

**3D Conceptualization and Numerical Model Analysis, and its Impact on Drawdown, in the Bulgarene Borefield, Port Hedland WA
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The Bulgarene borefield (BB) is situated between the De Grey and Ridley Rivers, 60km east of the town of Port Hedland in Western Australia. The BB has substantial ecological and indigenous heritage values, and there was concern that abstraction from this borefield could significantly drawdown water levels within the culturally sensitive Muccungarra Pool along the Ridley River. In 2013 the Water Corporation engaged SKM to undertake a drilling and aquifer testing program with the aim to stress the aquifer and observe any impacts to the water table. A total of five monitoring bores were drilled in strategic locations within the upper alluvium aquifer to capture accurate drawdown data. Two separate 14 day aquifer tests were undertaken at 81 s on bores 21 96 and 18 96 with drawdown readings collected from both the newly installed bores in the upper alluvium and several existing bores in the lower alluvium aquifer. A numerical model was built after the field programme indicating, with a 2G1 yr. abstraction, a maximum drawdown at Muccungarra of 0.1m. This is a significantly smaller estimation in maximum drawdown at Muccungarra Pool, compared to the two previously completed numerical models for the borefield. This investigation involved reviewing all existing data sets, including bore lithological logs, EM surveys, hydraulic testing data, current and previous 2D conceptual models. This information was then used to create three 3D conceptual models using LeapfrogTM modelling software. These conceptual models were then used to compare the three depositional environments used in the previous hydrogeological investigation work undertaken at the BB. The second part of this investigation involved comparing all three conceptual models and their corresponding numerical models to determine what had the biggest influence on the drawdown results. The conceptualisation, or the revised hydraulic parameters and numerical modelling.

