June 2018

ELIWANA MINING PROJECT

DEWATERING AND WATER SUPPLY ASSESSMENT

Submitted to:
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REPORT

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Table of Contents

APPENDICES

APPENDIX A
Modelled Dewatering and Water Supply Abstraction Regime

APPENDIX B
Modelling Results – Tracking Point Plots

APPENDIX C
Important Information

1.0 INTRODUCTION

Fortescue Metals Group (Fortescue) engaged Golder Associates Pty Ltd (Golder) to carry out several mine dewatering and water supply groundwater modelling scenarios using the Eliwana Groundwater Model (EWGM) developed for the project (Golder 2017a). The purpose of this modelling work was to provide input into Fortescue's feasibility assessment for mining at Eliwana, specifically to inform water management decision making with respect to mine planning, dewatering and water supply. This work has been carried out in accordance with the scope of services outlined in our proposals P1671484-001-P-Rev0 and P1671484-002-P-Rev0 dated 25 January 2017.

The modelling outcomes documented in this report are based on the assumptions provided within the mine plan file ***Prelim Mine Plan (04-05-2017).xls*** (the "plan") received from Mr Jordin Barclay on 15 May 2017 and a subsequent update received on 26 May 2017 (***Prelim Mine Plan (26-05-2017).xls***). Any changes to this mine plan may invalidate dewatering or water supply recommendations contained within this report.

2.0 BACKGROUND

Fortescue is assessing the potential development of a new iron ore mining area located approximately 140 km west of its existing Solomon Mine. The mining area comprises several iron ore deposits, which when mined would collectively be known as the "Eliwana[1] Mining Project (the Project, Figure 1). The Project lies on the northern limb of the east west trending Brockman Syncline. It comprises multiple ore bodies within both the bedded Brockman Iron and Marra Mamba Iron Formation rock types.

A hydrogeological program of work was initiated in mid-2016 by Fortescue to collect data including regional geological mapping and literature review, exploration drill hole data, assay results and exploration water supply monitoring data, which was used to develop a conceptual geological model for the mining area. This model was used to plan further hydrogeological drilling studies which comprised the drilling of 10 production bores and 11 monitoring bores, followed by a program of test pumping, single well ("slug") testing and downhole geophysical surveying.

The above information has been used by Golder to develop and document a conceptual hydrogeological model (Golder, 2017a) based on which a numerical groundwater model (Golder, 2017b) was constructed and reviewed by Fortescue. Fortescue has subsequently provided Golder with a mine plan and water demand estimate to apply within the groundwater model for an assessment of the proposed mine site water balance. The proposed pit shells, preliminary depths and rate of vertical advance are provided within Fortescue's Prelim Mine Plan.

3.0 MINE PLAN

The preliminary mine plan provides nominal locations of pit shells, waste rock dumps, adjoining access corridors and the minimum bench RL in each of the proposed mine pits. The pit crest outlines of each proposed mine pit are shown in Figures 2 to 5, those shown in a bolder red outline correspond with the below water table pits and have been labelled with their names corresponding with Table 1. This geographic information has been used to plan where dewatering or water supply bores can be reasonably located, given knowledge of aquifer extent and location.

The minimum mine bench RL was compared against the conceptual groundwater level (derived from downhole resistivity derived water levels from mineral holes and dipped levels from monitoring bores) to calculate the maximum pre mining saturated thickness for each pit. Seven below water table (BWT) pits have been identified in this preliminary mine plan. Of these pits, three comprise 26m or less of maximum saturated thickness (intersected groundwater depth). Of the remaining four BWT pits, the most significant dewatering effort will be required at Westend (147m saturated thickness), Talisman 2 (49m saturated thickness) and MM4-6 (50m of saturated thickness).

The mine plan contains 30 periods with a corresponding period start date. The first 19 periods represent quarterly time steps commencing from 1 March 2020 to 1 September 2024 (Period 19). From Period 20

[1] Note the term Eliwana is also a geographic location used to describe the western half of the greater Eliwana Mining Project area.

commencing 1 December 2024 the mine plan is in annual increments up to Period 30 commencing 1 December 2034. It is assumed the end of mine life is 1 December 2035. A summary of the mine plan fundamentals for the dewatering assessment are provided in Table 1.

Table 1: Eliwana Mining Project preliminary mine plan dewatering summary

Pit Name	Pre Mining SWL (m RL)	Minimum Bench (m RL)	Saturated thickness (m)	Pit Start date	BWT intersected date	Approximate Start of dewatering[2]
BROADWAY EAST	459	435	24	1 Mar 2020	1 Mar 2023	1 Mar-2022
BROADWAY WEST	393	363	30	1 Dec 2026	1 Dec 2028	1 Dec 2027
EAGLES_NEST	510	492	18	1 Jun 2024	1 Dec 2031	1 Dec 2030
MM4-6	500	450	50	1 Dec 2032	1 Dec 2033	1 Dec 2032
TALISMAN 2	475	426	49	1 Dec 2020	1 Dec 2022	1 Dec 2021
WESTEND	457	310	147	1 Mar 2020	1 Dec 2029	1 Dec 2026
WESTSIDE	474	456	19	1 Jun 2021	1 Sep 2024	1 Sep 2023

4.0 WATER DEMAND

An estimate of water demand per mining period was supplied by Fortescue as part of the Prelim Mine Plan (04-05-2017).xls. Water is required for dust suppression, dry processing facilities and mine camp / potable supply throughout the mine life. A wet processing water demand commences from 2024. Early mine construction water demand is required at start-up (2019/20) and for the construction of the proposed wet process plant in 2023 / 24. As such, water demand comprises annual variations and ranges from a minimum of 4GL/a up to a peak of 6.2GL/a in 2024 and 2025. Figure A presents the annual demand in graphical format with a comparison of the different demand sources.

At this preliminary stage no allowance has been made for daily variation in demand and the supply demand simulated represents an average daily demand based on the estimated annual cumulative demand provided by Fortescue.

[2] Time has been estimated assuming the final date of in pit mining is based on whether the next period in the plan represented a quarterly or annual step, however better definition of mine plan dates would be preferable. Where the plan instantaneously commences a pit BWT; pre dewatering at a rate of 25m per annum is assumed.

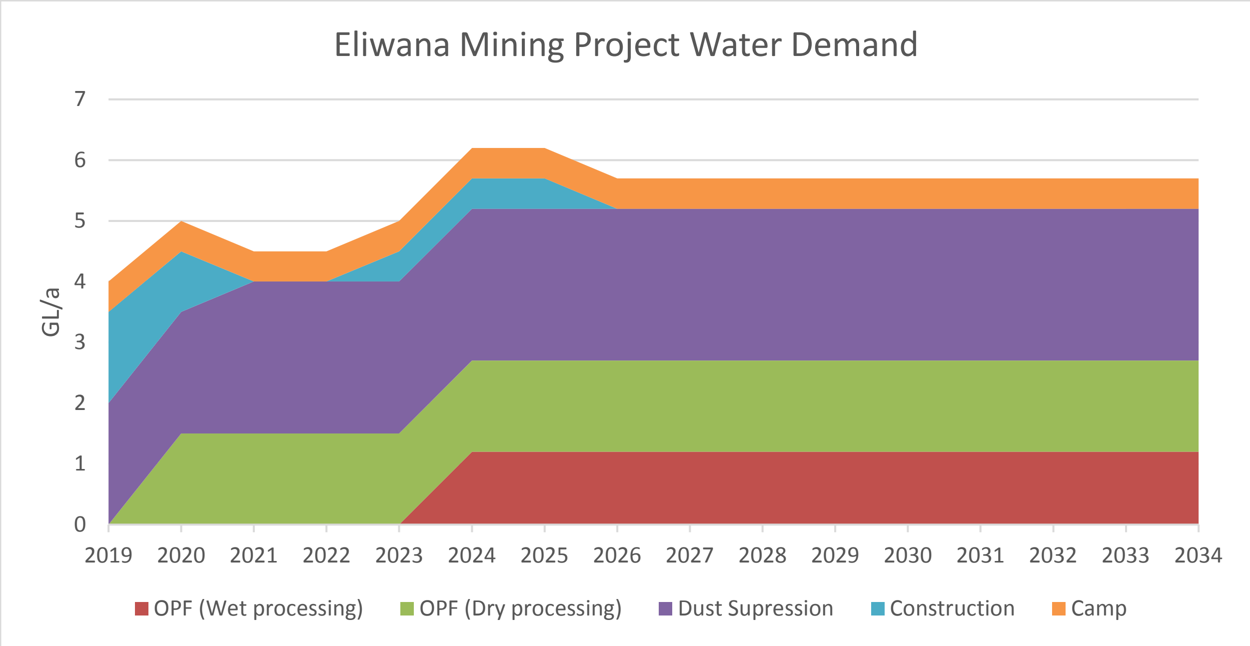

Figure A: Estimated annual water demand and sources of demand

5.0 MODELLING APPROACH

The predictive transient groundwater modelling was carried out using the parameters within the calibrated steady state groundwater model as described in the model development and calibration report (Golder, 2017b). The transient version of the model was run with a total of 6209 days (17 years) between 01/01/2019 and 01/01/2036. The approach to the dewatering and water supply strategy represented within the numerical model was dictated by the following aspects:

- BWT Marra Mamba ore bodies can be dewatered from ex pit production bores targeting down dip or adjacent permeable hydro stratigraphy (the “Wittenoom Aquifer”).
- BWT Brockman Iron Formation ore bodies are isolated by low permeability banded iron, shale or dolerite and can only be dewatered from in pit production bores.
- All bores were assumed to have a peak yield in the order of 25L/s for all modelling scenarios. In practise, local variations in hydraulic conductivity may allow for higher or lesser bore yields. This variability can only be resolved following the installing of dewatering or water supply bores, as such any borefield design or recommendations contained in this report are conceptual only.
- Model pumping water levels were set at a minimum of 15m above the base of the bore design allowing for head above the pump and length of the pump for practical consideration in the design of the borefield.
- Water supply demand precedes dewatering need for the vertical pit advance given the depth to water table. However, water supply was sourced from those areas adjacent to or within pits that do require dewatering to deliver early dewatering advantages / optimisation of mine plan.
- Modelled pumping to meet water supply demand was assigned to existing water supply bores FFPB001 and FFPB002 in addition to a series of proposed bores within the 517/519 groundwater sub catchment. This sub catchment was chosen for the following reasons:

  - Based on the data available, this sub catchment is relatively large (i.e. spans an east to west length of approximately 12 km along the valley) which would therefore correspond with a comparatively large storage volume compared with other sub catchments.
  - It is located between two proposed below water table pits which could reduce the cost of transferring water since pipelines will be required to service the dewatering bores in the area
  - This sub catchment lies in an approximate surface water divide where Pinara Creek drains to the west and tributaries to the Boolgeeda Creek drain to the east. The depth to groundwater is typically > 40 m bgl which corresponds with reduced risk of impacting groundwater dependent ecosystems (GDE's) through groundwater drawdown.
- Where possible, proposed ex-pit bores used for dewatering pits have been utilised beyond the mining period to make up any shortfall in water supply demand. This approach has been used in particular at Broadway West and Talisman.
- Notwithstanding the above, dewatering of the Westend pit is expected to be problematic owing to the proposed vertical advance rate BWT at the end of mine life. The practical realities of operating the number of bores required in a deep narrow pit in high permeability strata will require detailed operational planning during mining.
- Utilisation rates for production bores were assumed to be 90% for bores located ex pit or in pit prior to mining activities. In pit bores operated coincident with mining activities were assumed to have 50% utilisation.
- Ex pit bores were operated in preference to in pit bores for water supply up until or unless dewatering was required to meet pit plan vertical advance rates.

Pumping wells were represented in the model using the well boundary condition of FEFLOW. A summary of the locations and depths of dewatering and water supply bores is provided in Table 2 and shown in Figures 2 to 5. A copy of the modelled abstraction regime for each of the modelled scenarios, is provided in Appendix A.

The definition of a well type boundary in 3D heterogeneous aquifers under confined and unconfined conditions requires a general formulation to model the effects of well bore storage and vertical hydraulic gradients along the well bore in a more realistic way. The multilayer, FEFLOW Well Boundary Condition is an efficient and accurate method for handling well bore conditions in 3D aquifer systems comprising multiple layers.

5.1 Sensitivity

Sensitivity analyses were performed to compare model outputs with different sets of reasonable model parameter estimates during model predictions involving transient scenarios. Given the lack of temporal groundwater level observations or significant stresses applied to the groundwater flow system the transient model for dewatering predictions incorporates significant uncertainty with respect to storage parameters. Given the above, the focus of sensitivity analyses has been on the specific yield of the target dewatering and water supply strata. As the established conceptual understanding comprises isolated groundwater sub catchments, model predictions of dewatering volume will be relatively insensitive to hydraulic conductivity as groundwater through flow between sub catchments is insignificant in comparison to groundwater storage.

Specific yields derived from aquifer testing ranged over two orders of magnitude from $1x10^{-3}$ to 0.07 (Golder, 2017b). A number of models were built to test sensitivity to the specific yield within the mineralised Brockman and Wittenoom aquifers. The modelling conducted comprised of the following;

- The Base case model (Scenario 1) assumed specific yield of 3%.
- The conservative water supply case (Scenario 2) assumed a specific yield of 1%.
- The conservative dewatering case (Scenario 3) assumed a specific yield of 7%.

Predicted groundwater volumes derived from dewatering and water supply were compared against the estimated demand for each scenario and the results are presented in Section 7.

A summary of the production bores used within the simulations is provided in Table 2. The well pumping input schedule for each scenario is presented within Tables 3 to 5.

Table 2: Proposed and Existing Dewatering and Water Supply Bore Details

Bore Name	Status	Bore Type	Aquifer	Easting mE GDA z50	Northing mN GDA z50	Drill depth (m bgl)
502_1	Proposed	Water Supply	Wittenoom	489980	7513185	89
502_2	Proposed	Water Supply	Wittenoom	491450	7513350	92
519_1	Proposed	Water Supply	Wittenoom	495260	7513040	97
519_2	Proposed	Water Supply	Wittenoom	497075	7512000	149
519_3	Proposed	Water Supply	Wittenoom	498773	7511571	148
519_4	Proposed	Water Supply	Wittenoom	500818	7511095	144
519_5	Proposed	Water Supply	Wittenoom	502544	7510667	143
519_6	Proposed	Water Supply	Wittenoom	504407	7509951	141
Broadway West 1	Proposed	Dewatering	Wittenoom	470911	7516511	93
Broadway West 2	Proposed	Dewatering	Wittenoom	471458	7516480	93
Broadway East 1	Proposed	Dewatering	Wittenoom	480184	7514041	112
Broadway East 2	Proposed	Dewatering	Wittenoom	480710	7513637	112
Eagles Nest	Proposed	Dewatering	Wittenoom	493025	7513340	93
EWPB003	Existing	Dewatering	Brockman	484771	7513231	123
EWPB004	Existing	Dewatering	Brockman	484995	7513688	162
EWPB006	Existing	Dewatering	Brockman	481396	7513603	77
EWPB05R^	Proposed	Dewatering	Brockman	483001	7511832	247
EWPB07R^	Proposed	Dewatering	Brockman	482606	7512508	269
FFPB001	Existing	Water Supply	Wittenoom	522380	7511026	94
FFPB002	Existing	Water Supply	Wittenoom	516324	7509684	91
MM4-6_1	Proposed	Dewatering	Wittenoom	506430	7510170	89
MM4-6_2	Proposed	Dewatering	Wittenoom	507600	7510000	89
MM4-6_3	Proposed	Dewatering	Wittenoom	508456	7509561	88
Talisman 1	Proposed	Dewatering	Wittenoom	484492	7513921	162
Talisman 2	Proposed	Dewatering	Wittenoom	485690	7513690	165
Talisman 3	Proposed	Dewatering	Wittenoom	484764	7513807	164
Westend 1	Proposed	Dewatering	Brockman	482915	7511647	240
Westend 2	Proposed	Dewatering	Brockman	482555	7512310	257
Westend 3	Proposed	Dewatering	Brockman	482800	7512380	260
Westend 4	Proposed	Dewatering	Brockman	482390	7512590	269
Westside	Proposed	Dewatering	Brockman	486164	7512688	135

*PWL – pumping water level, ^ R- denotes replacement to be drilled deeper than original bore. Orange highlighting indicates bores used only in Scenario 2. Blue highlighting indicates bores used only in Scenario 3

6.0 RESULTS

6.1 Scenario 1: Base Case

The Base Case (Scenario 1) model assumed a generic specific yield of 3% for both the mineralised ore and weathered dolomite. All other parameters were consistent with the steady state model solution presented in Golder (2017c). The schedule and location of existing and hypothetical wells to meet dewatering and water demand are provided in Figures 2 to 5 and Appendix A. The model predicted volume derived from the borefield compared against estimated demand is provided in Figure B. The tracking points depict the change in groundwater level over time against the coincident mine plan vertical advance rate for each pit in Appendix B.

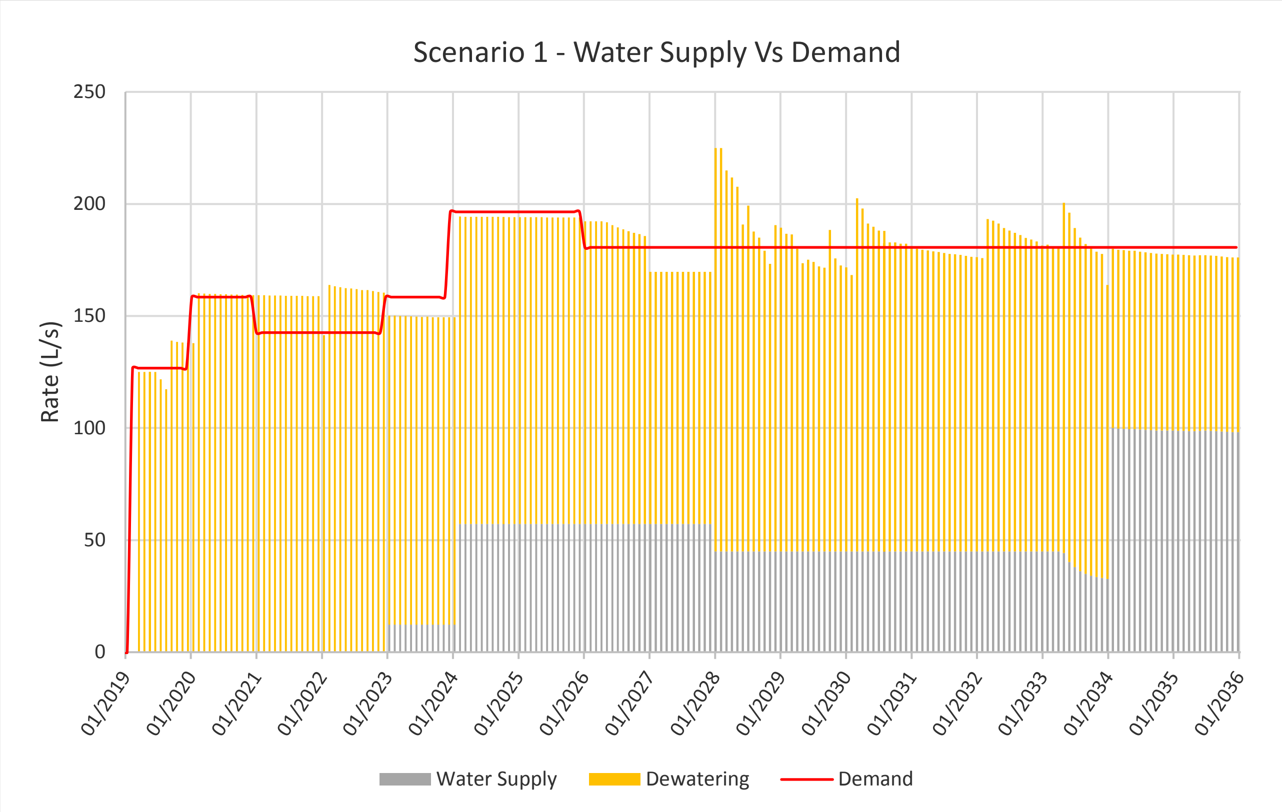

Figure B: Scenario 1 model predicted dewatering and water supply volume

Water supply needs are met initially from early dewatering focussed on Talisman 2, Broadway East, Broadway West and Westside pits. At Talisman, Broadway East and Broadway West dewatering is applied assuming ex pit dewatering bores located adjacent to the southern pit wall. Westside pit comprises one in pit bore prior to mining commencement and is required to drawdown pit groundwater levels ~25m within the isolated Westside pit.

The commencement of dewatering of Broadway West from late 2019 is up to 2 years premature with respect to the pumping required to meet the mining plan. This has been done to meet what would otherwise be an approximate shortfall in water demand of around 20 L/s. This approach also has the advantage that it will allow early data to be collected pertaining to aquifer properties in an area which has not yet been tested (groundwater sub catchment 397 m AHD). This pumping also contributes to early dewatering of the Broadway West pit.

Pumping from ex-pit bores at Talisman and Broadway East have been modelled to continue through to early 2028 although the mine plan indicates these pits will be completed by the end of 2023. This has been done with the intent of utilising existing bores, pipe and pump infrastructure to provide around 90 L/s during a period where a significant shortfall of water supply is predicted. This occurs because the water demand rises to between 180 and 200 L/s over this period and bringing forward (advance dewatering) of the Westend pit would not be sufficient to meet the shortfall. A similar, sustained abstraction, from dewatering bores at MM4-6 and Eagles Nest have been modelled from 2032 and 2034 (after mining is completed) to contribute between 25 and 50 L/s to the water supply.

In addition to the pumping from dewatering bores described above, there will still be a need to meet a shortfall in water supply of between 20 and 100 L/s from early 2023 to the end of the life of mine. The modelling results indicate that this shortfall could be met by pumping from the two existing bores at Flying Fish (FFPB001 and FFPB002) and three bores located in the catchments to the east of the Talisman Pit (groundwater sub catchment 502 m AHD and 519 m AHD). The proposed new water supply bores are named 502_1, 502_2 and 519_1, their locations are shown in Figure 3 and Figure 4.

A breakdown of the model results based on water supplied by dewatering bores from each pit is shown in Figure C.

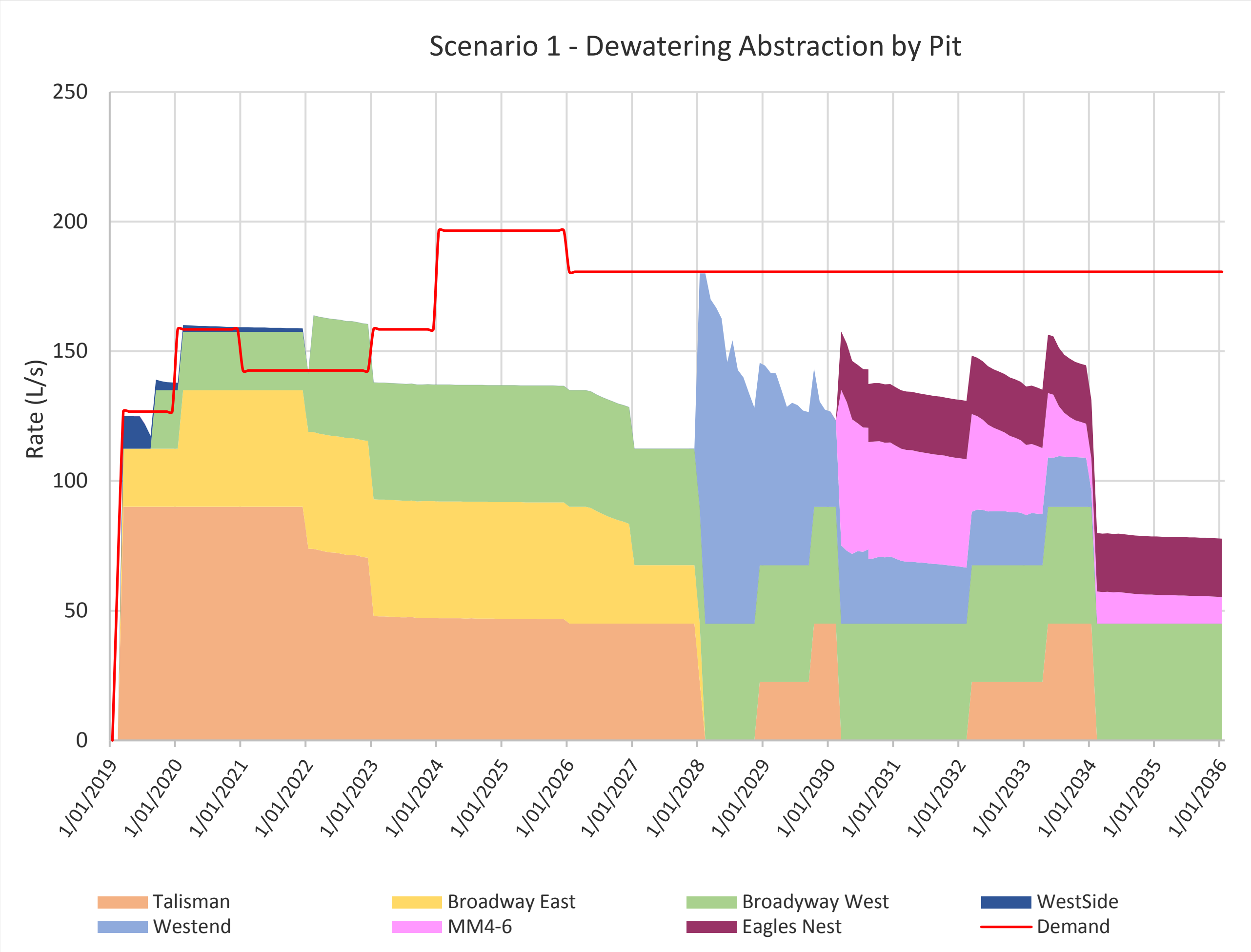

Figure C: Dewatering required from individual below water pits against estimated demand - Scenario 1

The use of existing dewatering bores to meet some of the water deficit predicted by dewatering abstraction alone is considered a reasonable option from a cost efficiency perspective (using existing infrastructure), and also to minimise the potential spatial extent of groundwater level drawdown impacts. More directly, if the number of groundwater sub catchments from which water is taken is minimised, this will reduce the risk of potential impacts. Despite this, there may be operational influences which mean this approach is not practicable and in this case, external groundwater sub catchments (to those with pits) will need to be used to meet water demand. As discussed for Scenario 2 (Section 6.2), if this is the case, the deficit in water supply estimated based on the minimum dewatering simulated in Scenario 1 could be met by water supply borefields in groundwater sub catchments 502 m AHD and 519 m AHD.

Based on the results of the Scenario 1 modelling simulations, approximately 76 % of the dewatering demand could be pumped from dewatering bores and the remaining 24 % from water supply bores. The Scenario 1 version of the model indicates that under the base case specific yield conditions, there would be no requirement to dispose of excess water on a long term continual basis. However the modelling carried out does not consider the daily variability of demand which may be effected by shutdowns, poor weather or other operational factors and therefore a contingency for short term disposal or retention of excess water should be identified.

6.2 Scenario 2: Low Specific Yield

The Scenario 2 model assumed a generic specific yield within both the mineralised ore and weathered dolomite of 1%. This is a conservative case with respect to identifying whether the water supply demand can be met if low storage conditions prevail, and to provide an estimate of the numbers of bores which may be required. All other parameters were consistent with the steady state model solution presented in Golder (2017c).The schedule and location of existing and hypothetical wells to meet dewatering and water supply demand are provided in Figures 2 to 5 and Appendix A. The model predicted volume derived from the borefield compared against estimated demand is provided in Figure D.

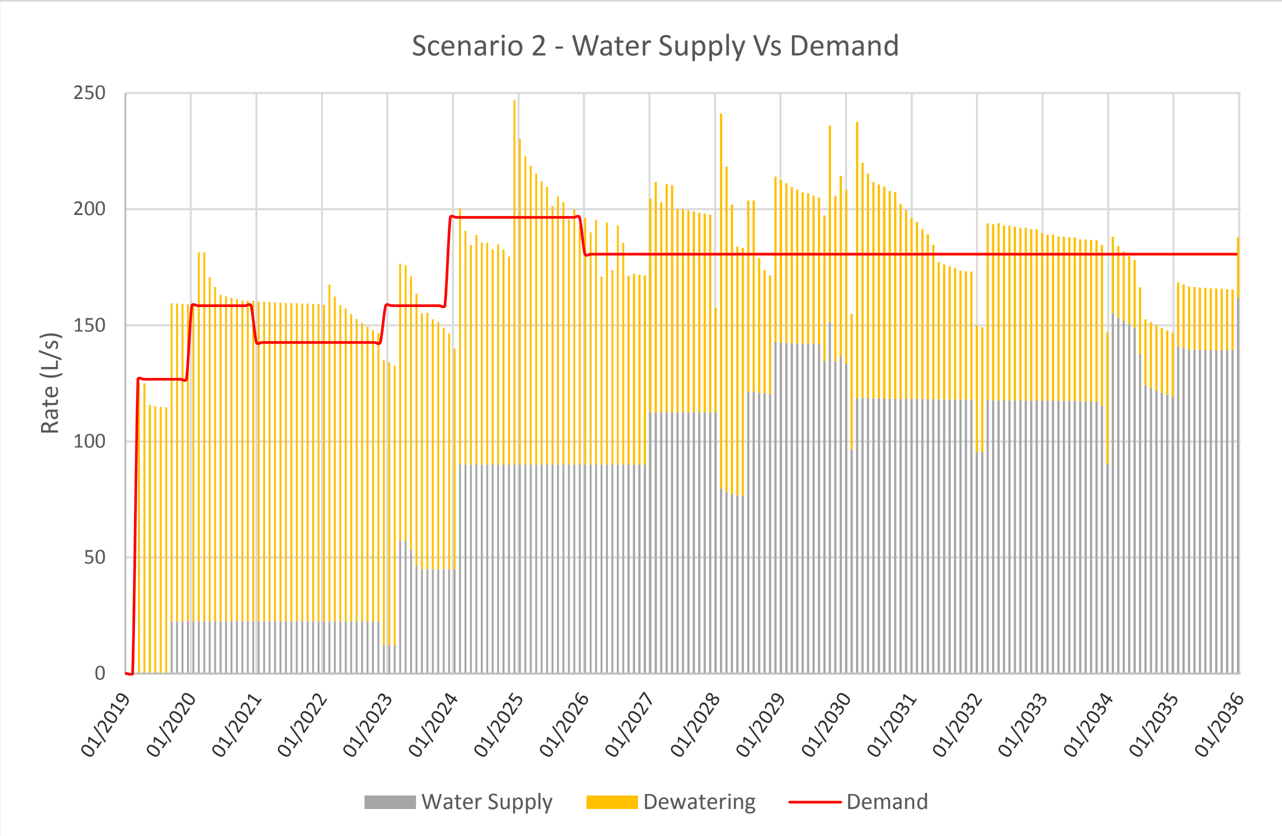

Figure D: Scenario 2 model predicted dewatering and water supply volume

Based on the results of the Scenario 2 modelling simulations approximately 49 % of the total project water demand could be pumped from dewatering bores and the remaining 51 % would need to be sourced from water supply bores. However, the proportion of water which will need to be sourced from water supply bores is not constant and increases steadily throughout the life of mine. Initially (between 2019 and 2024) the demand which would need to be met by water supply bores is around 40 to 50 L/s (around 35%), however this increases to between 80 and 120 L/s (around 55%) between 2024 and 2032. Between 2032 and the end of mining, up to 160 L/s could be required from water supply bores which is around 90% of the total demand.

The Scenario 2 model run which achieved both dewatering of the proposed below water table pits and met the project water demand, required an additional 5 water supply bores to be used, spread at approximately 1.5 km intervals along the valley within the 519 m AHD groundwater catchment. The locations of these proposed, modelled bores are shown in Figure 3 and Figure 4. Therefore, if the low specific yield conditions were to prevail within the Project aquifers, it is estimated that a water supply borefield consisting of two bores at Flying Fish (FFPB001 and FFPB002) and eight bores within groundwater sub catchment 502 and 519 m AHD would be required to meet the project water demand.

A breakdown of the model results based on water supplied by dewatering bores from each pit is shown in Figure E.

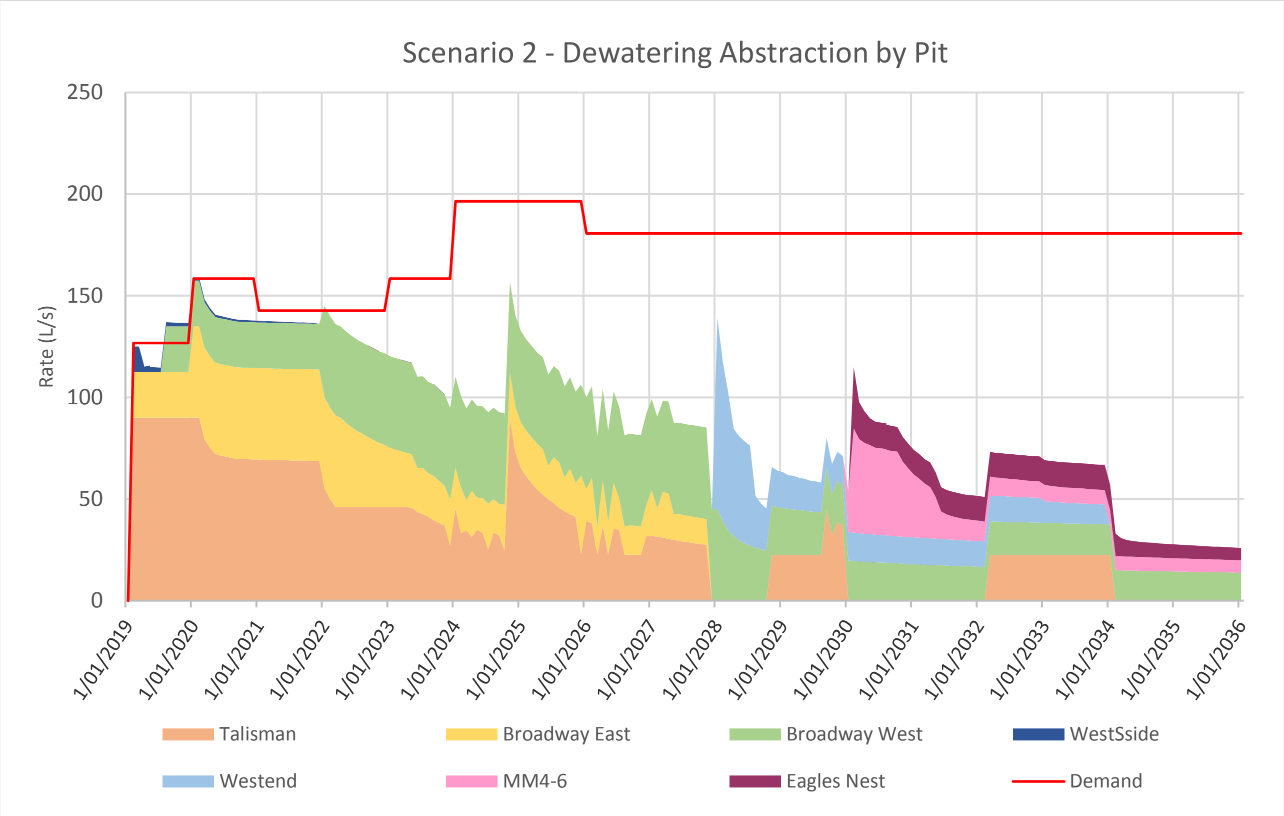

Figure E: Dewatering required from individual below water pits against estimated demand - Scenario 2

6.3 Scenario 3: High Specific Yield

The Scenario 3 model assumed a generic specific yield within both the mineralised ore and weathered dolomite of 7%. This is a conservative case with respect to dewatering requirements. All other parameters were consistent with the steady state model solution presented in Golder (2017c).The schedule and location of existing and hypothetical wells to meet dewatering and water supply demand are provided in Figures 2 to 5 and Appendix A. The model predicted volume derived from the borefield compared against estimated demand is provided in Figure D.

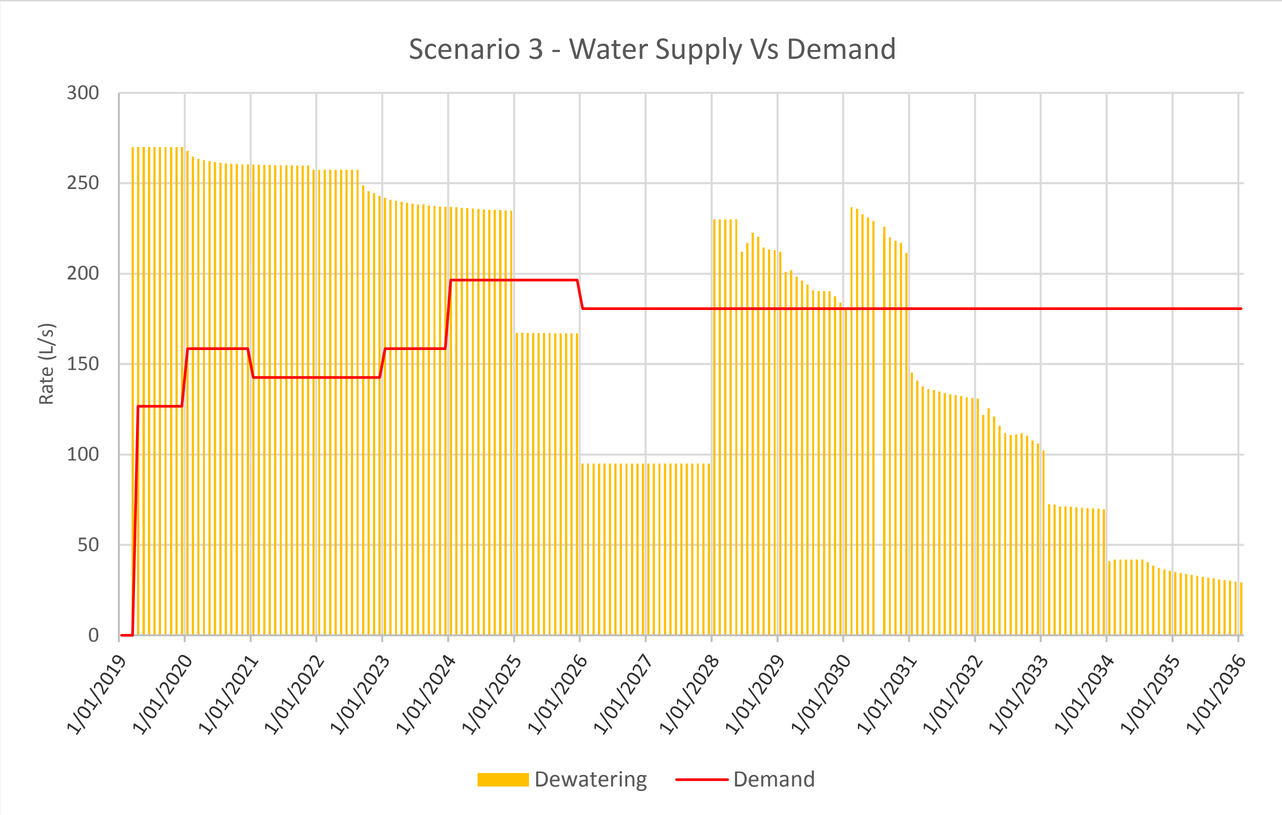

Figure F: Scenario 3 model predicted dewatering rates compared with water demand

The results of Scenario 3 model indicate that if the higher specific yield conditions prevail within the Project's ore bodies, dewatering rates could exceed project water demand by between 40 and 140 L/s between 2019 and the start of 2025. During this period an estimated 16.5 GL of excess water could be produced which would need to be managed either by managed aquifer recharge or discharge to the environment. A further 2.6 GL surplus is predicted between 2028 and the end of 2030 however, commencement of dewatering at Westend and MM4-6 earlier than simulated by the Scenario 3 model runs (i.e. from 2025) could help to balance the deficit predicted between 2025 and 2028.

The total deficit in the water demand across the modelled period is estimated to be around 22.5 GL. Therefore, if all surplus water could be retained through managed aquifer recharge into groundwater sub catchments with no below water table pits, this volume of water could be reused for water supply later in the life of mine when a water deficit is apparent. This would still leave an estimated deficit of around 3.2 GL towards the end of the life of mine. Although not specifically modelled in Scenario 3, this shortfall of water towards the end of the life of mine could easily be met under high storage conditions using the dewatering infrastructure installed to dewater the early life of mine pits, dedicated water supply bores or a combination of both.

The cumulative dewatering rates for the early period of mining (2019 to 2025) required to dewater Talisman, Broadway East, Broadway West and Westside pits are estimated to be up to 270 L/s. This is difficult to avoid under high specific yield conditions since early dewatering is required to achieve the required groundwater level drawdown at final pit depths in 2023 (Talisman and Broadway East) and 2025 and 2029 (Broadway West and West End). It was necessary to commence dewatering these pits from the start of mining in 2019 to achieve the necessary drawdown.

A breakdown of the model results based on water supplied by dewatering bores from each pit is shown in Figure G. An additional dewatering bore was required at both Talisman (Talisman 3 in Figure 3) and Broadway East (Broadway 2 in Figure 3) to achieve the groundwater level drawdown required to meet the mining plan.

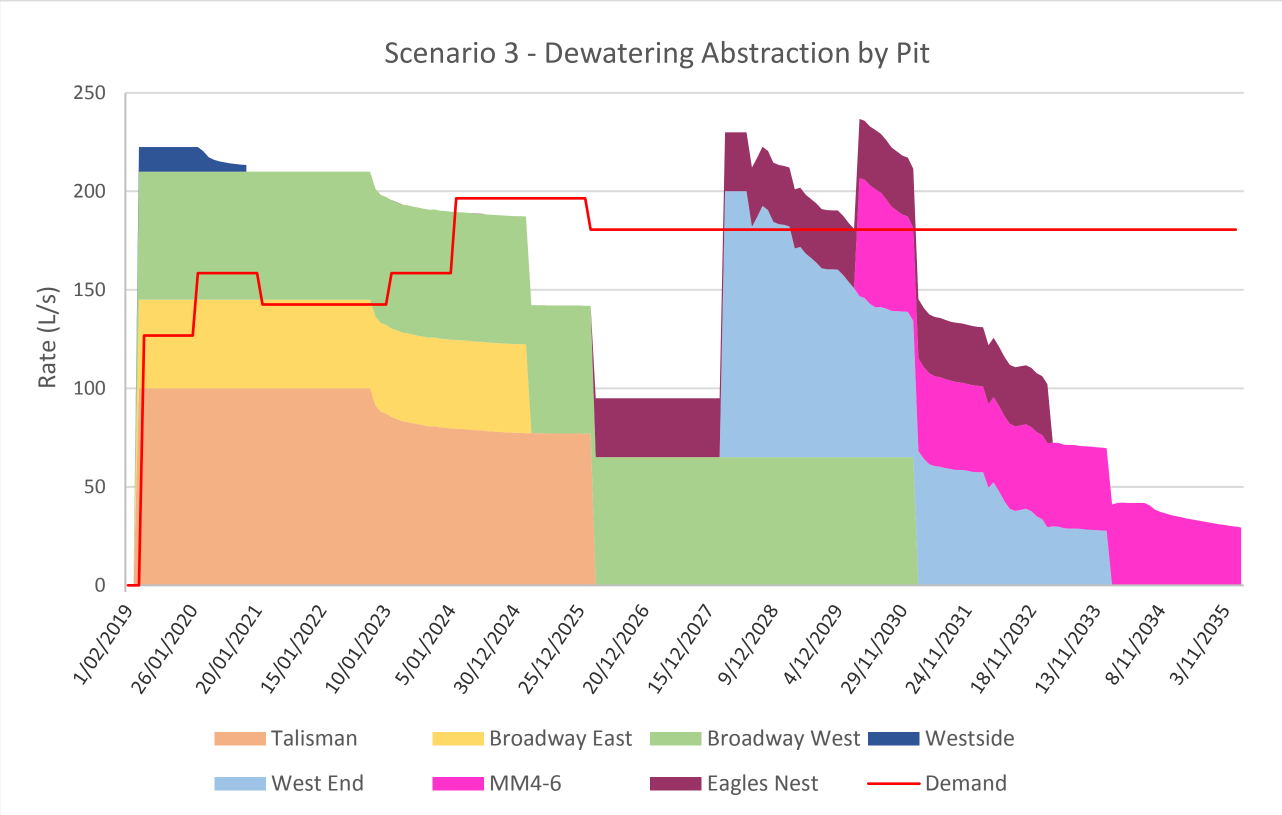

Figure G: Dewatering required from individual below water pits against estimated demand - Scenario 2

6.4 Summary

Table 3 provides a summary of the results of modelling for the three scenarios with respect to meeting the mine plan and project water demand for the life of mine.

Table 3: Summary of Simulated Water Balance for All Scenarios by Rate (L/s)

<table>
<tr><th>Z</th><th>2019</th><th>2020</th><th>2021</th><th>2022</th><th>2023</th><th>2024</th><th>2025</th><th>2026</th><th>2027</th><th>2028</th><th>2029</th><th>2030</th><th>2031</th><th>2032</th><th>2033</th><th>2034</th><th>2035</th><th>2036</th></tr>
<tr><th>Scenario/(Sy)</th><th colspan="18">Water Balance</th></tr>
<tr><td>1 (3%)</td><td colspan="5">0 L/s</td><td>-10 L/s</td><td colspan="10">-45 to -55 L/s</td><td colspan="2">-100 L/s</td></tr>
<tr><td>2 (1%)</td><td>0 L/s</td><td colspan="3">-25 L/s</td><td>-50 L/s</td><td colspan="13">-90 to -120 L/s</td></tr>
<tr><td>3 (7%)</td><td colspan="5">+100 to +140 L/s</td><td colspan="2">+40 L/s</td><td colspan="3">-20 to -85 L/s</td><td colspan="2">+40 L/s</td><td colspan="2">-50 L/s</td><td colspan="2">-100 L/s</td><td colspan="2">-145 L/s</td></tr>
</table>

Dewatering Supply = Water Demand
Dewatering Supply Deficit
Dewatering Supply Surplus

Table 4: Summary of Simulated Water Balance Volumes

<table>
<tr><th>Scenario</th><th>Total Demand (GL)</th><th>Total Dewatering (GL)</th><th>Water Supply (GL)</th><th>Deficit /Surplus (GL)*</th></tr>
<tr><td>1</td><td rowspan="3">92</td><td>71</td><td>22</td><td>+1</td></tr>
<tr><td>2</td><td>67</td><td>27</td><td>+2</td></tr>
<tr><td>3</td><td>91</td><td>0</td><td>-1</td></tr>
</table>

* This is an indicator of the error in the ability to manipulate the model with various pumping schedules and is not indicative of an actual project surplus/deficit

7.0 MANAGEMENT OF SURPLUS WATER

One option for managing the surplus of water identified early in the life of mine (Scenario 3) could be to inject/infiltrate the water into a separate groundwater sub catchment where no below table pits are required. Due to their proximity to the mine pits and relatively deep water table groundwater sub catchments 502 and 519 m AHD are considered reasonable options for reinjection of surplus water. An analytical assessment of the potential volume of water which could be stored in these sub catchments on a conceptual basis is presented in Table 5.

Table 5: Estimate of Storage Capacity for Groundwater Sub Catchments

Groundwater Sub Catchment	Estimated Area (km^2)	Volume of Surplus Water (GL)	Specific Yield	Water Level Rise (m)
502	8.7	16.5*	1%	191
			3%	63
			7%	27
517/519	27.4		1%	60
			3%	20
			7%	9

*Assumes that 2.6 GL of predicted surplus between 2028 and 2031 can be avoided by early dewatering

The results of these basic calculations indicate that the 517/519 catchment is the most suitable option for storage of surplus water by managed aquifer recharge, however this is based purely on a storage basis and does not take into account other aquifer properties such as transmissivity and boundary conditions for which very little data is available. Groundwater level rises predicted in Table 5 are likely to be significant underestimates of the groundwater mounding at the location of injection/infiltration points as it assumes completely efficient transmission of the water within the aquifer across the sub catchment which will not occur. These preliminary calculations indicate that only under high specific yield conditions (7%), reinjection of the surplus groundwater into the 517/519 catchment could be significantly less than the average depth to groundwater below surface (i.e. 9 m vs >40 m allowing for much greater localised mounding at recharge points).

8.0 DISCUSSION

The predictive model scenarios presented highlight the following key issues for consideration.

8.1 Sensitivity and Uncertainty

- The modelling results are sensitive to changes in the bulk specific yield applied to the mineralised ore bodies and weathered dolomite aquifers. The outcomes of the dewatering modelling have a relatively significant range in implications for water management for the project (i.e. 145 L/s max .deficit vs 140 L/s max. surplus).
- The modelling carried out to date only considers varying the parameters consistently across the entire model, however it is possible that these parameters may have a similar degree of variability between groundwater sub catchments. Further investigating the project water management implications of such variability would present a significantly complex and convoluted set of permutations and would be unlikely to add value to results of the modelling exercise (in the absence of further collection of field data).
- To reduce the uncertainty in estimating specific yield the other significant factor is the proof of concept for the hydraulic boundaries of each sub catchment as dictated by geological structure, i.e. location of dolerite dykes, presence of strike slip faults. Detailed mapping and structural geology interpretation of the area could greatly enhance the predictive reliability of the groundwater model (and the predictions described herein) for the Eliwana Mining Project.

- Detailed geology mapping and interpretation in combination with additional aquifer testing of the area suggested for managed aquifer recharge (groundwater sub catchments 502 and 517/519 m AHD) would be required to obtain a reasonable degree of confidence in this management option. Whilst the groundwater sub catchment 517/519 m AHD is attractive from the perspective of overall area available for groundwater storage, there remains some uncertainty over the possible presence of additional geological structures/dykes further compartmentalising the area.
- While sensitivities to the hydraulic conductivity of the weathered dolomite and mineralised ore bodies as defined by Golder (2017b) have not been performed, they may be somewhat less important to dewatering predictions given the conceptual model. That is a higher hydraulic conductivity might make dewatering more effective in each sub catchment and potentially mitigate the number of wells required. A lower hydraulic conductivity will have a negative effect, requiring more wells be installed and taking longer to effectively dewater an area. The most important parameter for reducing water management uncertainty is estimating specific yield, although this needs to be verified.
- The inclusion of the area west of Broadway, Broadway West, has presented some conceptual knowledge gaps with respect to the location and appropriate boundary condition required for the model's western boundary. It is likely that another dolerite dyke occurs somewhere west of Broadway West pit but there is an absence of monitoring data to confirm where this boundary may occur. As such the predictions for dewatering of Broadway West have a lower reliability (and higher uncertainty) than other areas of the model.

8.2 Dewatering Efficiency

- Tracking point hydrographs provided in Appendix B indicate that dewatering the Westend pit is unlikely to be effective in depressurising surrounding low permeability strata such as the southern wall Weeli Wolli Formation or Yandicoogina Shale, the internal dolerite sill or the north wall Mount McRae Shale. Although drawdowns appear to occur in the latter, this is likely in response to the dewatering occurring to the north in the valley associated with Broadway East and Talisman below water table pits. It is difficult to comment on the need for depressurisation of these low permeability strata as there is currently no monitoring data available in these areas.
- The three scenarios presented deferred early dewatering of Westend pit in an attempt to defer the need for mining through and managing in pit bores given the significant depth to groundwater. However the total depth of drawdown required may demand dewatering to commence at a much earlier stage than presented to;
  - Ensure dewatering is affected ahead of mine plan.
  - Reduce the number of bores required in pit over all (late dewatering means larger volumes in a shorter period).

8.3 Groundwater Drawdown Impacts

- The dolerite dykes identified within the valley associated with the Wittenoom Formation are expected to act as effective barriers to the spread of drawdown along strike. This has the effect of mitigating drawdown impacts to those sub catchments that are targeted by dewatering or water supply. In essence they represent effective barriers to the spread of impacts, where drawdown impacts occur can be controlled by what sub catchments are selected for water supply and they mitigate the issue of cumulative impacts across tenement boundaries via containing the extent of drawdown.
- Groundwater level drawdown and the possible impacts caused to groundwater dependent ecosystems (GDE's) will be investigated as part of the impact assessment modelling to be carried out. It will be important to constrain the number of potential water management options and range of aquifer properties for consideration in the impact assessment to maintain a manageable set of outcomes.

9.0 REFERENCES

Golder (2017a), Dewatering, Near Mine and Flying Fish Water Supply Assessment – Basis of Study. Unpublished Report completed for Fortescue. Report number 1671484-001-R-Rev0, February 2017.

Golder (2017b), Eliwana Mining Project - Hydrogeological Conceptual Model Report. Unpublished Report for Fortescue. Report number 1671484-002-R-Rev1, December 2017.

Golder (2017c), Eliwana Mining Project – Numerical Groundwater Model Development and Calibration Report. Unpublished Report for Fortescue. Report number 1671484-003-R-Rev3, December 2017.

10.0 IMPORTANT INFORMATION

Your attention is drawn to the document titled – “Important Information Relating to this Report”, which is included in Appendix C of this report. The statements presented in that document are intended to inform a reader of the report about its proper use. There are important limitations as to who can use the report and how it can be used. It is important that a reader of the report understands and has realistic expectations about those matters. The Important Information document does not alter the obligations Golder Associates has under the contract between it and its client.

Report Signature Page

GOLDER ASSOCIATES PTY LTD

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Senior Hydrogeologist

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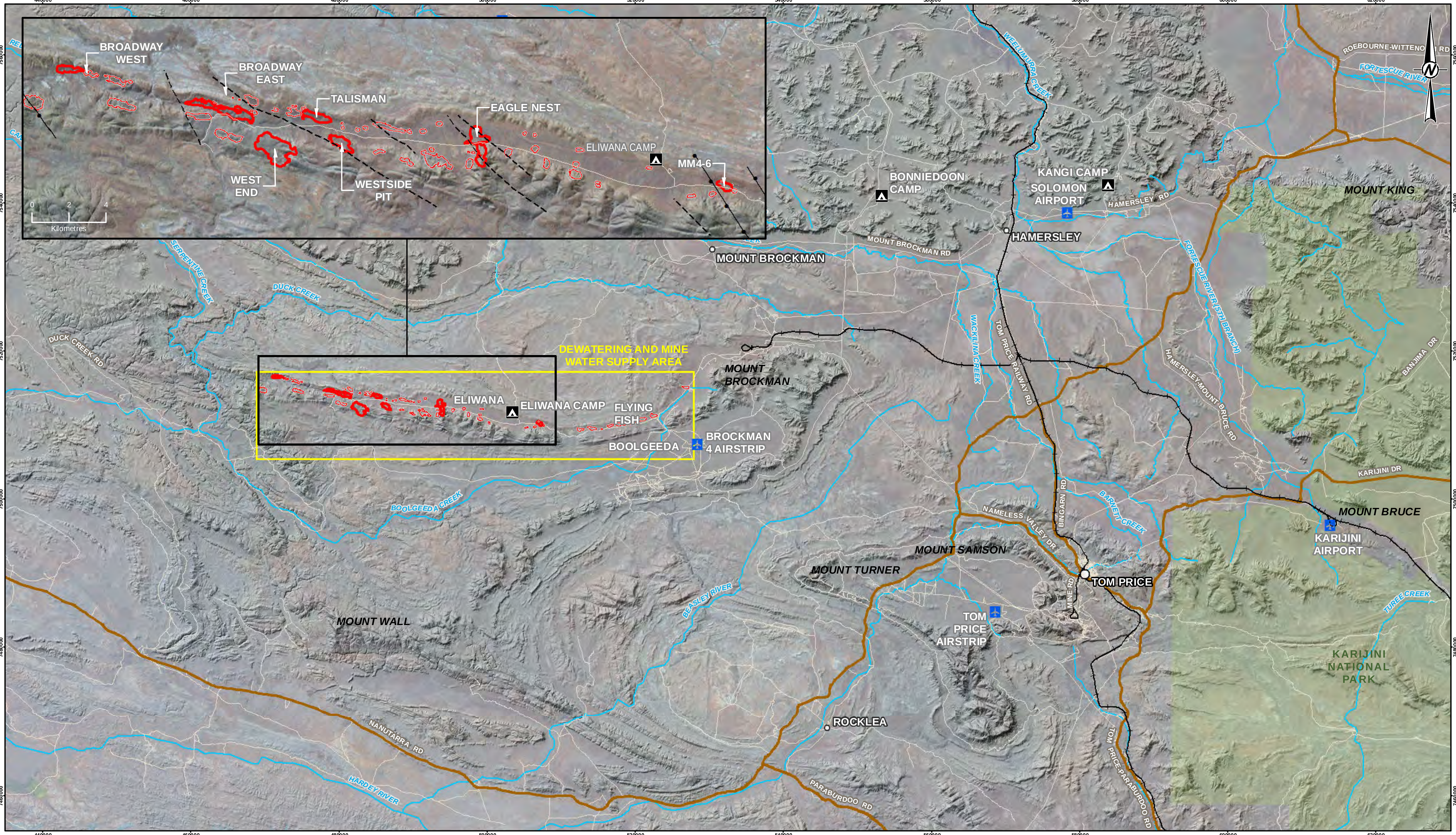
Principal Hydrogeologist

MJB/WD-AP/mjb

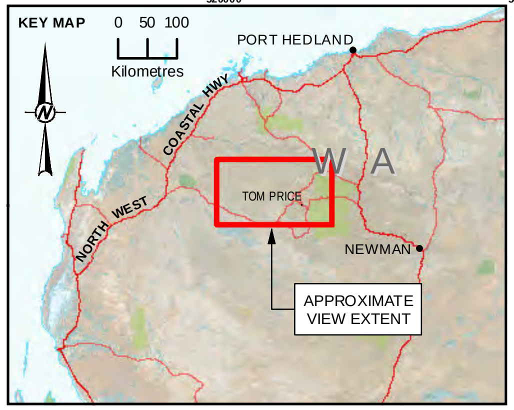
A.B.N. 64 006 107 857

c:\users\mjbartlett\desktop\final versions - copy\1671484-004-r-rev3 - dewatering and water supply assessment\1671484-004-r-rev3 - eliwana dewatering and water supply_fmgcomment.docx



LEGEND

- PIT SHELL BELOW GROUNDWATER TABLE
- PIT SHELL
- CAMP SITE
- AIRPORT / AIRSTRIP
- EXISTING RAIL
- MAIN ROAD
- ACCESS ROAD / TRACK
- DRAINAGE



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NOTE:
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REFERENCES:
1. ROADS © WESTERN AUSTRALIAN LAND INFORMATION AUTHORITY TRADING AS LANDGATE (2018)
2. INSET BASE DATA SOURCED FROM STREET PRO DATA 2009
3. AERIAL IMAGE AND TOPOGRAPHY SOURCED FROM GEOSCIENCE AUSTRALIA - ACRES LANDSAT MOSAIC
4. DRAINAGE © DEPARTMENT OF WATER

CLIENT
FORTESCUE METALS GROUP

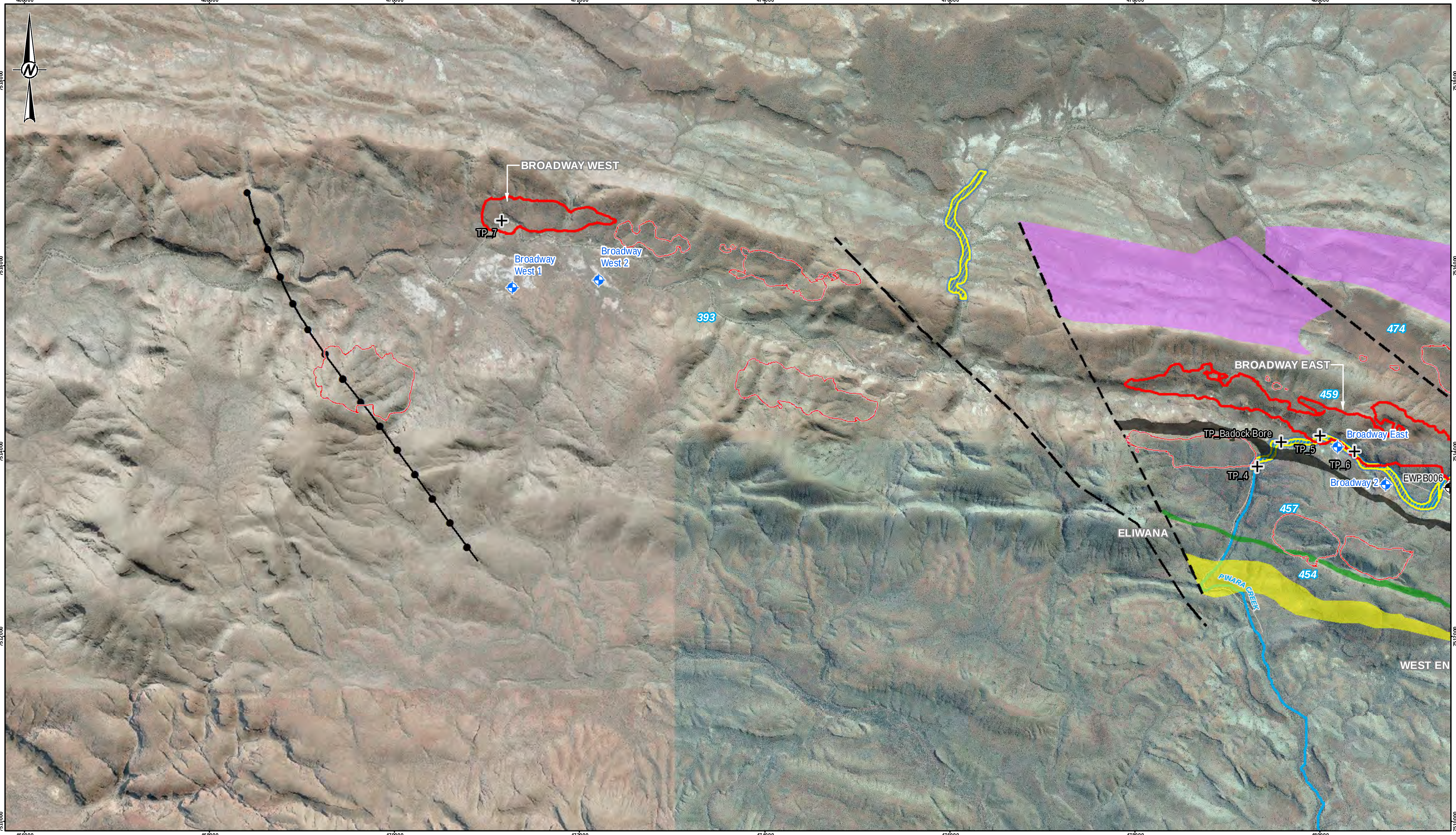
CONSULTANT
GOLDER

YYYY-MM-DD	2018-06-08
DESIGNED	MJB
PREPARED	MS
REVIEWED	MJB
APPROVED	MJB

PROJECT
ELIWANA MINING PROJECT - DEWATERING AND WATER SUPPLY ASSESSMENT

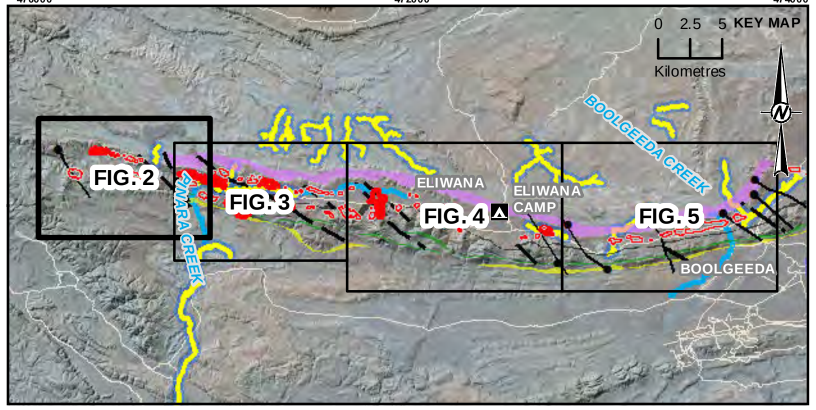
TITLE
PROPOSED ELIWANA MINING PROJECT LOCATIONS

PROJECT NO.	CONTROL	REV.	FIGURE
1671484	004 R	3	1



LEGEND

473 INTERPRETED GROUNDWATER LEVEL (m AHD)	CAMP SITE
PROPOSED WATER SUPPLY BORE	ACCESS ROAD / TRACK
EXISTING WATER SUPPLY BORE	MAJOR DRAINAGE
PROPOSED DEWATERING BORE	INTERPRETED DYKE
EXISTING DEWATERING BORE	INTERPRETED FAULT
TRACKING POINT	DOLERITE SILL
PIT SHELL BELOW GROUNDWATER TABLE	JEERINAH FORMATION
PIT SHELL	MOUNT MCCRAE SHALE
	YANDICOOGINA SHALE
	POTENTIAL GROUNDWATER DEPENDENT ECOSYSTEM (GDE)



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NOTE:
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CONSULTANT
GOLDER

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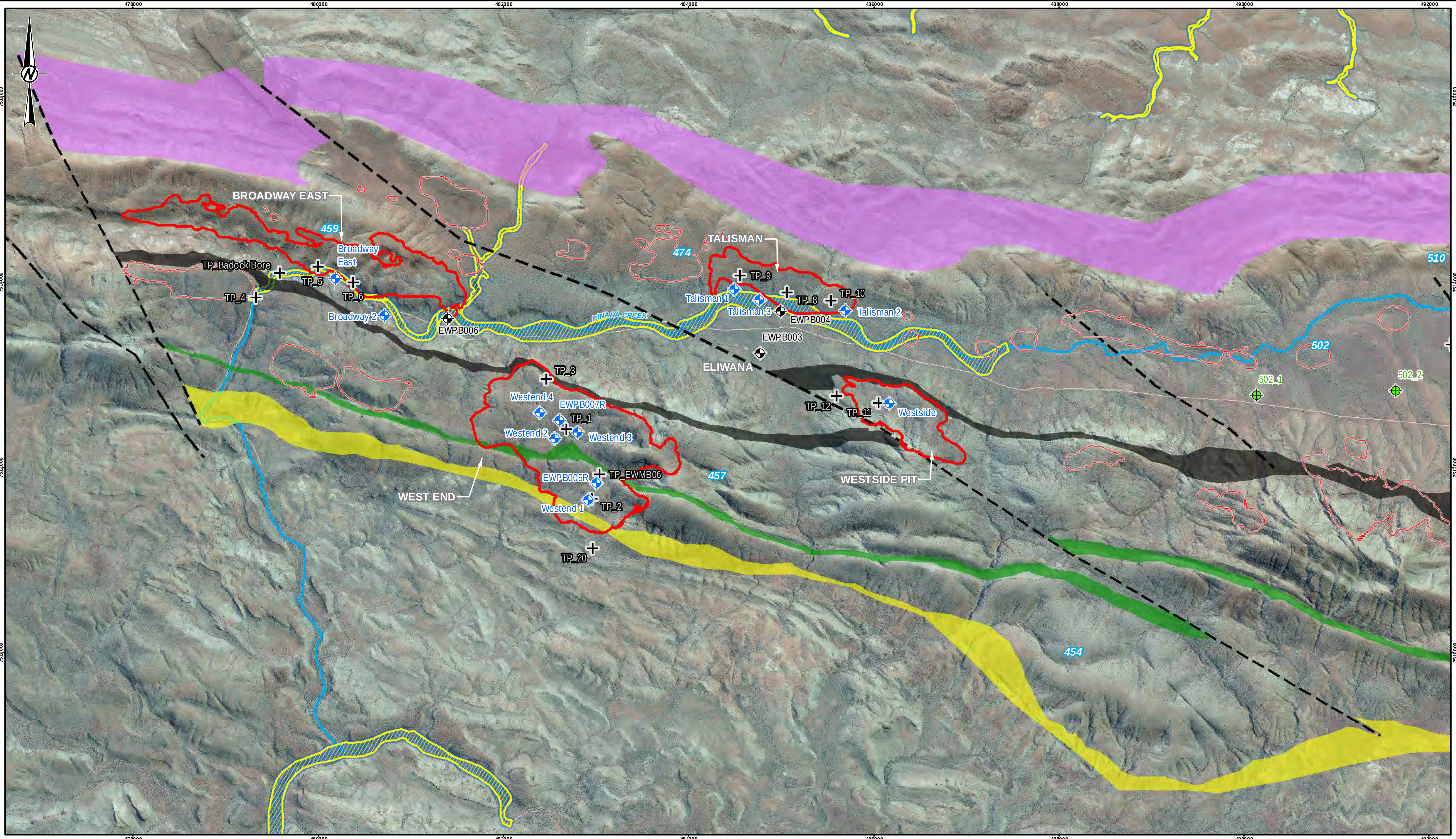
DESIGNED	MJB
PREPARED	MS
REVIEWED	MJB
APPROVED	MJB

PROJECT
ELIWANA MINING PROJECT - HYDROGEOLOGICAL CONCEPTUAL MODEL

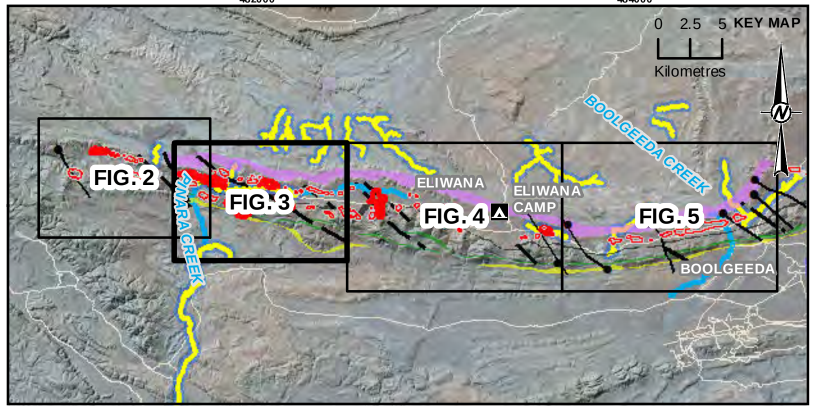
TITLE
GROUNDWATER MODELLING LOCATIONS

PROJECT NO.	CONTROL	REV.	FIGURE
1671484	004 R	3	2



LEGEND

- 473 INTERPRETED GROUNDWATER LEVEL (m AHD)
- PROPOSED WATER SUPPLY BORE
- EXISTING WATER SUPPLY BORE
- PROPOSED DEWATERING BORE
- EXISTING DEWATERING BORE
- TRACKING POINT
- PIT SHELL BELOW GROUNDWATER TABLE
- PIT SHELL
- CAMP SITE
- ACCESS ROAD / TRACK
- MAJOR DRAINAGE
- INTERPRETED DYKE
- INTERPRETED FAULT
- DOLERITE SILL
- JEERINAH FORMATION
- MOUNT MCCRAE SHALE
- YANDICOOGINA SHALE
- POTENTIAL GROUNDWATER DEPENDENT ECOSYSTEM (GDE)



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NOTE:
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REFERENCES:
1. AERIAL IMAGERY AND ROADS © WESTERN AUSTRALIAN LAND INFORMATION AUTHORITY TRADING AS LANDGATE (2018)
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DESIGNED	MJB
PREPARED	MS
REVIEWED	MJB
APPROVED	MJB
PROJECT	ELIWANA MINING PROJECT - HYDROGEOLOGICAL CONCEPTUAL MODEL
TITLE	GROUNDWATER MODELLING LOCATIONS

PROJECT NO.	CONTROL	REV.	FIGURE
1671484	004 R	3	3

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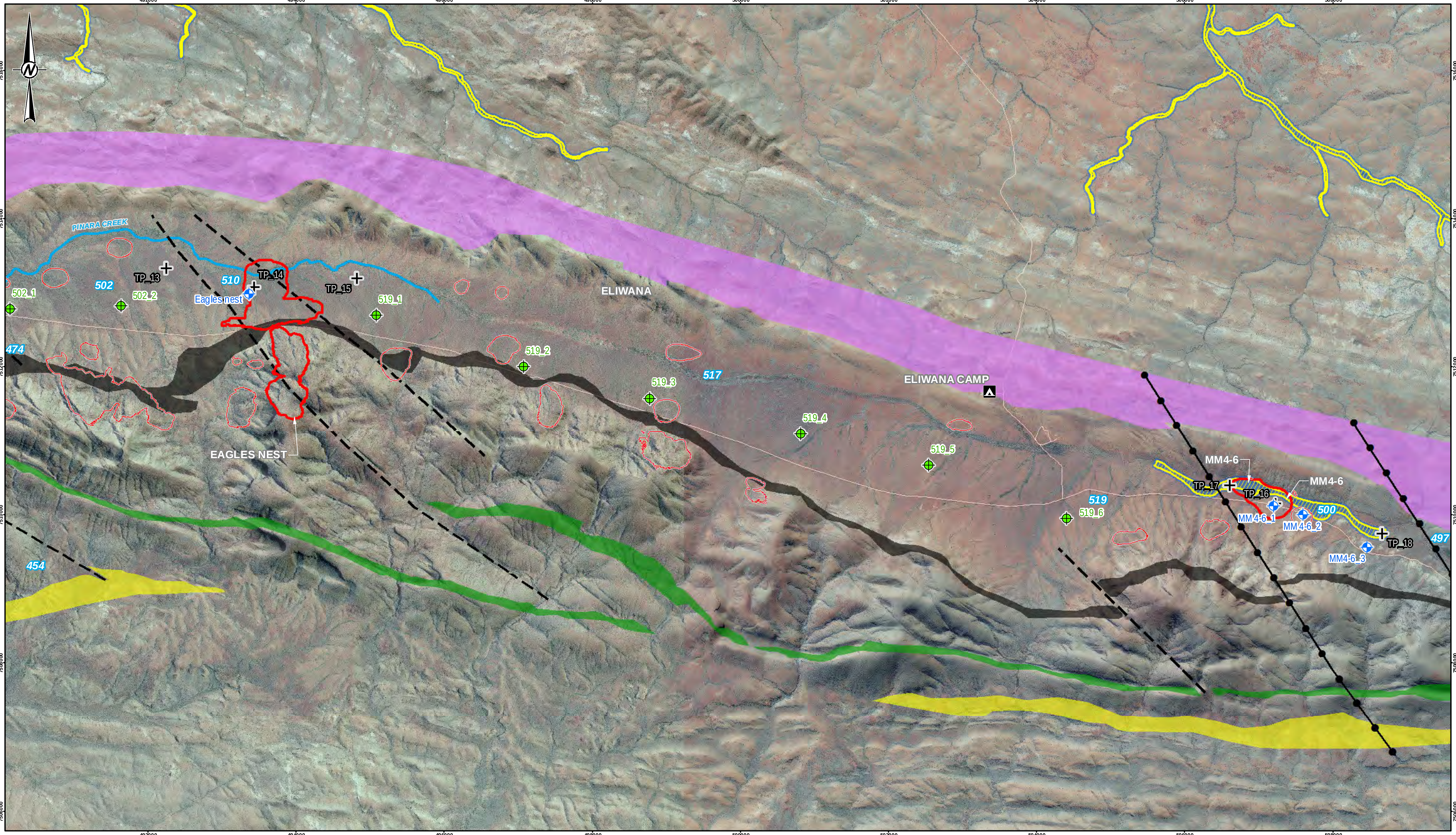
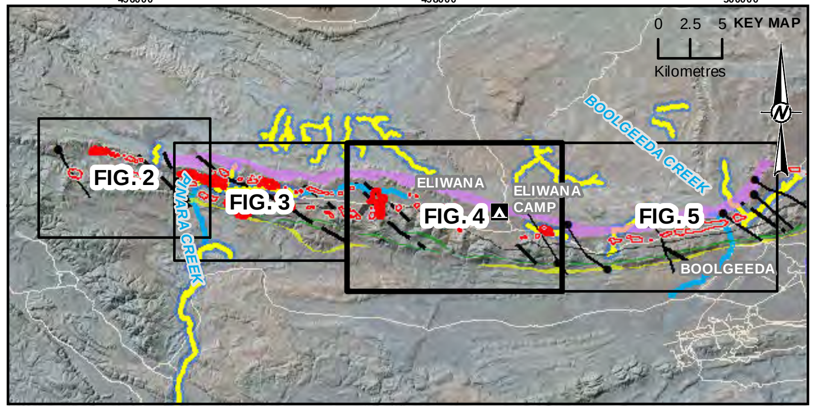


LEGEND

- 473 INTERPRETED GROUNDWATER LEVEL (m AHD)
- PROPOSED WATER SUPPLY BORE
- EXISTING WATER SUPPLY BORE
- PROPOSED DEWATERING BORE
- EXISTING DEWATERING BORE
- TRACKING POINT
- PIT SHELL BELOW GROUNDWATER TABLE
- PIT SHELL
- CAMP SITE
- ACCESS ROAD / TRACK
- MAJOR DRAINAGE
- INTERPRETED DYKE
- INTERPRETED FAULT
- DOLERITE SILL
- JEERINAH FORMATION
- MOUNT MCCRAE SHALE
- YANDICOOGINA SHALE
- POTENTIAL GROUNDWATER DEPENDENT ECOSYSTEM (GDE)



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NOTE:
1. COORDINATE SYSTEM: GDA 1994 MGA ZONE 50

REFERENCES:
1. AERIAL IMAGERY AND ROADS © WESTERN AUSTRALIAN LAND INFORMATION AUTHORITY TRADING AS LANDGATE (2018)
2. VEGETATION DATA MAPPING AND DRAINAGE SUPPLIED BY CLIENT
3. INSET IMAGE AND TOPOGRAPHY SOURCED FROM GEOSCIENCE AUSTRALIA

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FORTESCUE METALS GROUP

CONSULTANT
GOLDER

YYYY-MM-DD	2018-06-08
DESIGNED	MJB
PREPARED	MS
REVIEWED	MJB
APPROVED	MJB

PROJECT
ELIWANA MINING PROJECT - HYDROGEOLOGICAL CONCEPTUAL MODEL

TITLE
GROUNDWATER MODELLING LOCATIONS

PROJECT NO.	CONTROL	REV.	FIGURE
1671484	004 R	3	4

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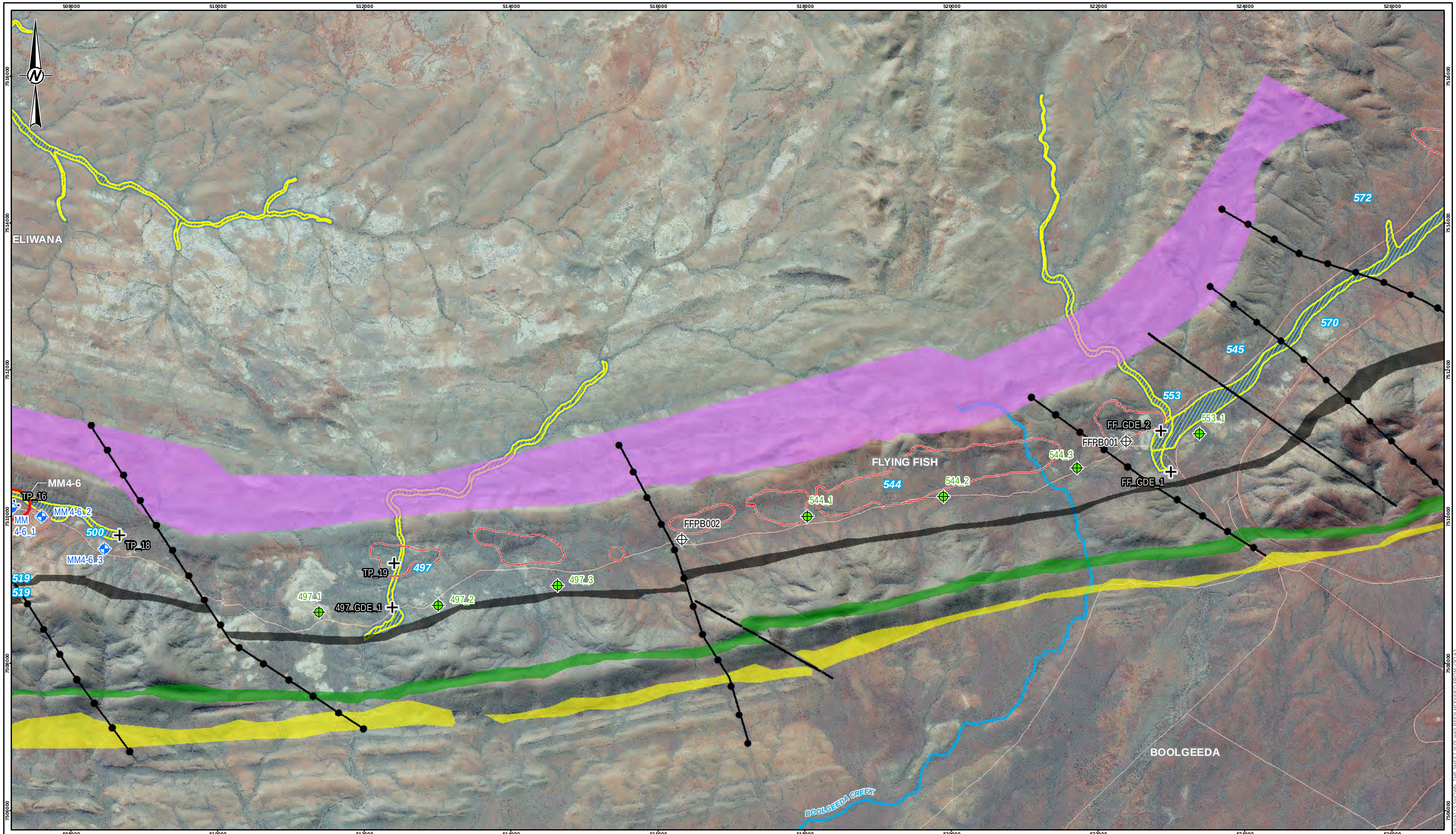
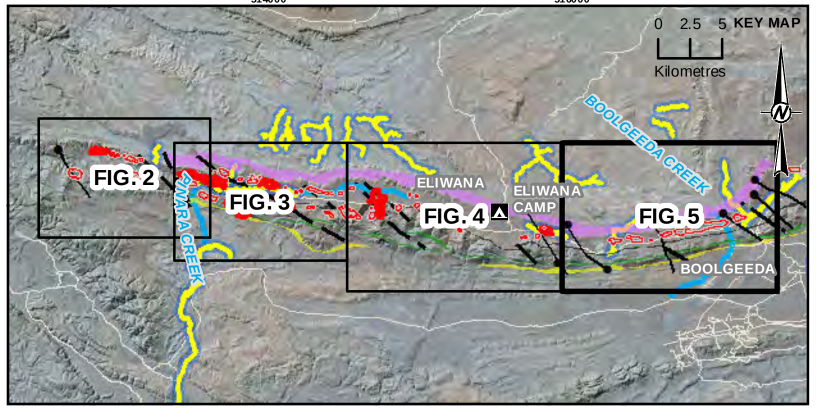


LEGEND

- 473 INTERPRETED GROUNDWATER LEVEL (m AHD)
- PROPOSED WATER SUPPLY BORE
- EXISTING WATER SUPPLY BORE
- PROPOSED DEWATERING BORE
- EXISTING DEWATERING BORE
- TRACKING POINT
- PIT SHELL BELOW GROUNDWATER TABLE
- PIT SHELL
- CAMP SITE
- ACCESS ROAD / TRACK
- MAJOR DRAINAGE
- INTERPRETED DYKE
- INTERPRETED FAULT
- DOLERITE SILL
- JEERINAH FORMATION
- MOUNT MCCRAE SHALE
- YANDICOOGINA SHALE
- POTENTIAL GROUNDWATER DEPENDENT ECOSYSTEM (GDE)



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NOTE:
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2. VEGETATION DATA MAPPING AND DRAINAGE SUPPLIED BY CLIENT
3. INSET IMAGE AND TOPOGRAPHY SOURCED FROM GEOSCIENCE AUSTRALIA

CLIENT FORTESCUE METALS GROUP		PROJECT ELIWANA MINING PROJECT - HYDROGEOLOGICAL CONCEPTUAL MODEL	
CONSULTANT GOLDER	YYYY-MM-DD	2018-06-08	TITLE **GROUNDWATER MODELLING LOCATIONS**
	DESIGNED	MJB	
	PREPARED	MS	
	REVIEWED	MJB	
	APPROVED	MJB	

PROJECT NO.	CONTROL	REV.	FIGURE
1671484	004 R	3	5

APPENDIX A

Modelled Dewatering and Water Supply Abstraction Regime

Scenario 1 Modelled Dewatering and Water Supply Abstraction Regime

Bore Name	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
502_1																Drill & commission	Operate	Operate	Operate
502_2																Drill & commission	Operate	Operate	Operate
519_1				Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate							Operate	Operate	Operate
Broadway East		Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate									
Broadway West 1			Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate
Broadway West 2				Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate
Eagles Nest												Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate
EWPB003	Commission	Operate	Operate	Operate	Operate														
EWPB004	Commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate			Operate	Operate	Operate		
EWPB005R										Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate			
Westend 1										Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate			
EWPB006	Commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate										
EWPB007R										Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate			
FFPB001						Commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate
FFPB002						Commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate
MM4-6_1							Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate
MM4-6_2												Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate
MM4-6_3												Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate
Talisman 1	Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate									
Talisman 2	Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate											
Westend 4										Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate			
Westend 3										Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate			
Westend 2										Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate			
Westside	Drill & commission	Operate	Operate	Operate															

Drill & commission | Commission | Operate

Scenario 2 Modelled Dewatering and Water Supply Abstraction Regime																			
Bore Name	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
502_1																Drill & commission	Operate	Operate	Operate
502_2																Drill & commission	Operate	Operate	Operate
519_1					Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate
519_2					Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate
519_3					Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate
519_4										Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate
519_5										Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate
519_6												Drill & commission	Operate	Operate	Operate				
Broadway East		Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate									
Broadway West 1			Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate
Broadway West 2				Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate
Eagles Nest												Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate
EWPB003	Commission	Operate	Operate	Operate	Operate														
EWPB004	Commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate			Operate	Operate	Operate		
EWPB005R										Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate			
Westend 1										Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate			
EWPB006	Commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate										
EWPB007R										Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate			
FFPB001						Commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate
FFPB002						Commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate
MM4-6_1							Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate
MM4-6_2												Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate
MM4-6_3												Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate
Talisman 1	Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate									
Talisman 2	Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate											
Westend 4										Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate			
Westend 3										Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate			
Westend 2										Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate			
Westside	Drill & commission	Operate	Operate	Operate															

Drill & commission | Commission | Operate

Scenario 3 Modelled Dewatering and Water Supply Abstraction Regime

Bore Name	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Broadway East 1	Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate											
Broadway East 2*	Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate											
Broadway West 1	Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate						
Broadway West 2	Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate						
Eagles Nest								Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate			
EWPB003	Commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate											
EWPB004	Commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate			Operate	Operate	Operate		
EWPB005R										Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate			
Westend 1										Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate			
EWPB006	Commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate	Operate										
EWPB007R										Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate			
MM4-6_1												Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate
MM4-6_2												Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate
MM4-6_3												Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate
Talisman 1	Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate											
Talisman 2	Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate											
Talisman 3*	Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate	Operate											
Westend 4										Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate			
Westend 3										Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate			
Westend 2										Drill & commission	Operate	Operate	Operate	Operate	Operate	Operate			
Westside	Drill & commission	Operate	Operate	Operate															

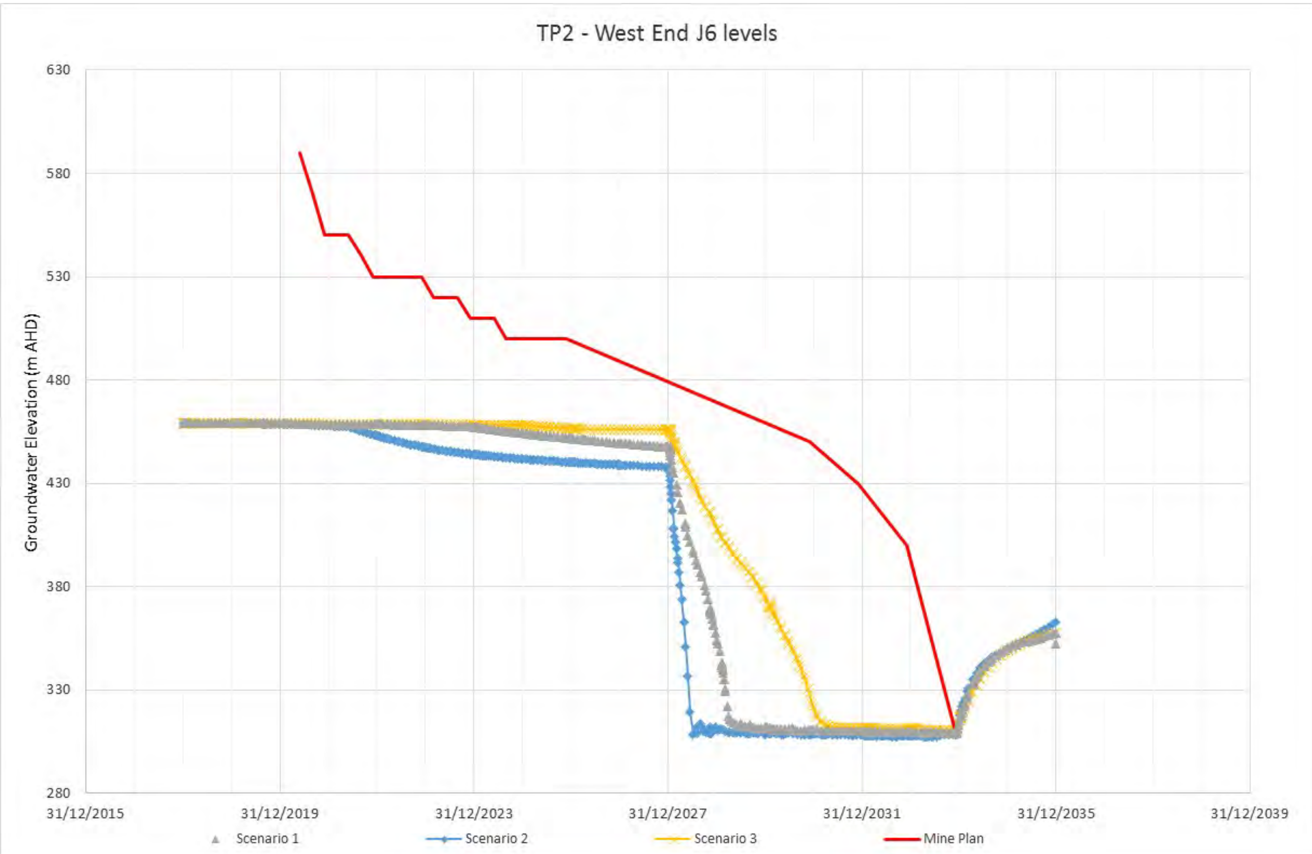
Drill & commission Commission Operate

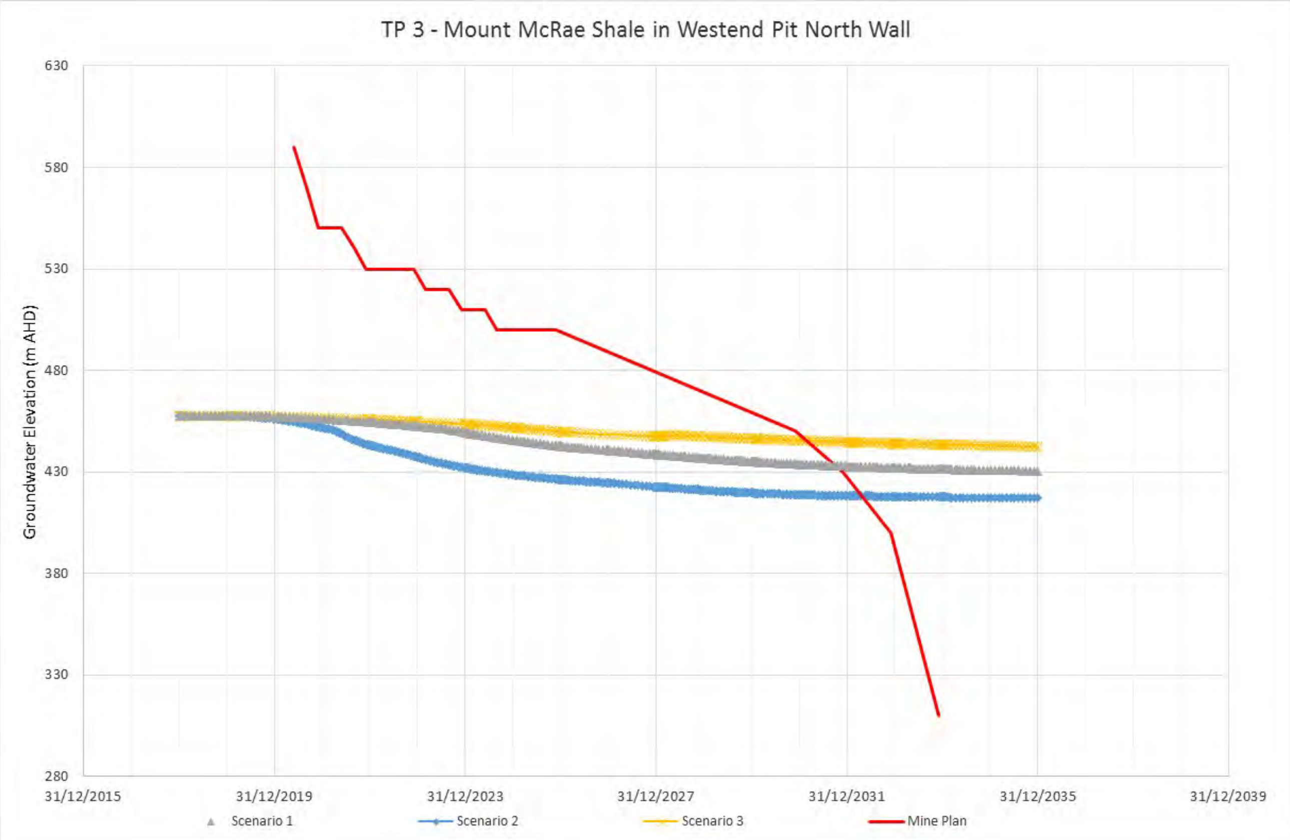
*Bores used in this scenario only

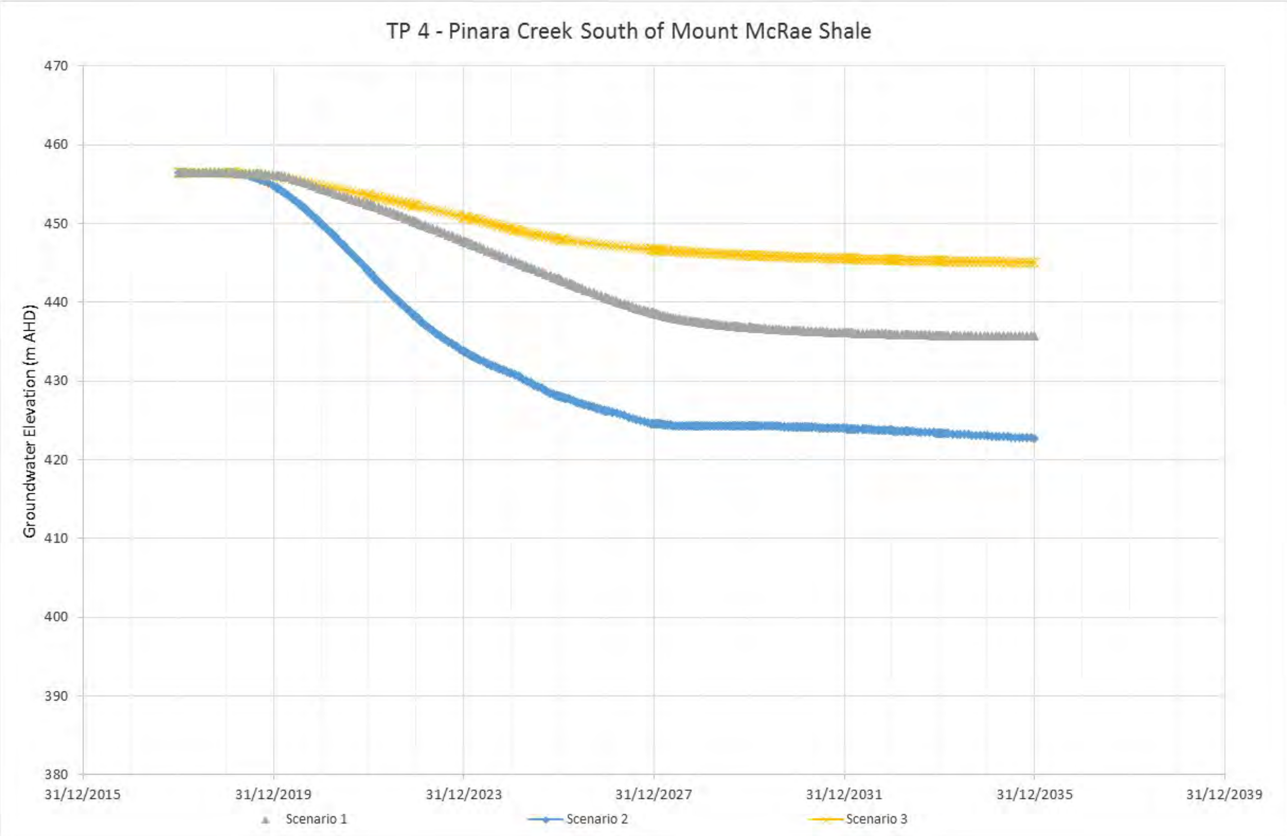
APPENDIX B

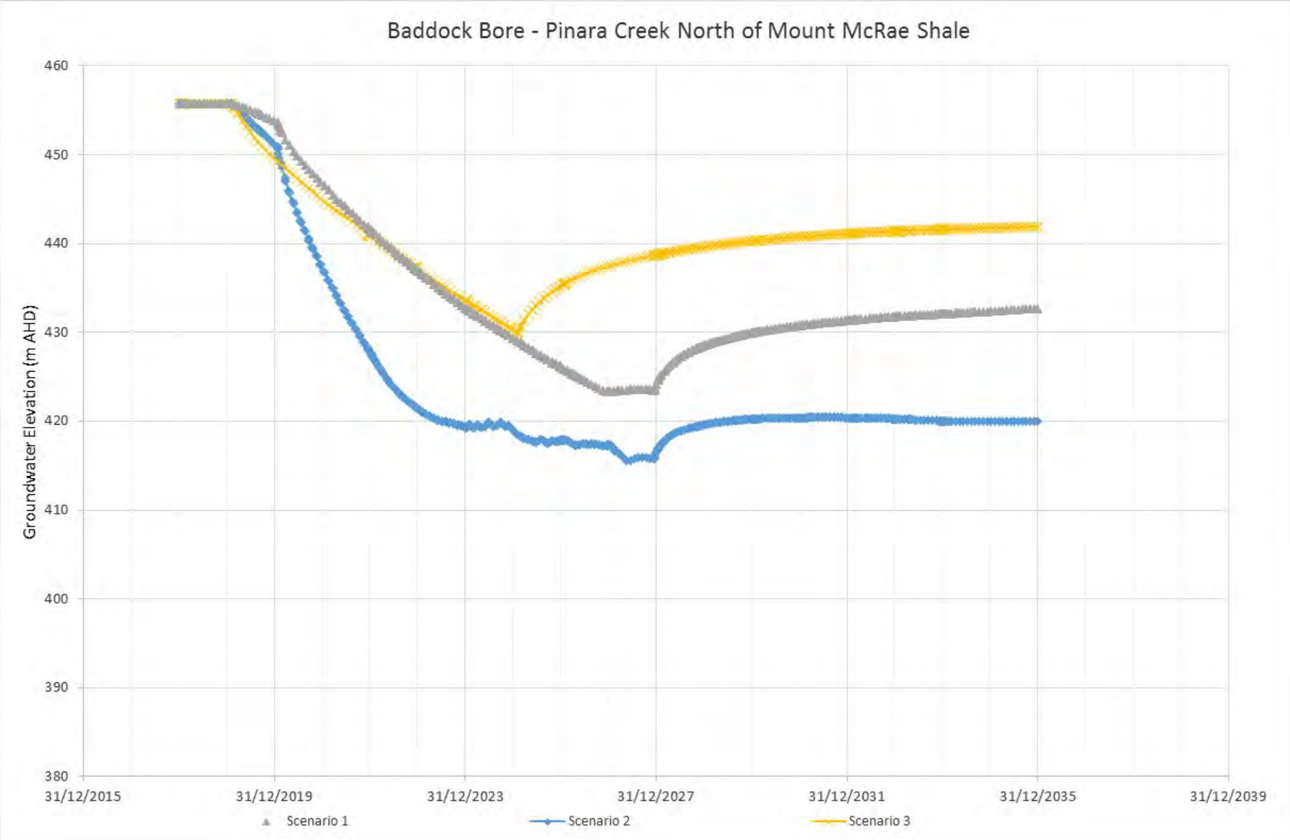
Modelling Results – Tracking Point Plots

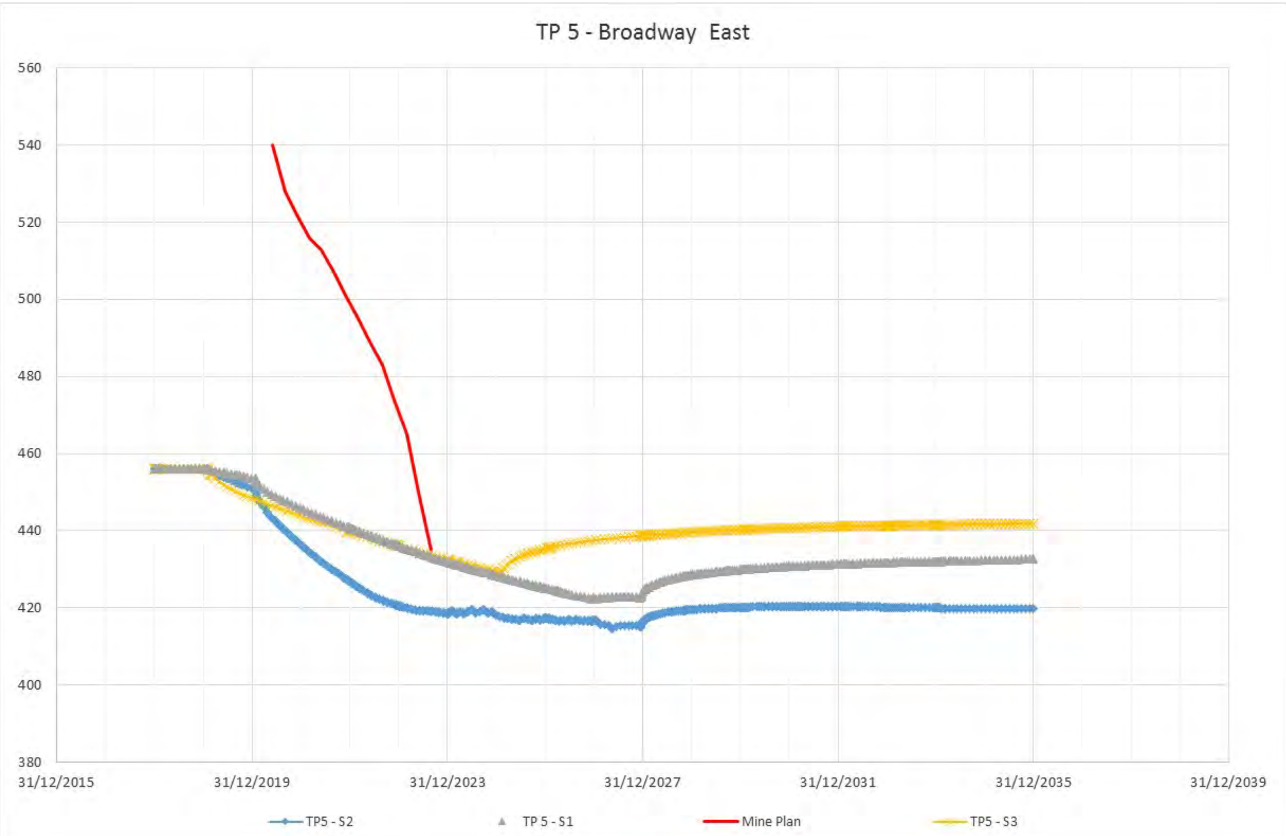

TP 1 - West End Pit
Groundwater Elevation (m AHD)
630
580
530
480
430
380
330
280
31/12/2015
31/12/2019
31/12/2023
31/12/2027
31/12/2031
31/12/2035
31/12/2039
Scenario 1
Scenario 2
Scenario 3
Mine Plan


TP2 - West End J6 levels
Groundwater Elevation (m AHD)
630
580
530
480
430
380
330
280
31/12/2015
31/12/2019
31/12/2023
31/12/2027
31/12/2031
31/12/2035
31/12/2039
Scenario 1
Scenario 2
Scenario 3
Mine Plan


TP 3 - Mount McRae Shale in Westend Pit North Wall
Groundwater Elevation (m AHD)
630
580
530
480
430
380
330
280
31/12/2015
31/12/2019
31/12/2023
31/12/2027
31/12/2031
31/12/2035
31/12/2039
Scenario 1
Scenario 2
Scenario 3
Mine Plan

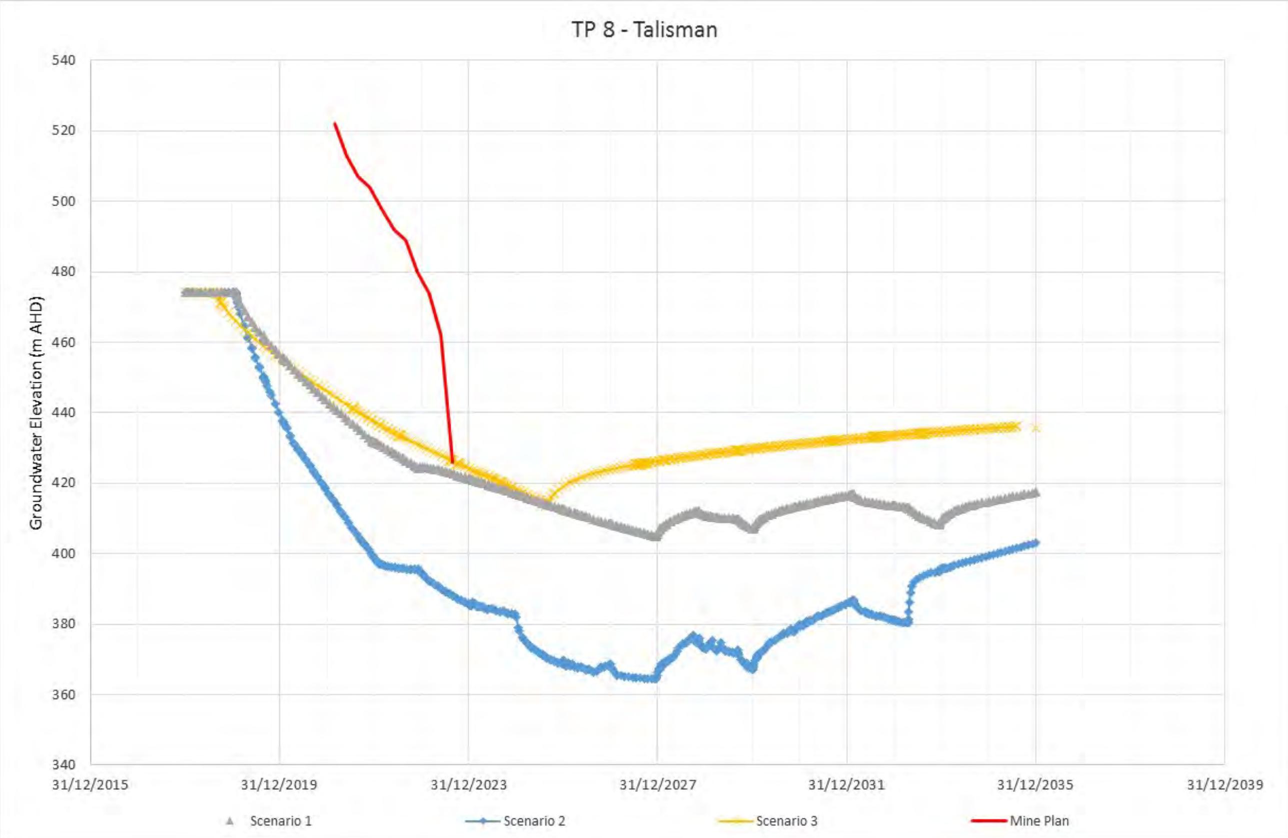

TP 4 - Pinara Creek South of Mount McRae Shale
Groundwater Elevation (m AHD)
470
460
450
440
430
420
410
400
390
380
31/12/2015
31/12/2019
31/12/2023
31/12/2027
31/12/2031
31/12/2035
31/12/2039
Scenario 1
Scenario 2
Scenario 3

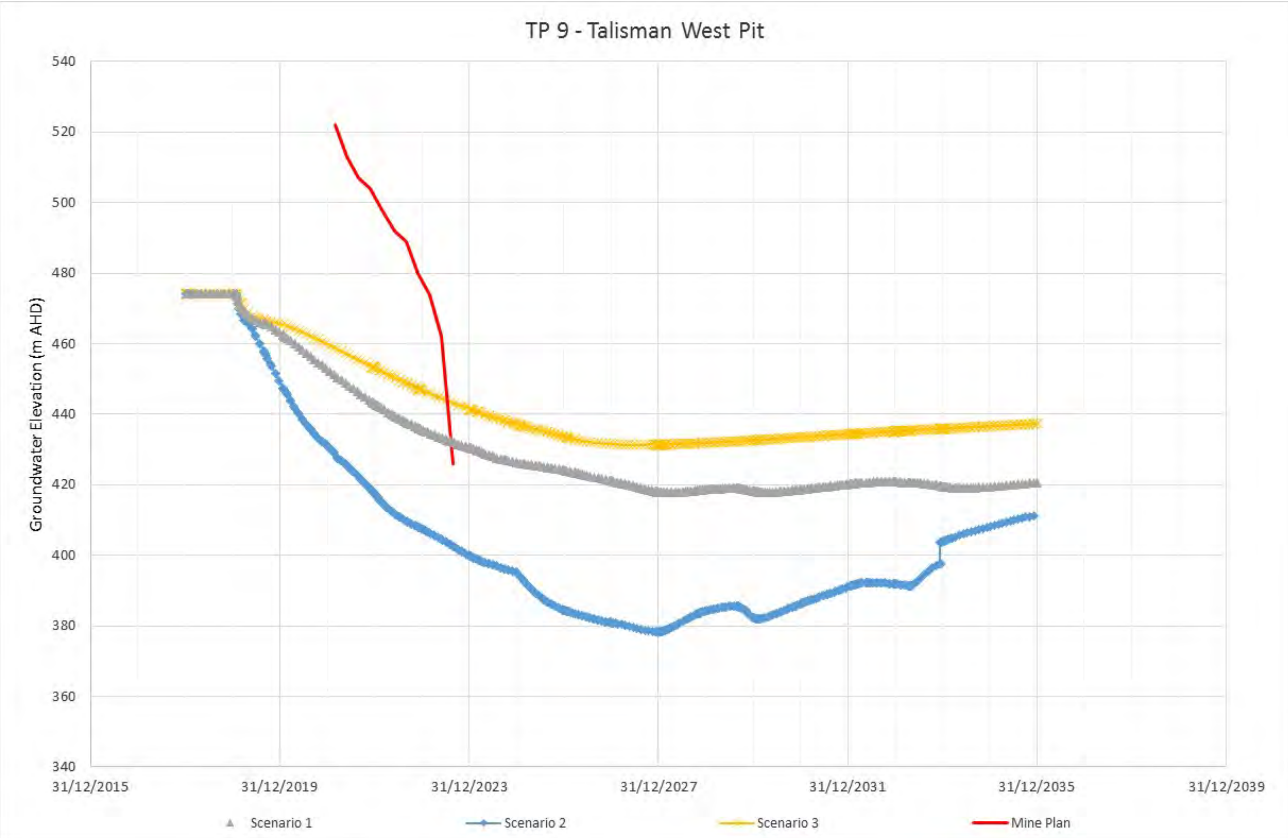

Baddock Bore - Pinara Creek North of Mount McRae Shale
Groundwater Elevation (m AHD)
460
450
440
430
420
410
400
390
380
31/12/2015
31/12/2019
31/12/2023
31/12/2027
31/12/2031
31/12/2035
31/12/2039
Scenario 1
Scenario 2
Scenario 3

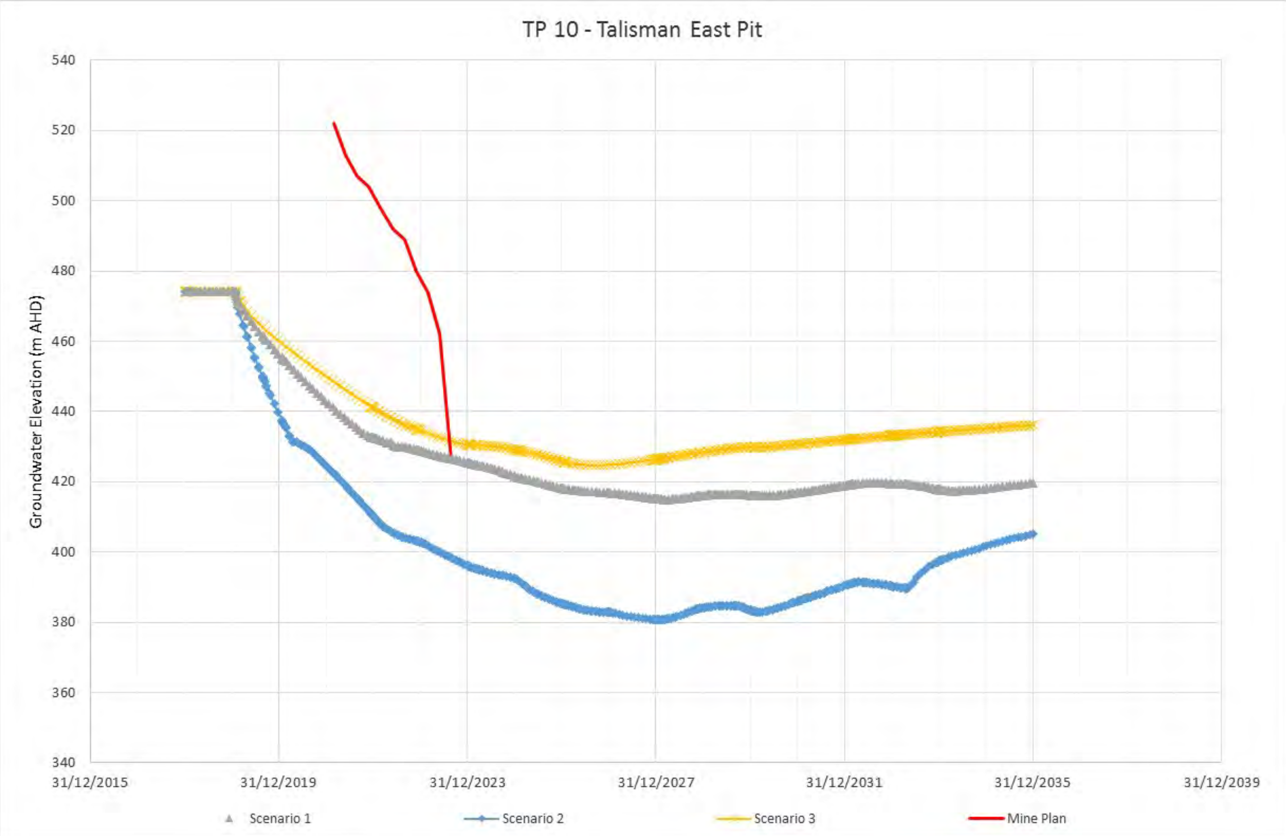

TP 5 - Broadway East
560
540
520
500
480
460
440
420
400
380
31/12/2015
31/12/2019
31/12/2023
31/12/2027
31/12/2031
31/12/2035
31/12/2039
TP5 - S2
TP 5 - S1
Mine Plan
TP5 - S3

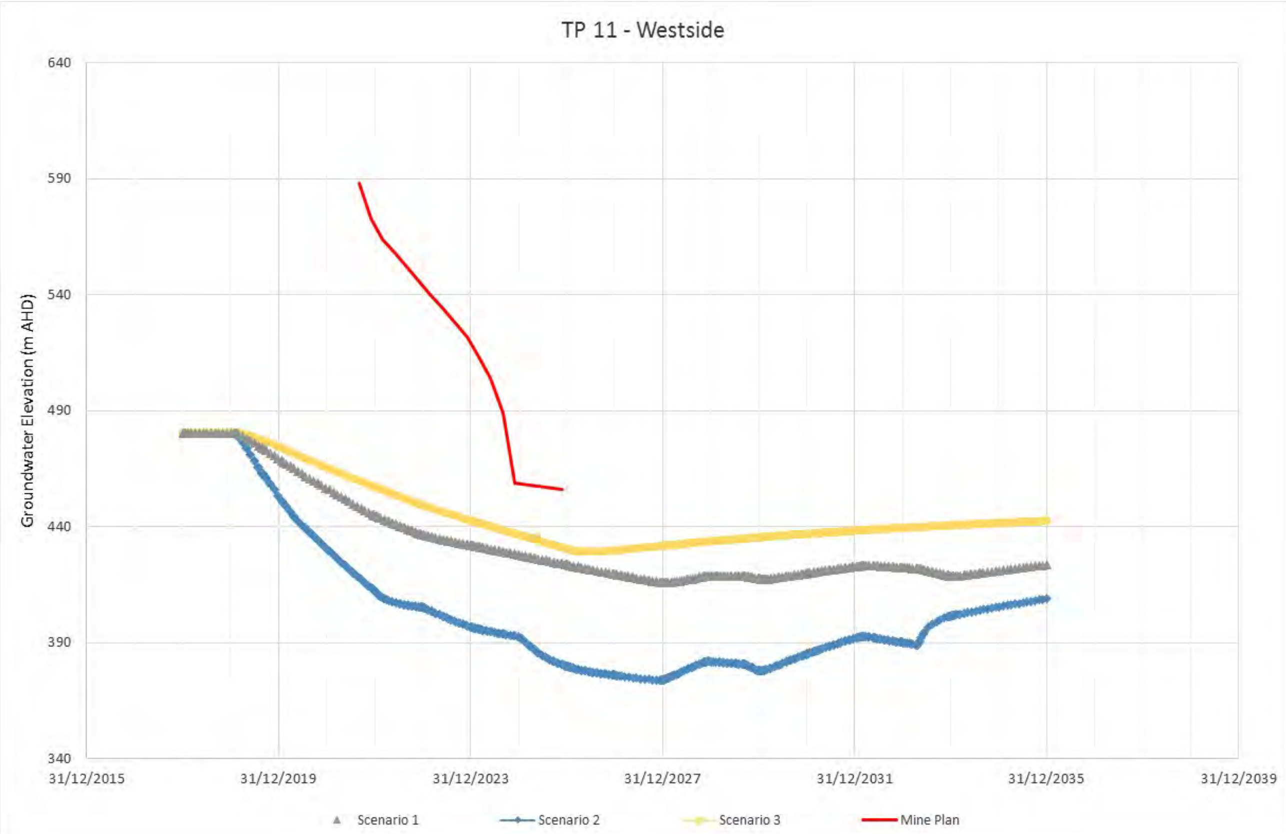

TP 6 - Broadway East
560
540
520
500
480
460
440
420
400
380
31/12/2015
31/12/2019
31/12/2023
31/12/2027
31/12/2031
31/12/2035
31/12/2039
Scenario 1
Scenario 2
Scenario 3
Mine Plan

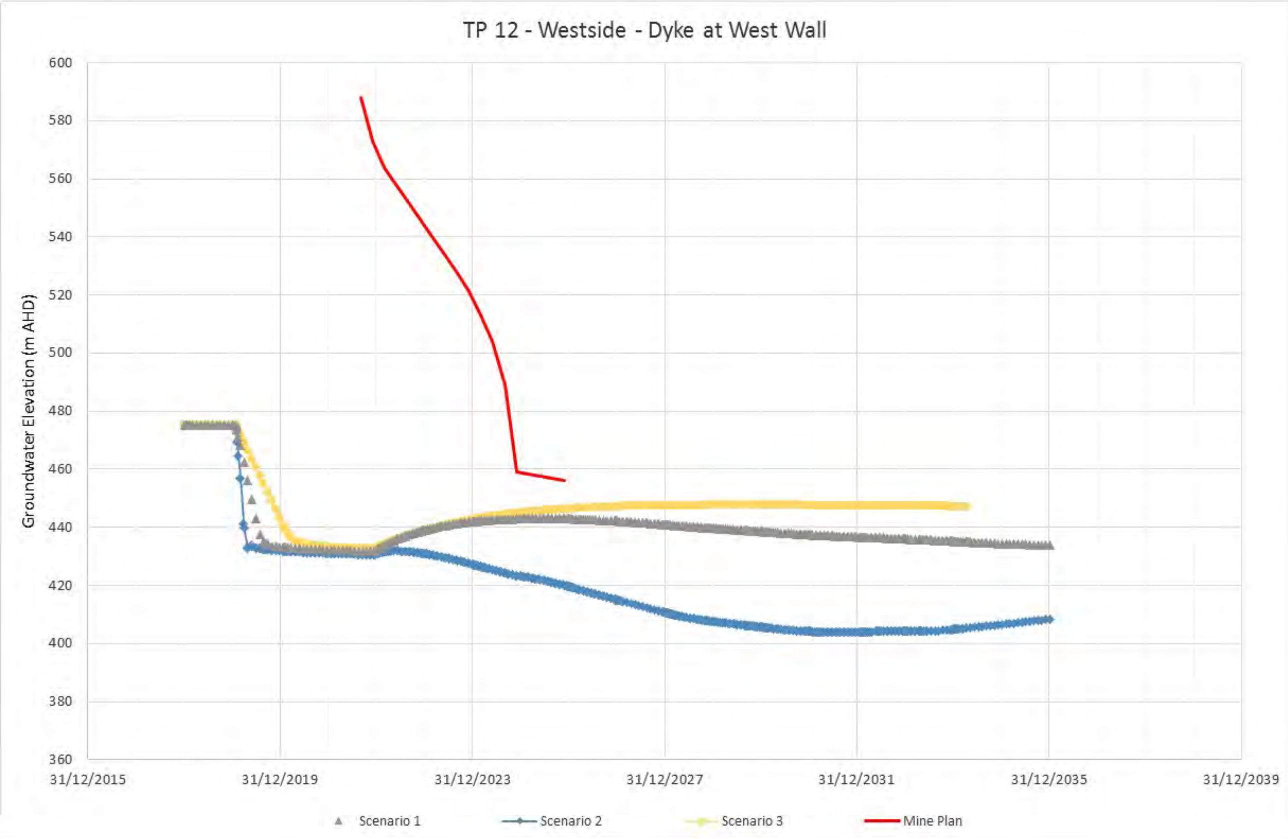

TP 7 - Broadway West
Groundwater Elevation (m AHD)
420
410
400
390
380
370
360
350
340
31/12/2015
31/12/2019
31/12/2023
31/12/2027
31/12/2031
31/12/2035
31/12/2039
Scenario 1
Scenario 2
Scenario 3
Mine Plan

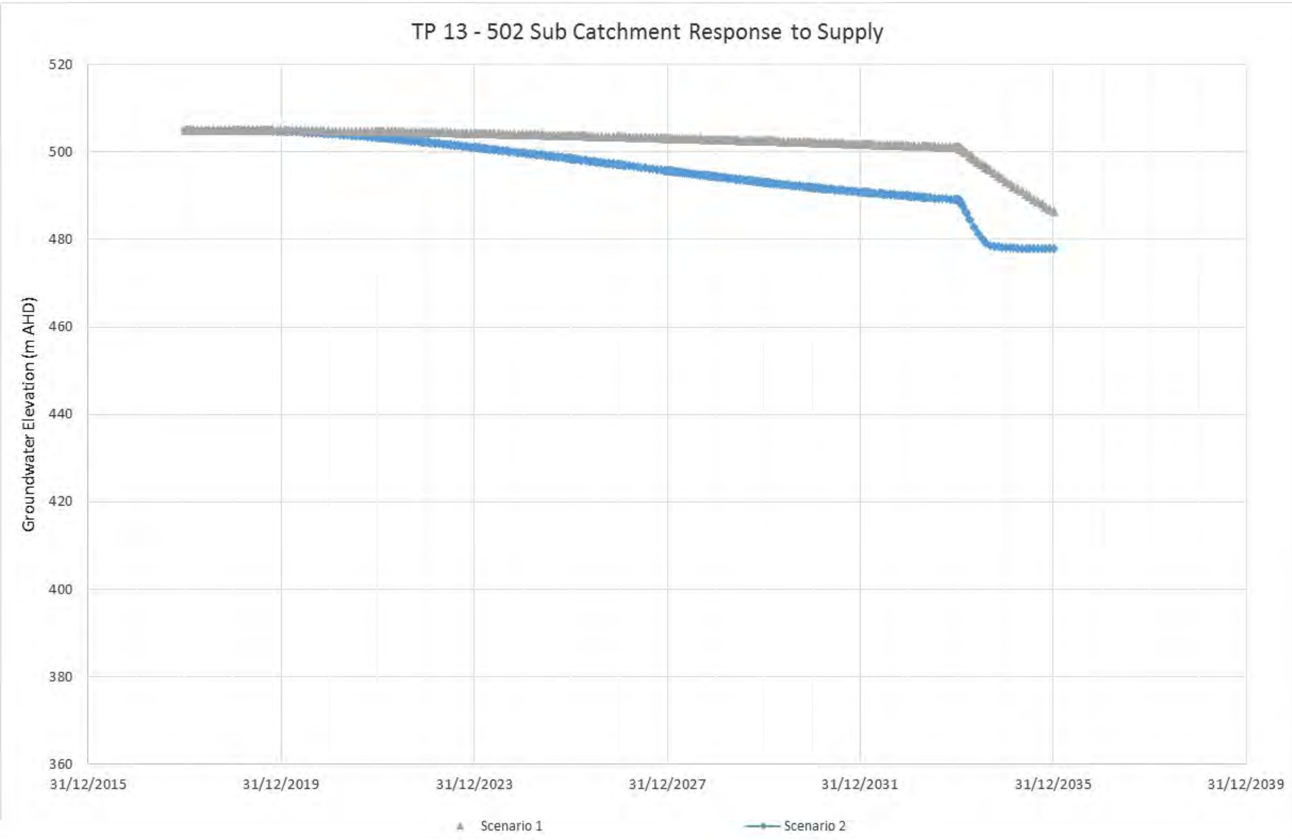

TP 8 - Talisman
Groundwater Elevation (m AHD)
540
520
500
480
460
440
420
400
380
360
340
31/12/2015
31/12/2019
31/12/2023
31/12/2027
31/12/2031
31/12/2035
31/12/2039
Scenario 1
Scenario 2
Scenario 3
Mine Plan

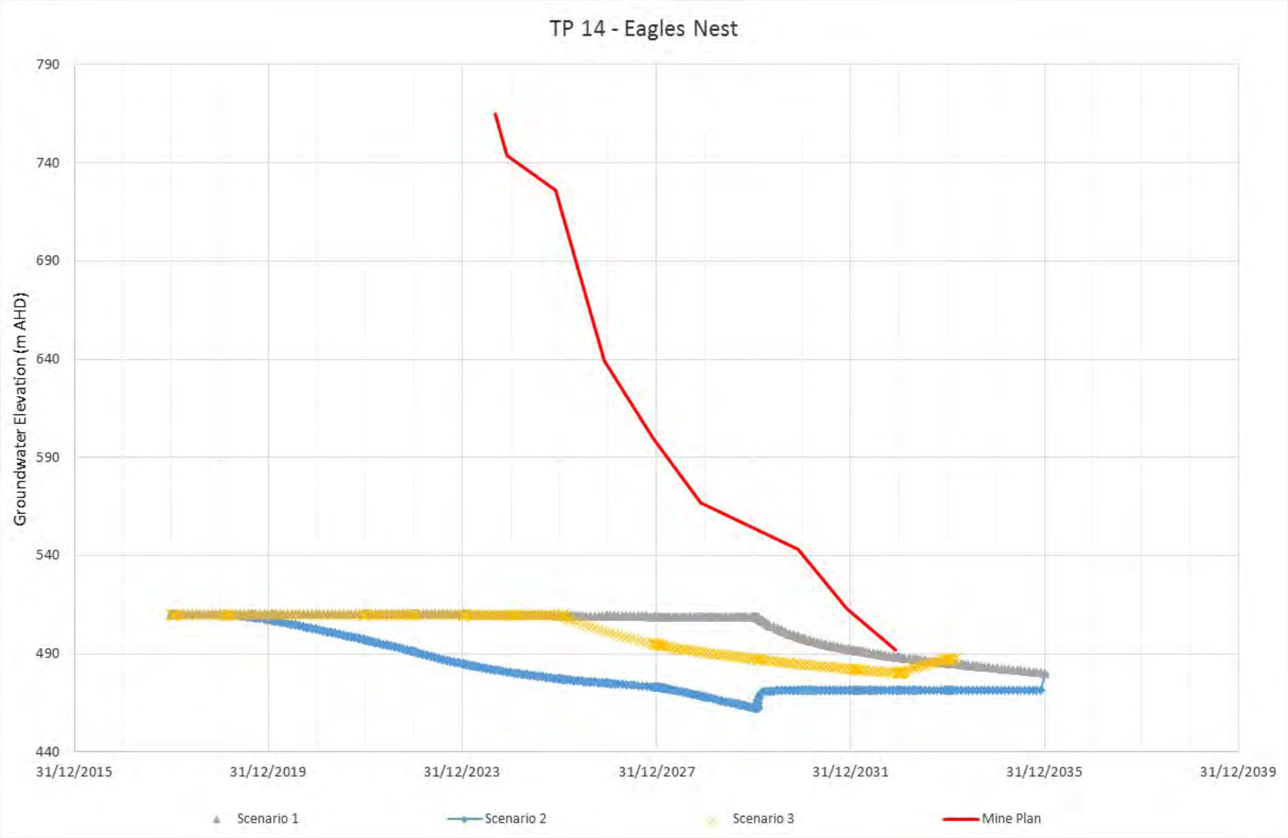

TP 9 - Talisman West Pit
Groundwater Elevation (m AHD)
540
520
500
480
460
440
420
400
380
360
340
31/12/2015
31/12/2019
31/12/2023
31/12/2027
31/12/2031
31/12/2035
31/12/2039
Scenario 1
Scenario 2
Scenario 3
Mine Plan

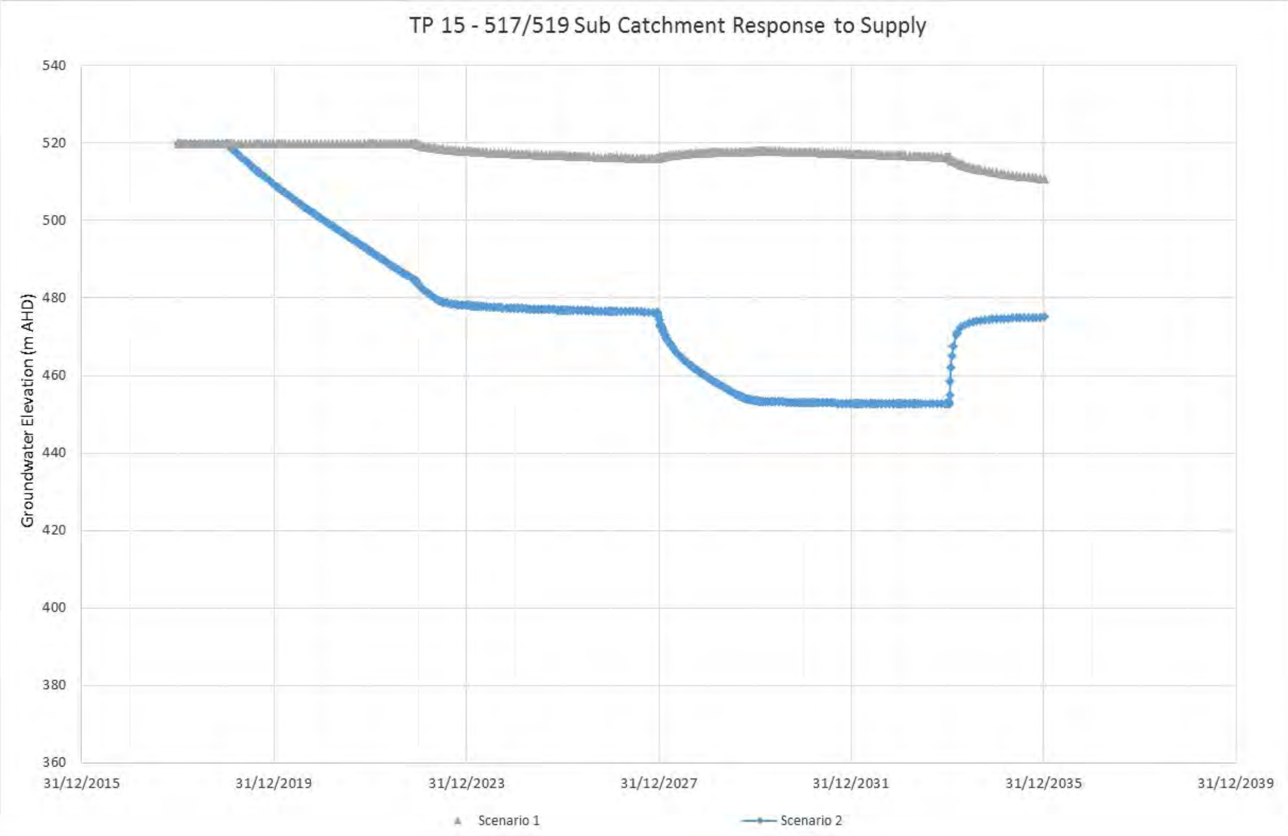

TP 10 - Talisman East Pit
Groundwater Elevation (m AHD)
540
520
500
480
460
440
420
400
380
360
340
31/12/2015
31/12/2019
31/12/2023
31/12/2027
31/12/2031
31/12/2035
31/12/2039
Scenario 1
Scenario 2
Scenario 3
Mine Plan

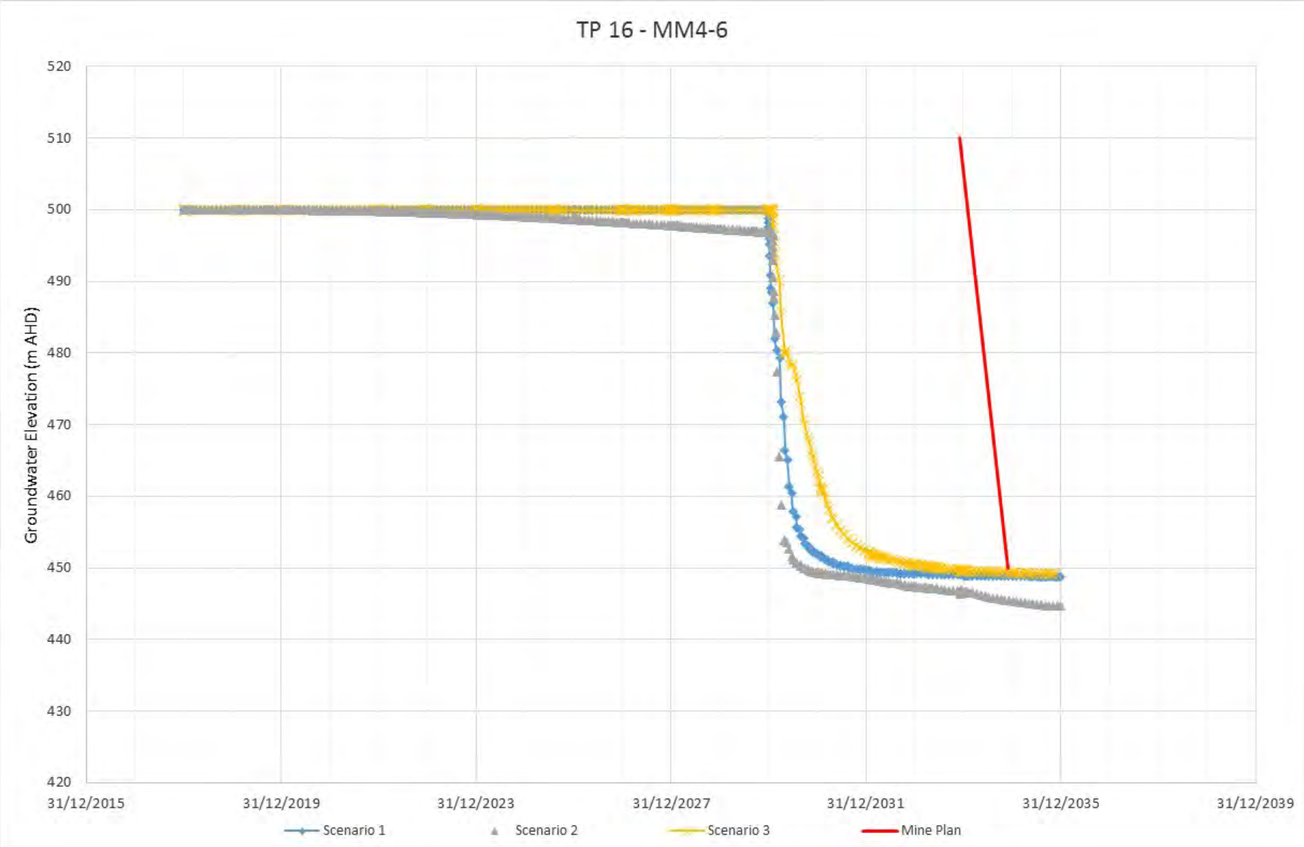

TP 11 - Westside
Groundwater Elevation (m AHD)
640
590
540
490
440
390
340
31/12/2015
31/12/2019
31/12/2023
31/12/2027
31/12/2031
31/12/2035
31/12/2039
Scenario 1
Scenario 2
Scenario 3
Mine Plan

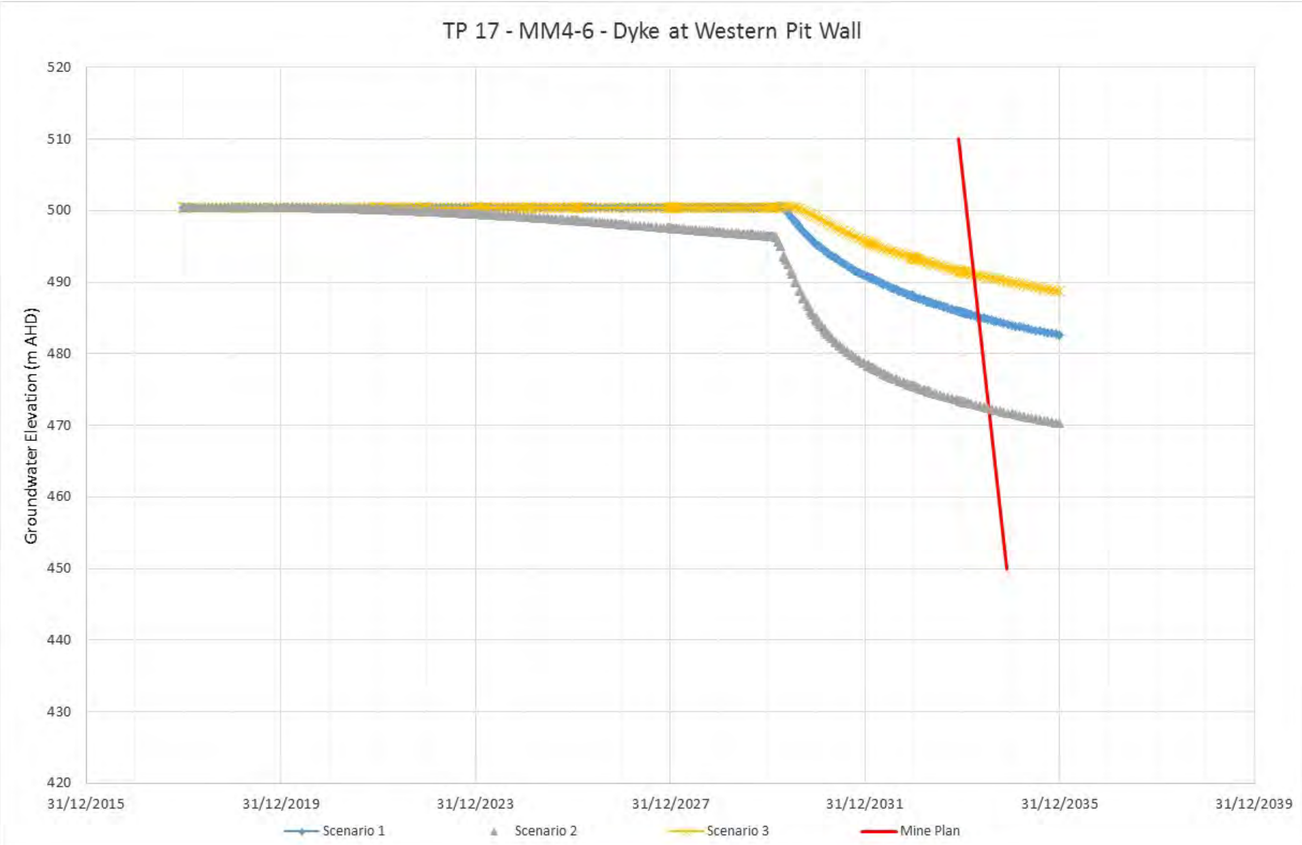

TP 12 - Westside - Dyke at West Wall
Groundwater Elevation (m AHD)
600
580
560
540
520
500
480
460
440
420
400
380
360
31/12/2015
31/12/2019
31/12/2023
31/12/2027
31/12/2031
31/12/2035
31/12/2039
Scenario 1
Scenario 2
Scenario 3
Mine Plan

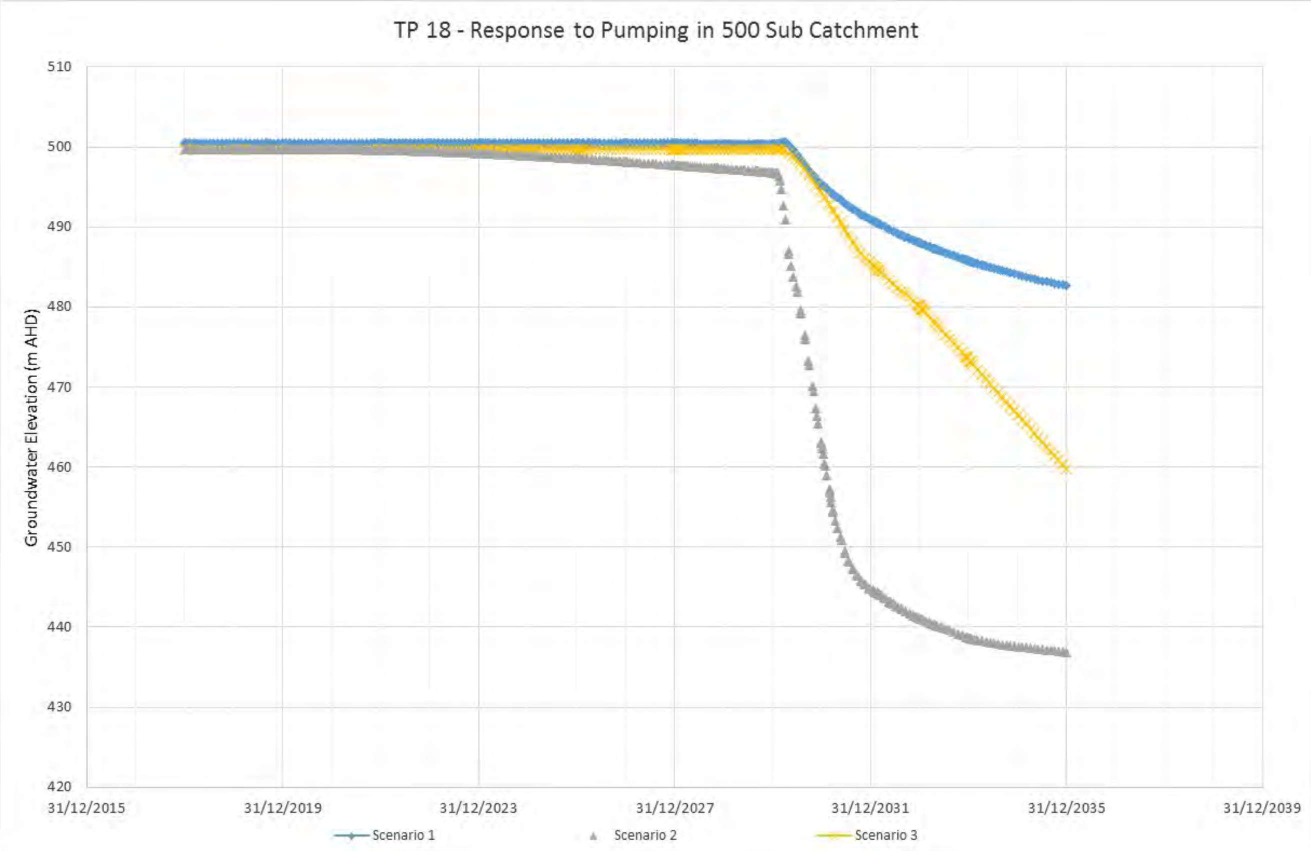

TP 13 - 502 Sub Catchment Response to Supply
Groundwater Elevation (m AHD)
520
500
480
460
440
420
400
380
360
31/12/2015
31/12/2019
31/12/2023
31/12/2027
31/12/2031
31/12/2035
31/12/2039
Scenario 1
Scenario 2

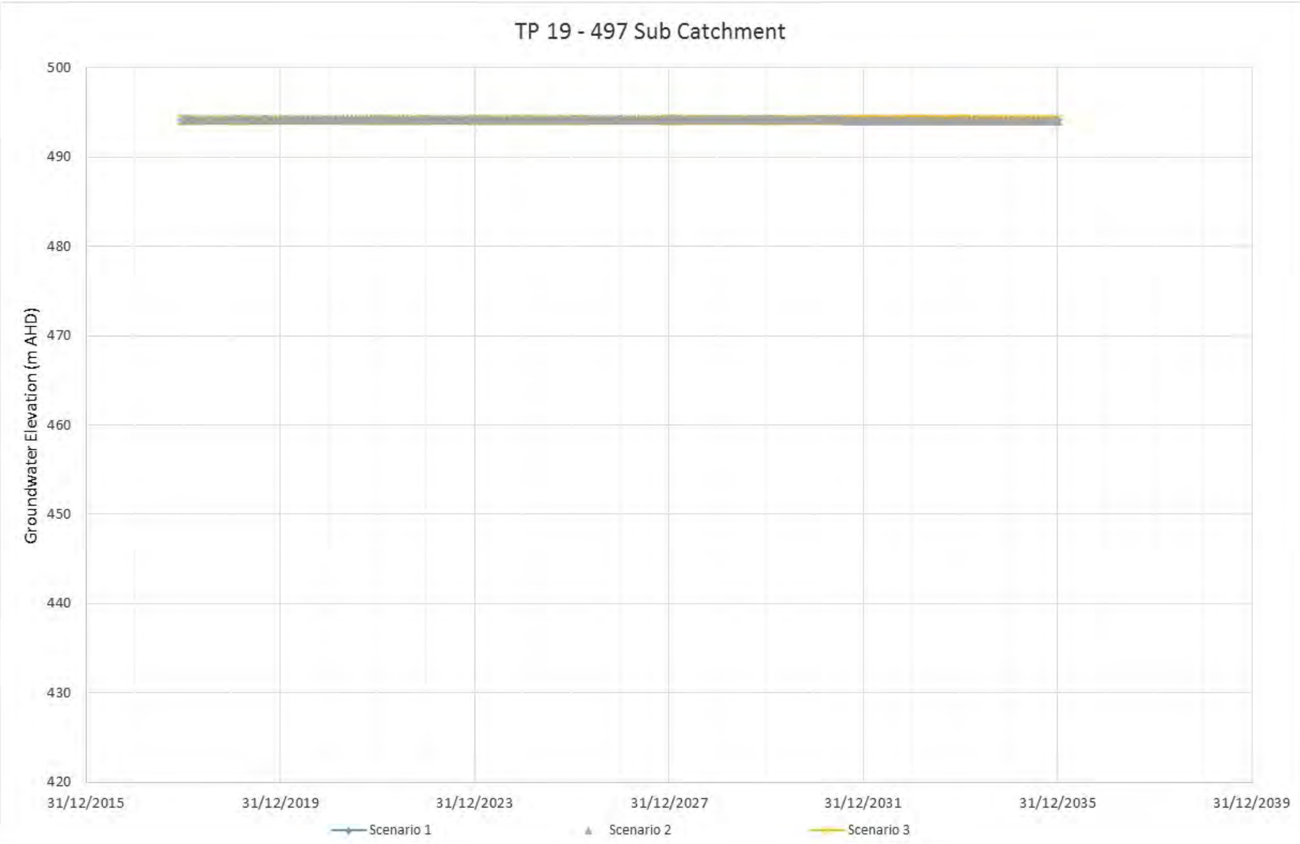

TP 14 - Eagles Nest
Groundwater Elevation (m AHD)
790
740
690
640
590
540
490
440
31/12/2015
31/12/2019
31/12/2023
31/12/2027
31/12/2031
31/12/2035
31/12/2039
Scenario 1
Scenario 2
Scenario 3
Mine Plan

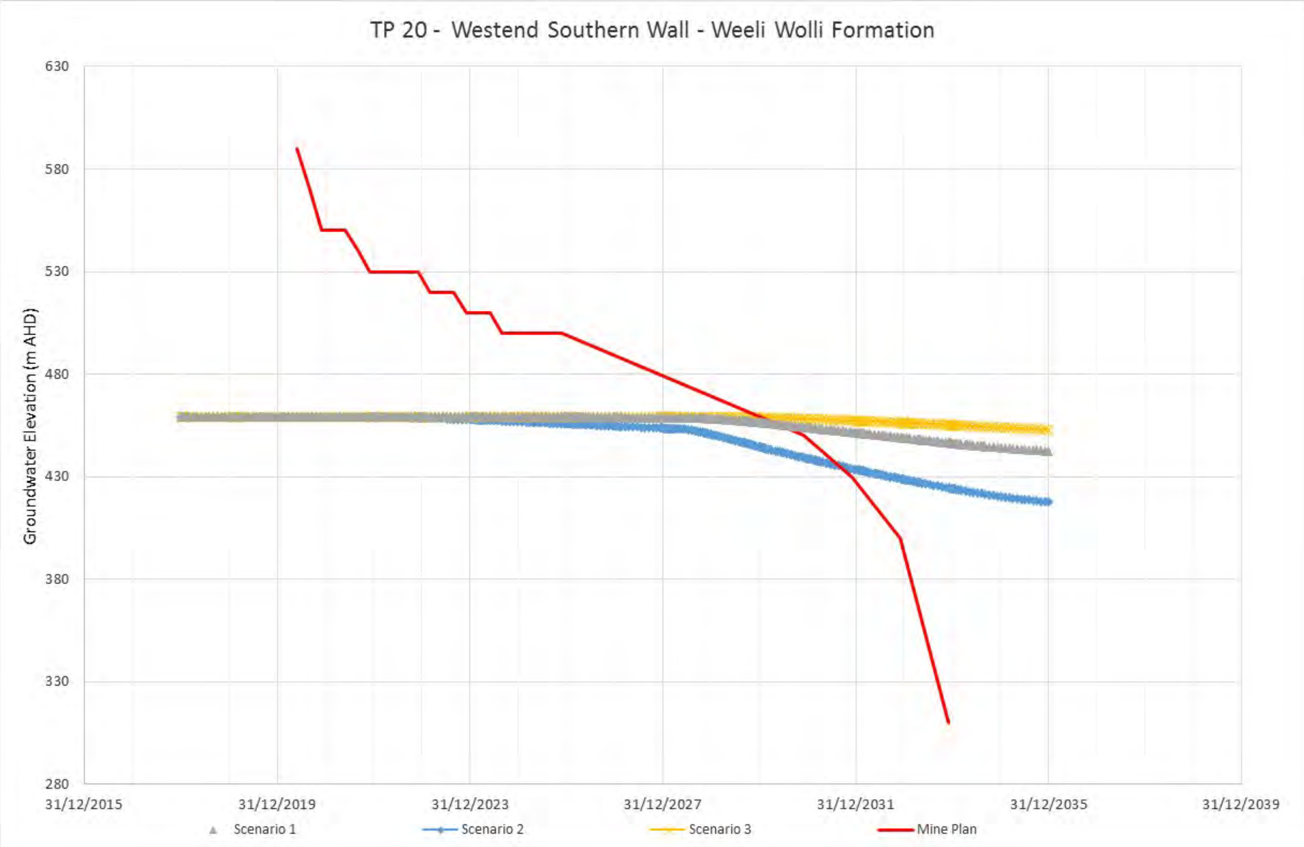

TP 15 - 517/519 Sub Catchment Response to Supply
Groundwater Elevation (m AHD)
540
520
500
480
460
440
420
400
380
360
31/12/2015
31/12/2019
31/12/2023
31/12/2027
31/12/2031
31/12/2035
31/12/2039
Scenario 1
Scenario 2


TP 16 - MM4-6
Groundwater Elevation (m AHD)
520
510
500
490
480
470
460
450
440
430
420
31/12/2015
31/12/2019
31/12/2023
31/12/2027
31/12/2031
31/12/2035
31/12/2039
Scenario 1
Scenario 2
Scenario 3
Mine Plan


TP 17 - MM4-6 - Dyke at Western Pit Wall
Groundwater Elevation (m AHD)
520
510
500
490
480
470
460
450
440
430
420
31/12/2015
31/12/2019
31/12/2023
31/12/2027
31/12/2031
31/12/2035
31/12/2039
Scenario 1
Scenario 2
Scenario 3
Mine Plan


TP 18 - Response to Pumping in 500 Sub Catchment
Groundwater Elevation (m AHD)
510
500
490
480
470
460
450
440
430
420
31/12/2015
31/12/2019
31/12/2023
31/12/2027
31/12/2031
31/12/2035
31/12/2039
Scenario 1
Scenario 2
Scenario 3


TP 19 - 497 Sub Catchment
Groundwater Elevation (m AHD)
500
490
480
470
460
450
440
430
420
31/12/2015
31/12/2019
31/12/2023
31/12/2027
31/12/2031
31/12/2035
31/12/2039
Scenario 1
Scenario 2
Scenario 3



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APPENDIX C

Important Information

IMPORTANT INFORMATION RELATING TO THIS REPORT

The document ("Report") to which this page is attached and which this page forms a part of, has been issued by Golder Associates Pty Ltd ("Golder") subject to the important limitations and other qualifications set out below.

This Report constitutes or is part of services ("Services") provided by Golder to its client ("Client") under and subject to a contract between Golder and its Client ("Contract"). The contents of this page are not intended to and do not alter Golder's obligations (including any limits on those obligations) to its Client under the Contract.

This Report is provided for use solely by Golder's Client and persons acting on the Client's behalf, such as its professional advisers. Golder is responsible only to its Client for this Report. Golder has no responsibility to any other person who relies or makes decisions based upon this Report or who makes any other use of this Report. Golder accepts no responsibility for any loss or damage suffered by any person other than its Client as a result of any reliance upon any part of this Report, decisions made based upon this Report or any other use of it.

This Report has been prepared in the context of the circumstances and purposes referred to in, or derived from, the Contract and Golder accepts no responsibility for use of the Report, in whole or in part, in any other context or circumstance or for any other purpose.

The scope of Golder's Services and the period of time they relate to are determined by the Contract and are subject to restrictions and limitations set out in the Contract. If a service or other work is not expressly referred to in this Report, do not assume that it has been provided or performed. If a matter is not addressed in this Report, do not assume that any determination has been made by Golder in regards to it.

At any location relevant to the Services conditions may exist which were not detected by Golder, in particular due to the specific scope of the investigation Golder has been engaged to undertake. Conditions can only be verified at the exact location of any tests undertaken. Variations in conditions may occur between tested locations and there may be conditions which have not been revealed by the investigation and which have not therefore been taken into account in this Report.

Golder accepts no responsibility for and makes no representation as to the accuracy or completeness of the information provided to it by or on behalf of the Client or sourced from any third party. Golder has assumed that such information is correct unless otherwise stated and no responsibility is accepted by Golder for incomplete or inaccurate data supplied by its Client or any other person for whom Golder is not responsible. Golder has not taken account of matters that may have existed when the Report was prepared but which were only later disclosed to Golder.

Having regard to the matters referred to in the previous paragraphs on this page in particular, carrying out the Services has allowed Golder to form no more than an opinion as to the actual conditions at any relevant location. That opinion is necessarily constrained by the extent of the information collected by Golder or otherwise made available to Golder. Further, the passage of time may affect the accuracy, applicability or usefulness of the opinions, assessments or other information in this Report. This Report is based upon the information and other circumstances that existed and were known to Golder when the Services were performed and this Report was prepared. Golder has not considered the effect of any possible future developments including physical changes to any relevant location or changes to any laws or regulations relevant to such location.

Where permitted by the Contract, Golder may have retained subconsultants affiliated with Golder to provide some or all of the Services. However, it is Golder which remains solely responsible for the Services and there is no legal recourse against any of Golder's affiliated companies or the employees, officers or directors of any of them.

By date, or revision, the Report supersedes any prior report or other document issued by Golder dealing with any matter that is addressed in the Report.

Any uncertainty as to the extent to which this Report can be used or relied upon in any respect should be referred to Golder for clarification.

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