts no drawdown impacts on any identified GDEs or other groundwater users, and that groundwater levels in the borefield would recover to within 1 m of pre-development levels around 100 years after the cessation of pumping.
- As with any investigation of the type completed, their remains some uncertainty around predictions relating to the distribution of aquifer parameters throughout the Rimfire area related to the short period of aquifer testing (up to 30 days) and subsequent model calibration compared with the prediction period (32 years). These uncertainties can be addressed (and reduced) during ongoing borefield development works.
- Notwithstanding the residual uncertainties, it is concluded that they will likely have no significant impact on total water supply capacity at Rimfire, although they might require some modifications to borefield design (number and distribution of bores).
- The work completed is also suitable to support the Department of Water and Environmental Regulation H3 level of assessment.

2. INTRODUCTION

2.1 Background

The Winu project is located approximately 320 km east of Port Hedland in the Pilbara region of Western Australia. The project will develop a copper-gold mine and associated infrastructure. A make-up water supply requirement of up to 2.8 GL per annum for a period of 32 years has been estimated for the project based on the project water balance.

Rio Tinto's proposed Rimfire Borefield has been identified to supply the water demand and is located 30 km to the east-southeast of the Winu project area. As part of further studies for the Winu Project, investigations and water management assessments were completed by Golder in 2021 and Worley in 2022 to 2024 in the Rimfire Borefield area to support the project. These studies were designed to assess the potential for, and impact of water supply pumping from the Rimfire Borefield.

2.2 Scope of Review

AQ2 were engaged by Rio Tinto to provide ongoing review during the modelling and assessment phases of the Rimfire Borefield hydrogeological investigations. This report presents a documented Peer Review of the work completed to support the overall project Environmental Review Document (ERD) and application for a Groundwater Well Licence. The review included:

- The interpretation of field investigations and hydrogeological conceptualisation.
- The representation of the hydrogeological conceptualisation in the groundwater model.
- Groundwater model development, calibration performance, predictions and treatment of uncertainty.

The results of investigations completed to date are documented in the Rimfire H3 Assessment report (Worley, 2025) and this report, together with ongoing review discussions with Rio Tinto and Worley were the principal sources of information for this review. It is noted that groundwater model input and output files have not been reviewed.

3. REVIEW

3.1 Background

The Rimfire H3 Assessment report prepared for the project provides detail on all hydrogeological studies completed by Golder and Worley. The studies completed and reported by Worley included:

- Reverse circulation (RC) drilling of eleven groundwater exploration holes (four in 2021 and seven in 2022).
- Installation of one production bore and three monitoring bores (in 2023).
- Installation of a replacement production bore (in 2024). Due to drilling condition constraints, the original production bore (WINU0942 – drilled in 2023) could not be screened against the main aquifer zone and subsequent test pumping results were not considered to be valid. The replacement bore (WINU1308 – drilled in 2024) was successfully completed and screened against the main aquifer zone.
- Aquifer testing including step-rate testing and extended (~30 days) constant rate testing and analysis (in 2023 and 2024).
- Development of a hydrogeological conceptual model.
- Development of a numerical groundwater flow model, including model calibration, prediction and uncertainty analysis.

The outcomes of the study are summarised below:

- Production bore WINU1308 was installed and screened in the interpreted main aquifer unit (moderately to highly weathered granite and metasediments) around 30 and 80 mbgl. Three monitoring bores were installed within 800 m of the production bore. An existing monitoring bore (of unknown construction details) located around 6km from the production bore was also monitored during test pumping.
- Aquifer testing (30-day constant rate test) and analysis suggests an aquifer transmissivity in the order of 400 m^2/d (range of derived values - 390 to 420 m^2/d).
- While the main aquifer unit (being weathered basement rocks) is likely to be relatively evenly distributed across the borefield area, groundwater flow in deeper aquifers/aquicludes maybe controlled by structural features.
- The overall groundwater flow direction is to the northeast towards discharge zones associated with the Wallal paleovalley system, located some 30km to the north.
- Groundwater modelling results, including probabilistic uncertainty analysis, indicate that a borefield of nine bores in the Rimfire area has the potential to supply 2.8 GL/a for a period of 32 years. Drawdown from the borefield is predicted to extend roughly radially away from the borefield with 2 m of drawdown extending up to 16 km from the borefield.
- The model predicts no drawdown impacts on other groundwater users, the nearest of which is 90 km away, or on identified GDEs or soaks, the nearest of which is 30 km away.
- Recovery simulations indicate that water levels in the immediate borefield area would recover within two metres of pre-development groundwater levels after 50 years and within one metre (of pre-development levels) after 100 years post-closure.
- The above results assume continuity of the main aquifer unit throughout the Rimfire area and ongoing drilling and test pumping over a broader area will be required to confirm this.

3.2 Review

Our review of the work completed to date and the H3 Assessment report is presented below:

- The consistency of drawdowns during test pumping indicates good hydraulic connection between pumping and monitoring bores and this provides confidence in the aquifer parameters derived from test pumping analysis and model calibration.
- The nature of the main aquifer unit (moderately to highly weathered granite and metasediments) suggests that the aquifer should be extensive. While further work (drilling/testing) will be required to confirm the distribution of aquifer parameters across the Rimfire area, it is not unreasonable to expect that the main aquifer unit is extensive even if there may be a broad range of aquifer parameters.
- There will likely be more variability in the aquifer parameters within the fractured basement aquifer underlying the main aquifer unit, although this will have less influence on the water supply capacity of the Rimfire borefield.
- The model developed for the Rimfire area is a standalone model although it draws on the results of the regional groundwater flow model developed to assess dewatering requirements and the water supply capacity of the Winu Pit.
- The pumping test calibration completed for the groundwater model includes pumping from WINU1308 and drawdowns in three monitoring bores (WINU943, WINU940 and WINU1244) all screening the main aquifer unit at distances up to 700 m from the pumping bore. The model was also calibrated against a water table rise at WINU1379 resulting from the infiltration from the test pumping discharge area.
- The model calibration is considered to be very good. Sensitivity analysis indicates, not surprisingly, that the key aquifer parameter is the permeability of the main aquifer unit.

- Model predictions were completed for a set of "base case" parameters. Pumping was simulated from nine bore locations with individual bores operating at rates of between 8 and 11 L/s to produce continuous abstraction of 2.8 GL/a for a period of 32 years.
- Uncertainty predictions were also undertaken for a range of probabilistically derived parameters (i.e., ensemble type uncertainty analysis was completed). The analysis used a standard Monte Carlo simulation approach, with 200 parameters realisations (or parameter combinations) developed and used to simulate borefield performance. The Monte Carlo analysis was unconstrained (i.e., calibration criteria were not used to select the best performing 200 realisations), however in the majority of cases the hydraulic parameters included resulted in a reasonable match to the observed (calibration) data.
- The uncertainty predictions suggested that the long term borefield yield of 2.8 GL/a, for 32 years, was simulated for 96% of the simulations (192 of the 200 realisations). The uncertainty prediction results also suggested that predicted drawdowns at each pumping bore (even allowing for well losses) are all well above the base of the modelled base of the main aquifer. This provides confidence that the predicted water supply capacity can be sustained by the nine simulated pumping bores. In practice however, additional bores may be installed to provide stand-by capacity.
- The groundwater change assessment, as part of the uncertainty analysis, was presented in similar terms with impacts presented as unlikely (less than 10% chance of occurring based on the range of simulations completed).
- As with any investigation of this type, there remains some uncertainty associated around the long-term water supply capacity:
    - As outlined above, while the nature of the main aquifer means that it is likely to be extensive, there will likely be a broad range of aquifer parameters. Further work is required to confirm the distribution of aquifer parameters across the overall Rimfire area.
    - The comparatively short length of time of the monitoring and the spatial distribution of water levels included in the model calibration data set and the magnitude of the aquifer stresses in relation to the length of time and stresses included in model predictions means that there remains some uncertainty associated with long term model predictions (i.e., over the life of the borefield).
    - The above uncertainties would be addressed and borefield capacity and design would be refined as part of ongoing borefield development works. However, based on results to date and the confidence in analysis and modelling results, it is considered unlikely that the water supply capacity of the Rimfire area would be significantly lower than currently predicted, although the borefield design (number and distribution of bores) might need to be modified.
- The H3 Assessment report is considered more than sufficient to support your application for a GWL.

4. REFERENCES

Worley, 2025. Rimfire H3 Assessment 2025 Update. Prepared for Rio Tinto Copper. June 2025. Document no 4: REP-HG-31

Regards,

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