



PROGRESSIVE REHABILITATION AND CLOSURE PLAN HYDROGEOLOGICAL REPORT

Wirralie Gold Mine

March 2026

Prepared For:
Solomons Gold Pty Ltd

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Introduction

Solomons Gold Pty Ltd (Solomons) owns and operates the Wirralie Gold Mine, located approximately 200 km west of Mackay and approximately 210 km south-southeast of Townsville in North Queensland. The operation comprises four open-cut pits and an ore processing facility utilising a cyanide heap leach circuit, and operates under Mining Lease ML1079 and Environmental Authority (EA) EPML00772413.

Amendments to the *Environmental Protection Act 1994* require mining operations to develop and implement a Progressive Rehabilitation and Closure Plan (PRCP). The PRCP guidelines (Department of Environment and Science (DES), 2023) outline the information required to demonstrate that post-mining landforms, including final voids, are stable and do not result in unacceptable environmental impacts. A key requirement of the PRCP is the assessment of hydrogeological conditions and the long-term behaviour of pit voids at closure.

This report has been prepared by HydroElement Solutions (HESS) on behalf of Solomons to address the hydrogeological assessment requirements of the PRCP. The assessment focuses on the prediction of post-closure pit lake behaviour, including equilibrium water levels, groundwater inflow, and the interaction between pit voids and the surrounding groundwater system. Analytical inflow estimation methods and site-specific water balance modelling have been applied to determine whether the final voids will function as groundwater sinks or sources under closure conditions.

This report builds on previous hydrogeological assessments and incorporates updated modelling and site data to refine predictions of pit void behaviour at closure.

1. Objective

The objectives of this report are to:

- Characterise the hydrogeological setting of the Wirralie Gold Mine, including groundwater systems and connectivity relevant to the final voids.
- Assess groundwater inflow to the open-cut pits under closure conditions using analytical methods.
- Develop site-specific water balance models to estimate equilibrium pit lake levels.
- Determine the long-term interaction between pit voids and the surrounding groundwater system.
- Assess whether the final voids will function as groundwater sinks or sources at closure.
- Support the Progressive Rehabilitation and Closure Plan by demonstrating that post-mining voids will achieve stable and acceptable long-term conditions.

2. PRCP Hydrogeological Assessment Requirements

The Progressive Rehabilitation and Closure Plan (PRCP) guidelines (DES, 2023) require a hydrogeological assessment to support the development of rehabilitation strategies and demonstrate that post-mining landforms, including final voids, will achieve stable and acceptable long-term outcomes.

The guidelines require characterisation of the groundwater system, including the occurrence and extent of aquifers and aquitards, groundwater levels, flow directions, recharge and discharge processes, and groundwater quality. This information is used to develop a conceptual hydrogeological model that underpins the assessment of potential impacts to groundwater environmental values.

In addition, the PRCP guidelines require assessment of groundwater use and environmental values, as well as evaluation of potential contaminant source, pathway, and fate associated with mining activities.

For final voids, the guidelines require assessment of long-term void hydrology, including prediction of equilibrium water levels, groundwater inflows, evaporative losses, potential for stratification, and the likelihood of overflow. A key requirement is to determine whether final voids will function as groundwater sinks or sources under closure conditions.

Groundwater modelling is required to support these assessments; however, the guidelines do not prescribe a specific modelling approach. In this assessment, a combination of analytical inflow estimation and site-specific water balance modelling has been adopted to provide robust and fit-for-purpose predictions of post-closure void behaviour.

Site Description

The Wirralie Gold Mine is located approximately 30 km north of Mount Coolon within the Whitsunday Regional Council Local Government Area in North Queensland (**Figure 1**). The site lies west of the Great Dividing Range and is characterised by a hot semi-arid climate under the Köppen classification, with distinct wet and dry seasons that influence surface water availability and groundwater recharge.

The Project area is situated on a gently undulating ridge between Rosetta Creek to the southeast and Bungobine Creek to the north. The site forms part of the Burdekin River drainage basin, within the Suttor River sub-catchment. Surface water drainage is therefore regionally controlled towards the Burdekin system, with local runoff directed towards adjacent ephemeral creek systems.

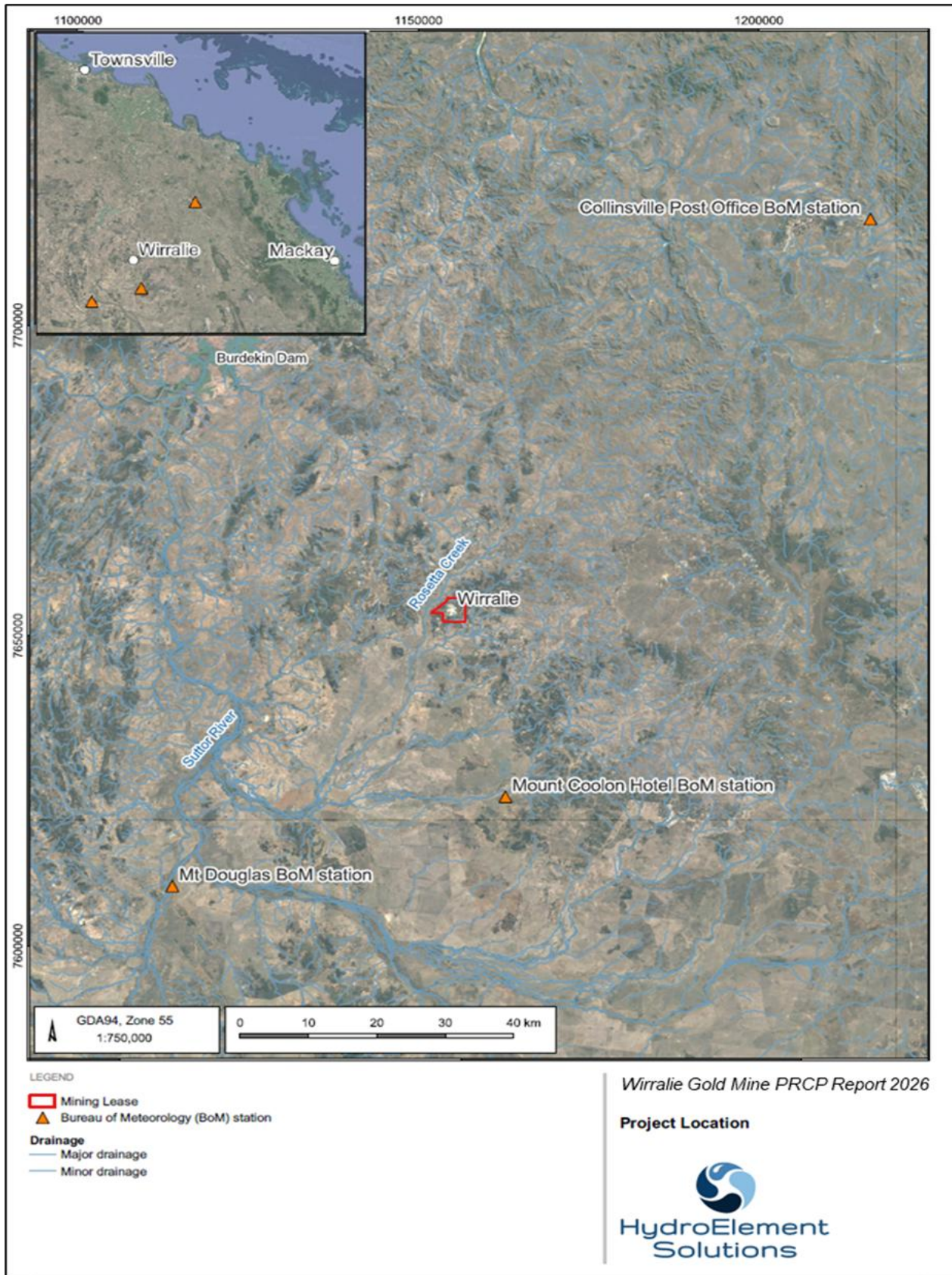


Figure 1 Project Location

1. Site History and Infrastructure

The Wirralie deposit was discovered in 1986 within the northeastern portion of the Drummond Basin and is hosted in the Late Devonian Mount Wyatt Formation (Olgers, 1972). The mineralisation is characterised as a low-grade, low-sulfidation epithermal gold system.

Mining operations commenced in 1987 and continued until 1993 under various owners. During this period, ore was extracted from four open cut pits and processed using a carbon-in-leach circuit, with associated management of tailings and waste rock. Supporting infrastructure included accommodation facilities, workshops, and ancillary services. Following cessation of operations in 1993, rehabilitation activities were undertaken across disturbed areas.

A second phase of operations occurred between 1999 and 2001, including the installation of an upgraded processing plant with a nominal capacity of 1.5 million tonnes per annum to treat low-grade oxide mineralisation, primarily from Deep Lead Pit. Operations ceased in 2001, after which further rehabilitation works were completed across waste rock dumps, tailings storage areas, process infrastructure, and ancillary disturbance areas. The processing plant was decommissioned in 2002, and the site was placed into care and maintenance.

Total production between 1987 and 2001 was approximately 7.93 Mt at an average grade of 1.97 g/t gold, resulting in the recovery of approximately 477,000 ounces of gold (NRC, 2016). Remaining oxide resources were estimated at 7.67 Mt at 0.82 g/t as at 2004 (WTS, 2023).

Solomons acquired the Project in 2013 and recommenced operations at a reduced scale relative to historical activities. Current operations involve mining of oxide material, primarily from Pit B, and processing via a cyanide heap leach circuit located within the existing disturbance footprint. Mining activities are limited in scale and are expected to continue for a relatively short duration, with future disturbance largely confined to previously impacted areas.

The operational history of the site has resulted in multiple disturbed landforms, including open-pit voids, waste rock dumps, and tailings storage areas, which form the basis of the current rehabilitation and closure assessment. The layout of the current site is shown in **Figure 2**, and key infrastructure components and their post-mining land use classifications are described in subsequent sections.

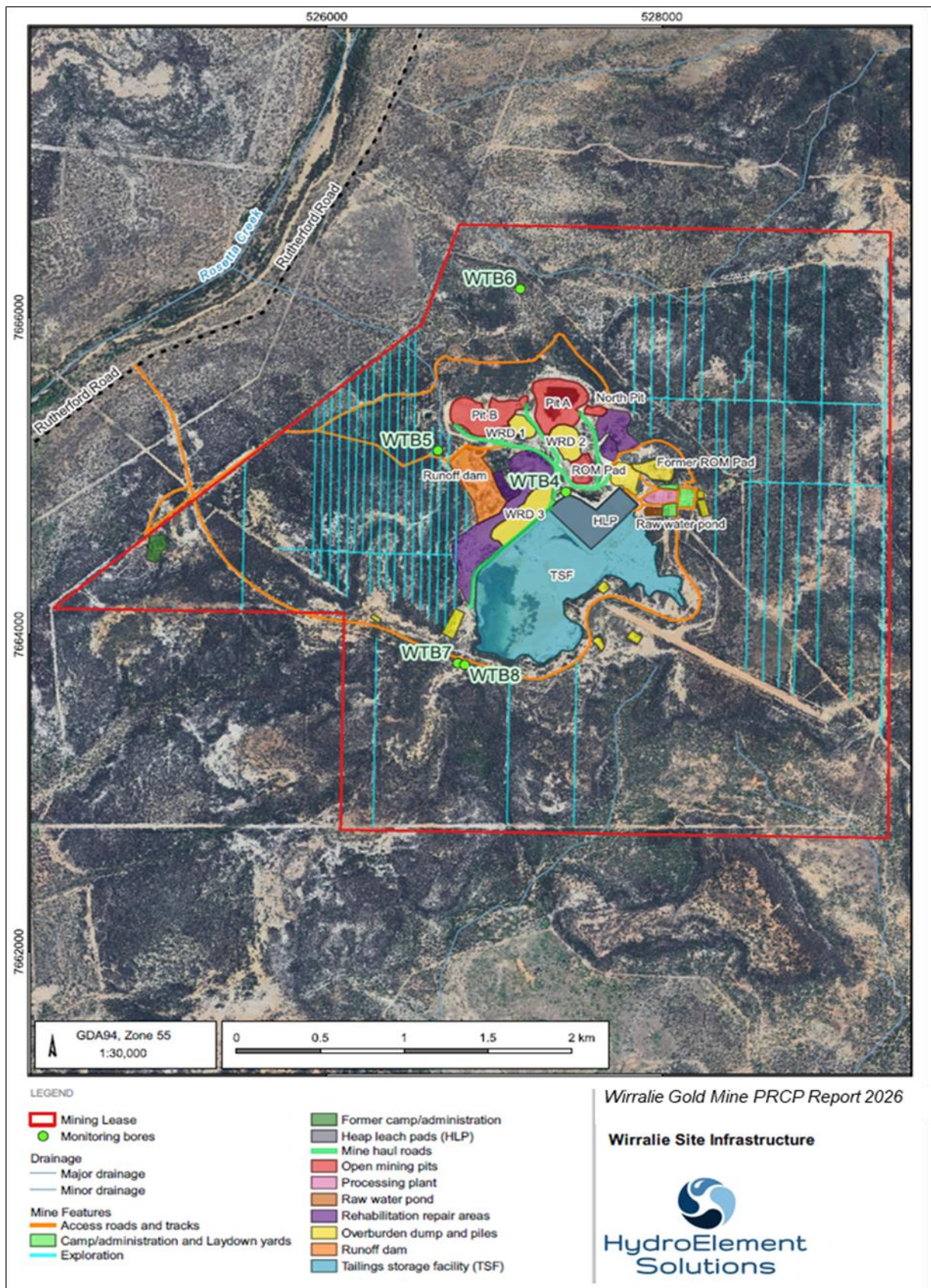


Figure 2 Site Infrastructure

2. Climate

The climate of the Project area is characterised as hot, seasonally semi-arid tropical, with distinct wet and dry seasons that strongly influence surface water availability and groundwater recharge. Rainfall is dominated by high-intensity events during the summer months (December to March), while the dry season typically extends from April to November.

Regional climate data indicate that mean annual rainfall ranges between approximately 575 mm and 700 mm, based on nearby Bureau of Meteorology stations at Collinsville, Mount Douglas, and Mount Coolon. Rainfall is highly seasonal, with the majority occurring in January and February, and minimal rainfall during the late dry season (August to October).

SILO climate data, which provides spatially interpolated records for the Project area, indicates a mean annual rainfall of approximately 585 mm. Mean annual potential evaporation is estimated to be approximately 2,400 mm, significantly exceeding rainfall and resulting in a persistent annual water deficit.

This evaporative dominance limits groundwater recharge across the site, with recharge typically restricted to short-duration periods during the wet season when rainfall temporarily exceeds evapotranspiration. Under these conditions, recharge is expected to be low, typically in the order of 1 to 5% of annual rainfall.

Long-term rainfall variability, assessed using cumulative rainfall departure (CRD), indicates alternating periods of above and below average rainfall, with an overall decreasing trend in recent decades. This variability influences groundwater levels and recharge, with sustained periods of below-average rainfall likely resulting in reduced recharge and declining groundwater levels.

Overall, the climatic conditions at the site are characterised by low effective recharge and high evaporative demand, which are key controls on groundwater availability and the long-term behaviour of pit voids.

Table 1 Silo Climate Averages

Wirralie (SILO)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Pan Evaporation	242.3	205.3	207.2	175.9	146.8	123.6	136.9	170.9	208.0	253.6	261.7	265.4	2397.7
Mean Actual Evaporation	128.6	120.6	117.4	85.9	58.6	42.1	48.3	66.4	86.0	104.7	113.3	126.4	1098.2
Max Temperature	33.9	32.9	32.0	30.0	26.9	24.4	24.3	26.4	29.5	32.3	34.0	34.5	361.0
Rainfall	116.9	117.3	61.0	31.4	26.3	26.8	22.4	13.7	10.8	26.1	48.7	83.3	584.7

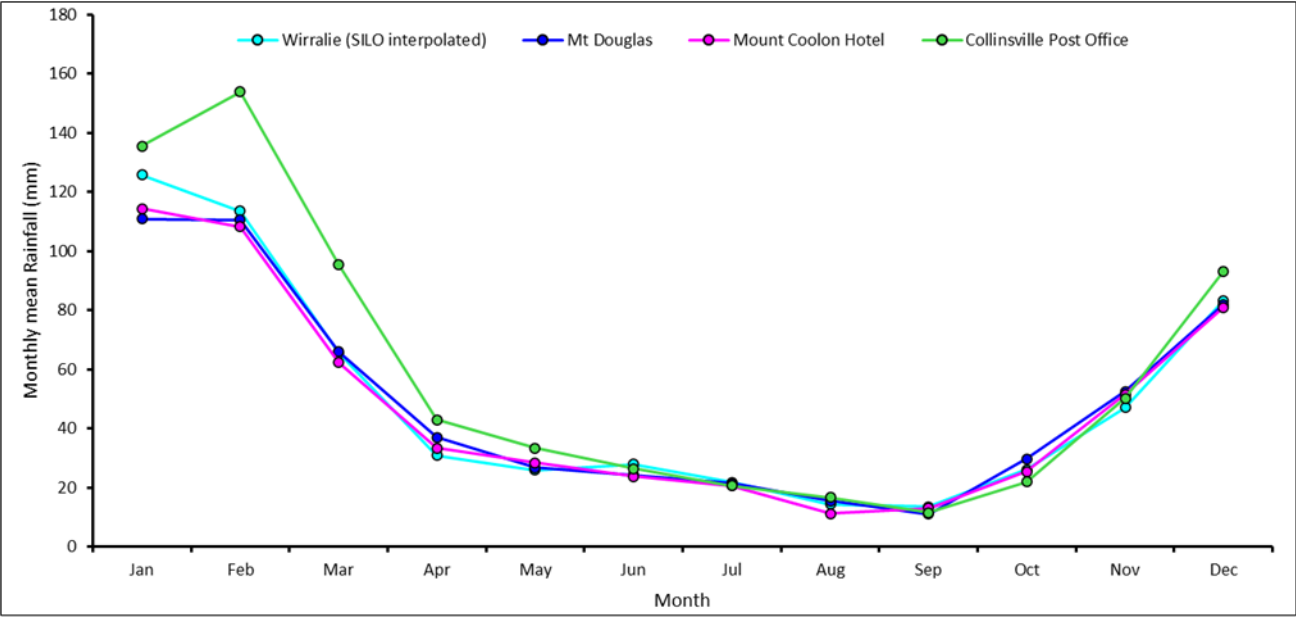


Figure 3 Mean Monthly Rainfall Comparison for Wirralie

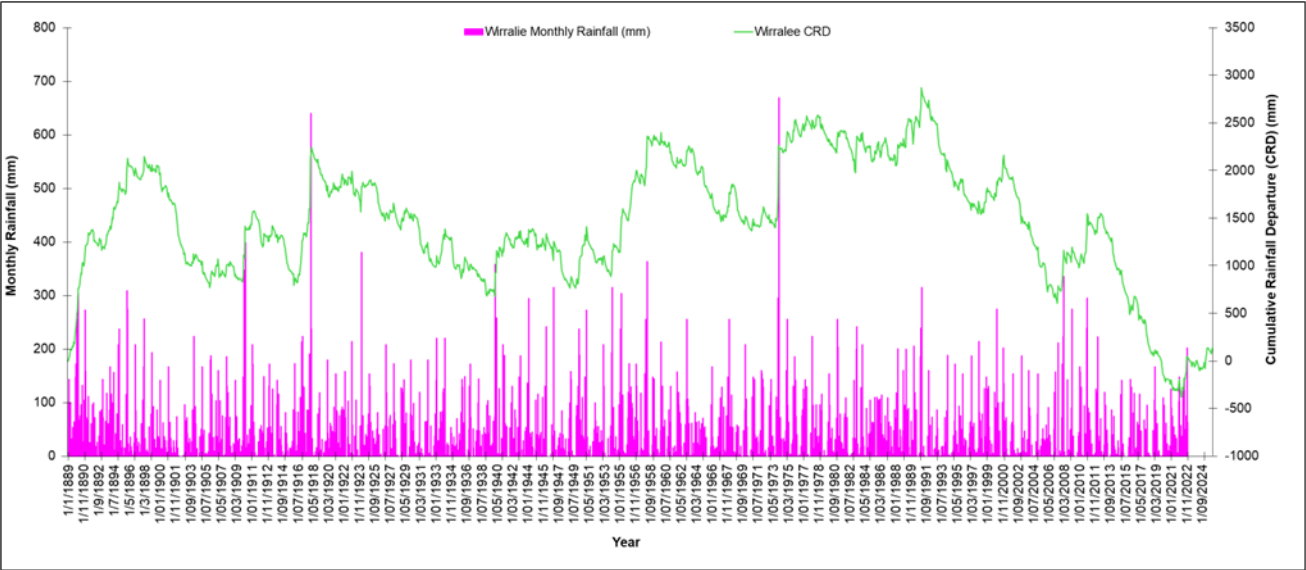


Figure 4 SILO rainfall and CRD (1889-2025)

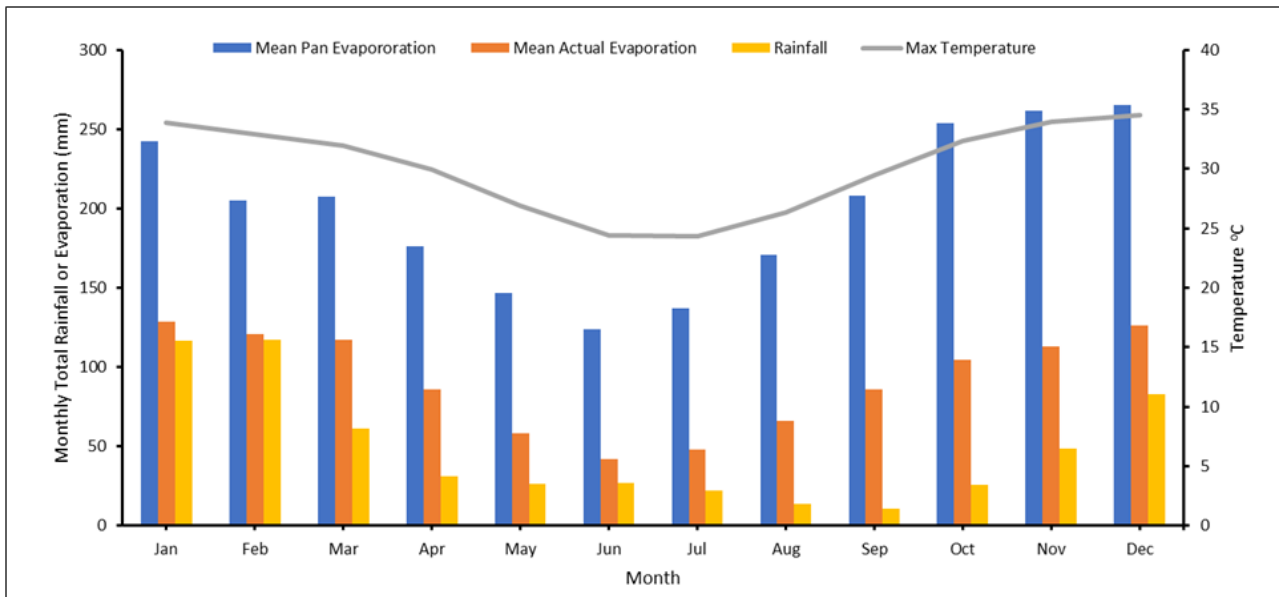


Figure 5 Long-term Evaporation, Rainfall, and Temperature

3. Topography and Surface Drainage

Wirralie is located to the west of the Leichhardt Range, part of the Great Dividing Range, and is situated on a ridge between Rosetta Creek to the southeast and Bungobine Creek to the north (**Figure 5**). Local topography comprises gently undulating rises and plains, with elevations ranging from approximately 250 m AHD near Rosetta Creek to 300 m AHD within the eastern portion of the mining lease (**Figure 6**).

The site is located within the Burdekin River drainage basin, specifically the Suttor River sub-catchment and the Rosetta Creek sub-catchment (**Figure 7**). Surface water drainage from the site is controlled by a series of minor ephemeral drainage lines, including Sugarbag Creek, which conveys runoff northwards towards Rosetta Creek.

These drainage systems are ephemeral in nature, typically flowing only in response to rainfall events and remaining dry for extended periods. Limited short-term pooling may occur following rainfall; however, no permanent surface water bodies are present within the immediate site area.

Clean water diversion structures have been constructed around key infrastructure, including the tailings storage facility, to direct runoff away from disturbed areas and into surrounding drainage lines. At a regional scale, Rosetta Creek drains into the Suttor River approximately 44 km from the site, which ultimately contributes to the Burdekin River system.



Figure 6 Topography and Natural Drainage

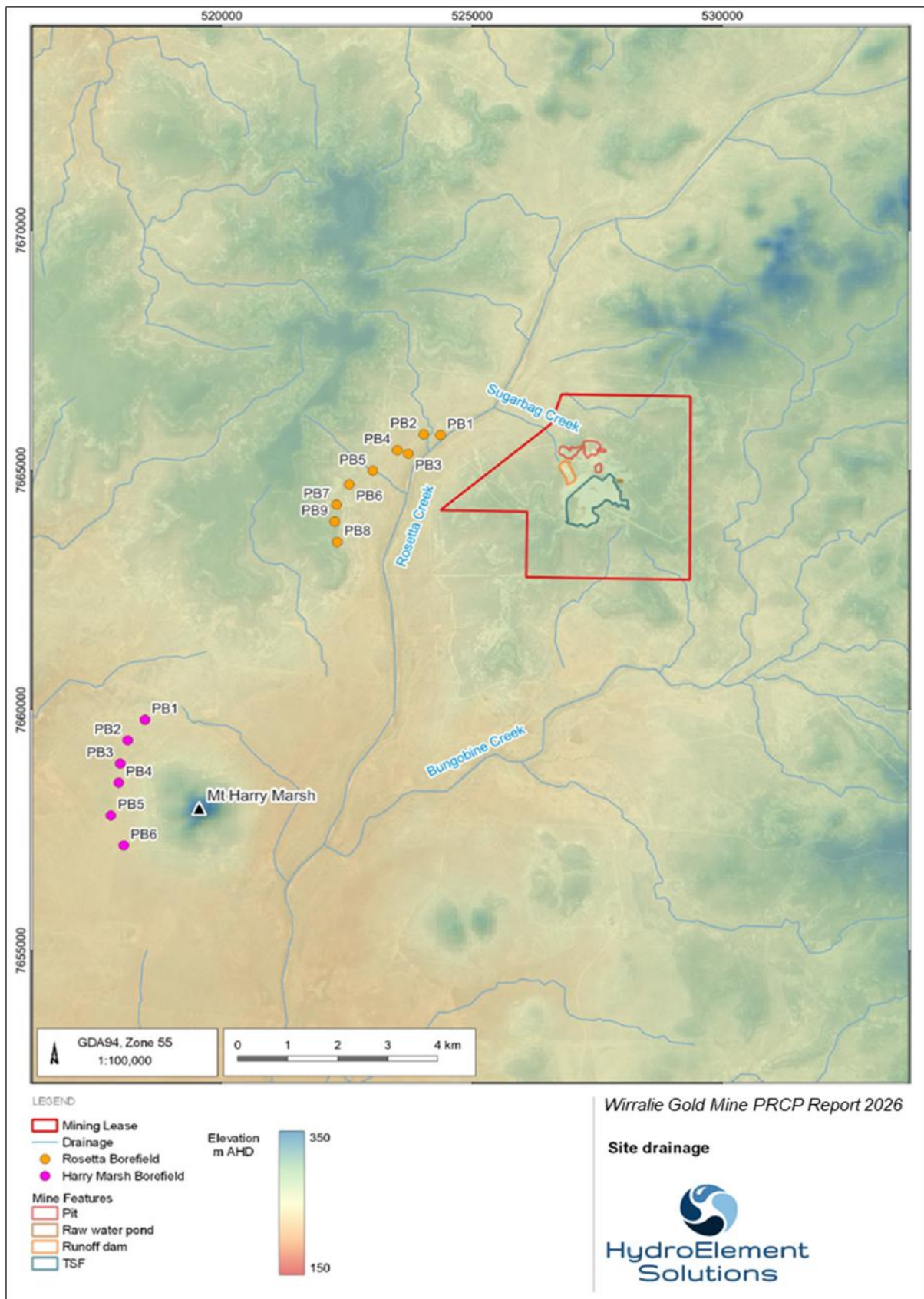


Figure 7 Site Drainage

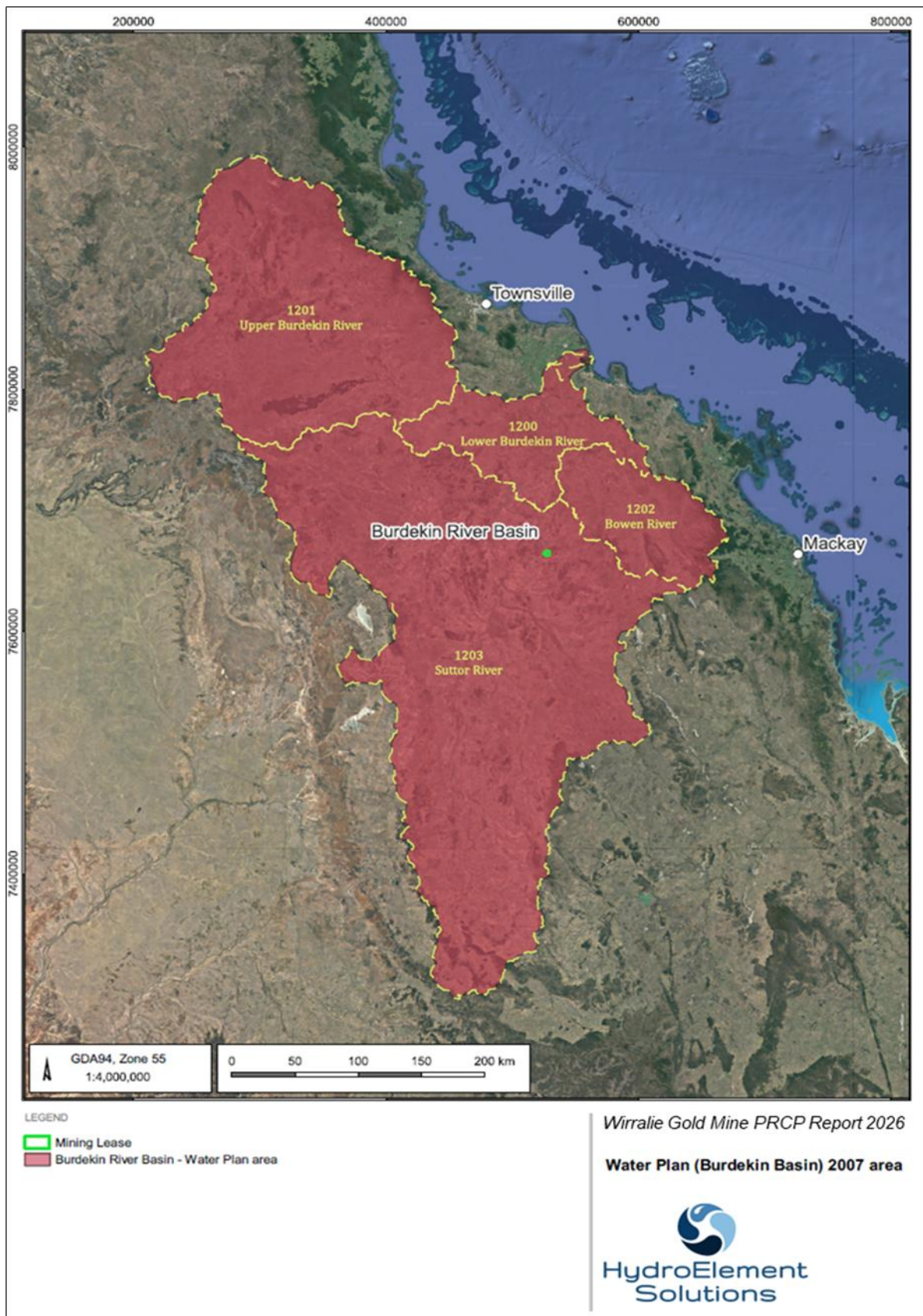


Figure 8 Water Plan (Burdekin Basin) 2007 Area

4. Geology

Regionally, Wirralie is located within the northeastern portion of the Drummond Basin, comprising Upper Devonian to Lower Carboniferous volcanic and sedimentary sequences (Olgers, 1972). The site is located southeast of the Anakie Inlier and is underlain by a sequence of volcanoclastic and sedimentary units associated with the basin's early depositional cycles (Uysal et al., 2011).

Gold mineralisation at the site is hosted within a low-grade, low-sulfidation epithermal quartz vein system associated with the Mount Wyatt Formation. This unit comprises volcanoclastic sediments with interbedded lapilli and crystal tuffs and is characterised by fracture-controlled mineralisation. The presence of fractures and vein networks is a key control on local permeability and groundwater movement within the bedrock.

At a site scale, the principal geological units include the Suttor Formation, Mount Wyatt Formation, Rosetta Creek Formation, and minor Tertiary to Holocene colluvium and alluvium. The Suttor Formation outcrops across much of the mining lease and forms the uppermost bedrock unit, particularly across elevated areas. It unconformably overlies the Rosetta Creek Formation, which is exposed in lower topographic areas where erosion has removed overlying units.

Unconsolidated colluvial deposits occur at the base of slopes, while alluvial sediments are present within the floodplains and active channels of Rosetta Creek and Bungobine Creek. These units may locally influence shallow groundwater processes and surface-water interactions.

Subsurface geological conditions are informed by drilling undertaken in 2021, which indicates that the Suttor Formation is present near surface across the site, with the Mount Wyatt Formation encountered at depth, particularly in the northern areas. The Rosetta Creek Formation was only intersected locally and is inferred to be discontinuous across the site. Groundwater monitoring bores installed to depths of approximately 25 to 76 m below ground level did not intersect deeper basement units, suggesting that groundwater flow is largely contained within the upper weathered and fractured bedrock profile.

The geological framework, particularly the distribution of weathered zones and fracture networks within the Mount Wyatt Formation, provides the primary control on groundwater occurrence, flow pathways, and inflow to pit voids.

Table 2 Summary of Geological Units

Formation	General lithological description ¹	Age ¹
Alluvium - active channel (Qha-QLD)	Sand, gravel, silt and clay; active stream channels and low terraces	Holocene (<0.0117 Ma)
Alluvium - flood plain (Qa-QLD)	Clay, silt, sand, gravel; flood-plain alluvium	Quaternary (<2.58 Ma)

Colluvium (TQr-QLD)	Clay, silt, sand, gravel and soil; colluvial and residual deposits (generally on older land surfaces)	Late Tertiary – Quaternary (<66 Ma)
Suttor (Tu)	Quartz sandstone, clayey sandstone, mudstone and conglomerate; fluvial and lacustrine sediments; minor interbedded basalt	Tertiary (Paleogene and Neogene, 66 - 2.58 Ma)
Rosetta Creek (DCr)	Siltstone to pebbly sandstone with locally abundant plant fossils; numerous, relatively thin rhyolitic ignimbrite sheets. Coherent basalt to andesite lava; minor high-level mafic intrusives. Volcaniclastic sst; minor intermediate pyroclastic deposits.	Late Devonian - Early Carboniferous (375 - 358.9 +/-0.4 Ma)
Mount Wyatt Formation	Labile sandstone and siltstone, tuff, epiclastic sediments, algal limestone pods, minor rhyolite and oligomictic "quartz-pebble" conglomerate.	Late Devonian (Famennian, 372.2 +/-1.6 - 358.9 +/-0.4 Ma)
Silver Hills Volcanics	Rhyolite, dacite, rhyolitic ignimbrite, volcaniclastic sediments, sinter, minor sandstone and siltstone.	Late Devonian - Early Carboniferous (Visean) (371.2 +/-6 - 343.7 +/-5.3)

Notes: ¹Source: Australian Stratigraphic Units Database (Geoscience Australia)

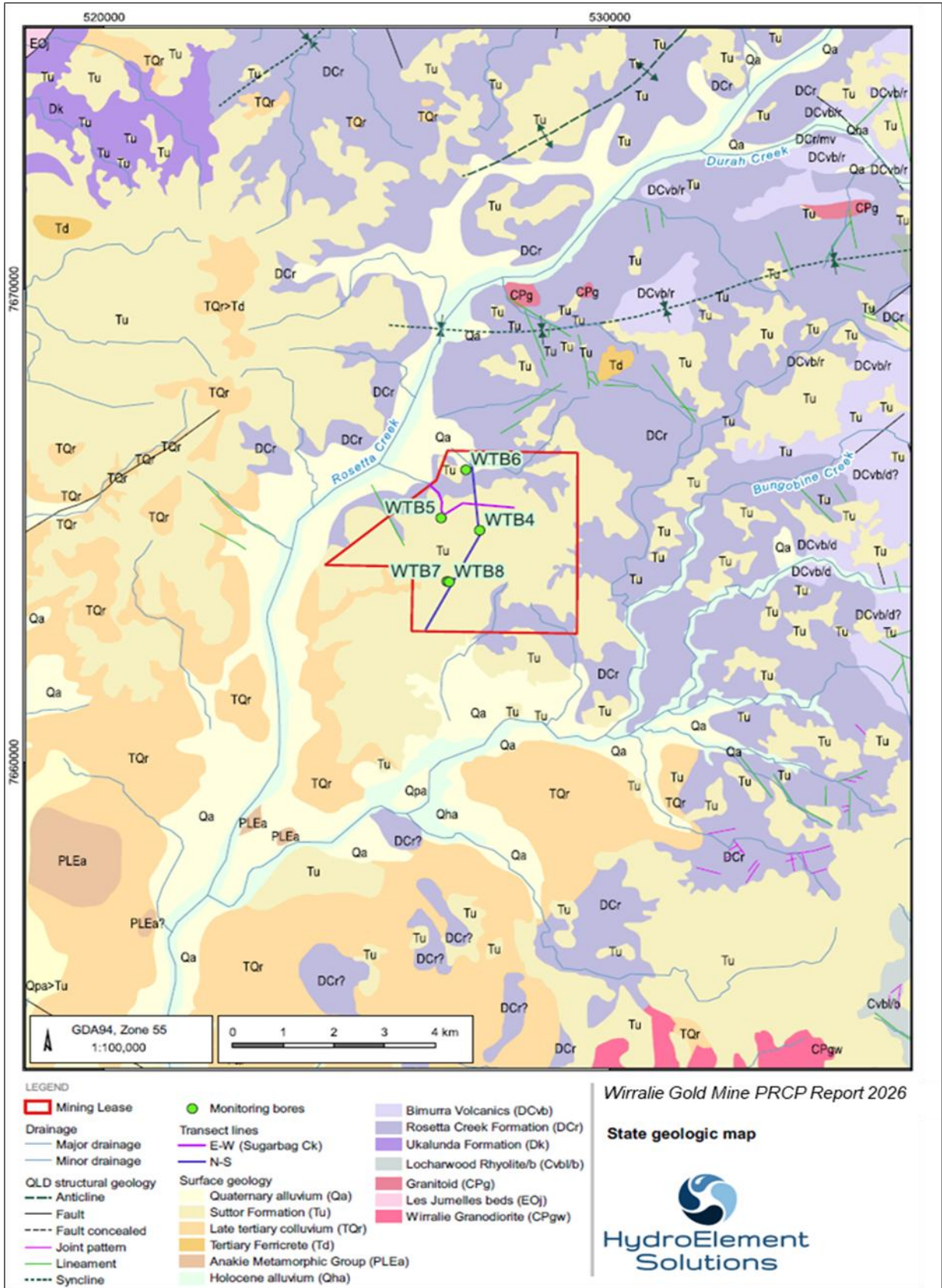


Figure 9 Surface Geology

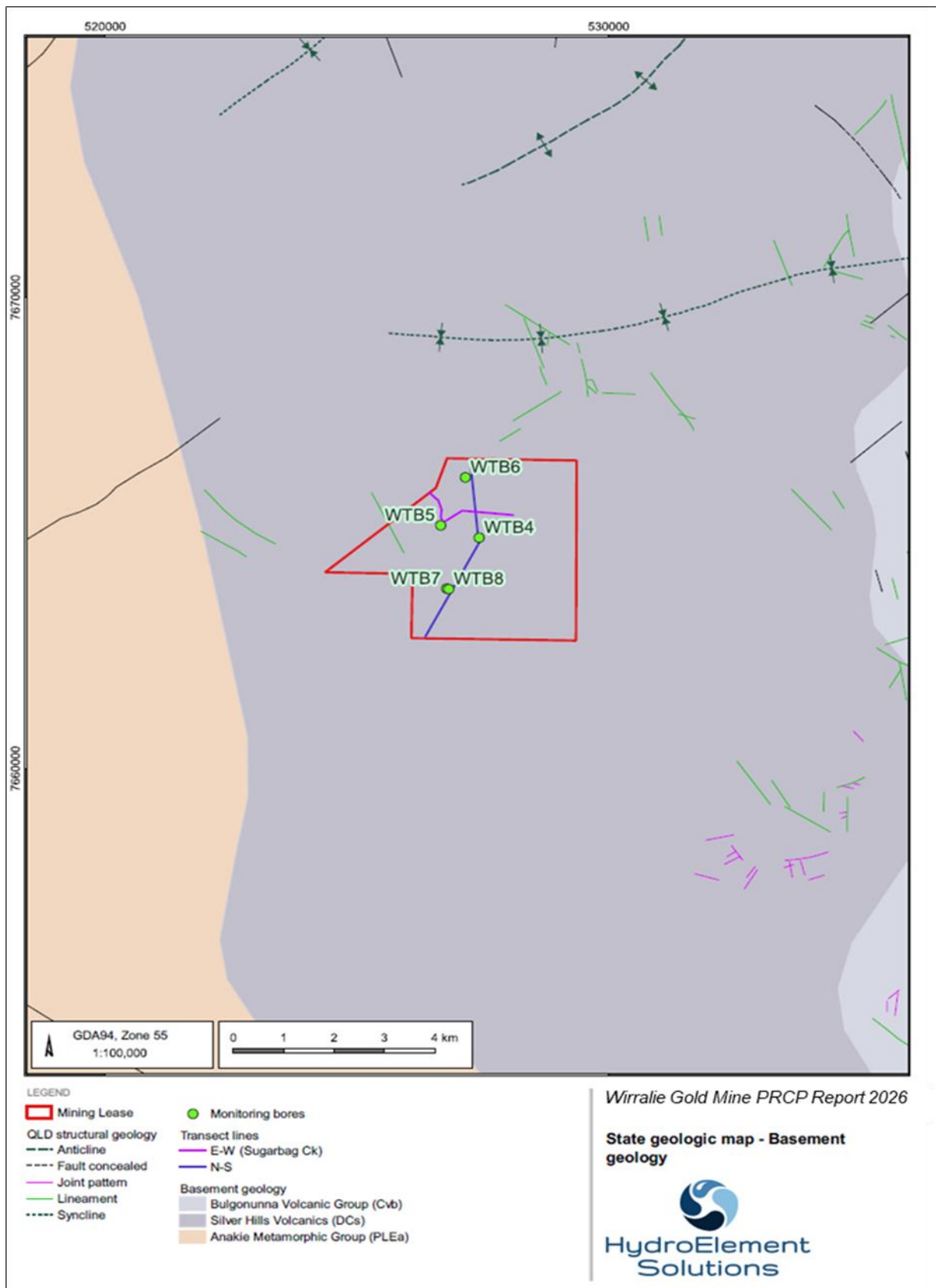


Figure 10 Basement Geology

5. Hydrogeology

5.1 Hydrostratigraphic Units

Groundwater occurrence at Wirralie is controlled by a sequence of weathered and fractured bedrock units overlain by minor unconsolidated sediments. The principal hydrostratigraphic units are:

- Mount Wyatt Formation
- Rosetta Creek Formation
- Suttor Formation
- Minor colluvial and alluvial deposits.

Mount Wyatt Formation

The Mount Wyatt Formation forms the primary bedrock unit hosting mineralisation and is characterised by low primary porosity due to its crystalline nature. Groundwater flow within this unit is therefore controlled by secondary porosity associated with fractures, quartz veining, and structural features. A weathered, clay-rich zone (approximately 5 to 21 m thick) overlies the fresh bedrock and may act as a semi-confining layer, locally influencing vertical groundwater movement.

Rosetta Creek Formation

The Rosetta Creek Formation comprises interbedded sandstone, conglomerate, and clay-rich units and exhibits variable primary porosity depending on grain size, sorting, and clay content. This unit is locally discontinuous and is inferred to have limited spatial extent across the site.

Suttor Formation

The Suttor Formation forms the uppermost bedrock unit across much of the site and consists predominantly of weathered sandstone with variable clay content. Primary porosity within this unit is variable and generally decreases with increasing clay content and ferruginisation (iron enrichment and cementation).

Unconsolidated colluvial and alluvial deposits

Unconsolidated colluvial and alluvial deposits occur locally in low-lying areas and drainage lines. These materials comprise poorly sorted clay, silt, sand, and gravel and may locally support shallow groundwater movement, although they are generally limited in extent and thickness.

Overall, groundwater flow at the site is interpreted to occur predominantly within the weathered and fractured bedrock profile, with the Mount Wyatt Formation representing the primary pathway for groundwater movement and pit inflow.

5.2 Hydraulic Properties

Hydraulic properties of the hydrostratigraphic units were assessed using slug testing undertaken in 2023 (AGE, 2023). Testing was successfully completed in bores screened within the Mount Wyatt Formation, with limited data available for other units due to low permeability conditions or bore constraints.

Hydraulic conductivity values for the Mount Wyatt Formation range from approximately 0.008 to 1.1 m/day, indicating moderate permeability associated with fractured and weathered volcanic rock (AGE, 2023). These values are consistent with published ranges for fractured igneous and volcanic units.

The Suttor Formation is interpreted to have significantly lower permeability, based on limited testing and slow recovery responses observed during field investigations. The Rosetta Creek Formation is expected to exhibit variable hydraulic conductivity depending on lithology, with permeability controlled by the relative proportions of sandstone, conglomerate, and clay-rich material.

Overall, the hydraulic regime at the site is characterised by:

- moderate permeability within fractured bedrock units
- lower permeability within clay-rich and less fractured units
- strong heterogeneity associated with weathering and structural features

These hydraulic properties indicate that groundwater flow is controlled by fracture networks and weathered zones, which are expected to govern groundwater inflow to pit voids.

6. Groundwater Levels and Flow Regime

Groundwater levels at Wirralie have been monitored on a monthly to quarterly basis since the installation of monitoring bores in 2021. Monitoring locations are presented in **Figure 2**, with groundwater level trends shown in hydrographs (**Figure 11** and **Figure 12**) and spatial distribution illustrated by a potentiometric surface map using groundwater levels from May 2023 event (AGE, 2023)(**Figure 13**).

Groundwater levels are generally greater than 20 m below ground level across the site, with shallower water levels of approximately 10 m below ground level observed locally at bore WTB05. Temporal fluctuations of up to approximately 5 m are observed; however, groundwater levels are generally stable over time, with no consistent long-term or seasonal trends evident across the monitoring network.

The absence of clear seasonal or long-term trends, despite periods of above-average rainfall, indicates that groundwater recharge is limited and occurs slowly. This behaviour is consistent with the climatic conditions at the site, which are characterised by high evaporation and low effective rainfall, as well as the relatively low to moderate hydraulic conductivity of the hydrostratigraphic units.

The potentiometric surface indicates that groundwater flow is controlled by topography, with flow generally directed towards lower elevation areas associated with local drainage systems. Pit A and Deep Lead Pit are interpreted to be hydraulically connected to the groundwater system, whereas

water bodies within North Pit and Pit B are interpreted to be perched above the regional water table.

Overall, groundwater conditions at the site are characterised by:

- relatively deep water levels
- limited and diffuse recharge
- low hydraulic gradients
- stable groundwater conditions with minimal temporal variability

These characteristics indicate a low-energy groundwater system, with groundwater movement controlled primarily by topography and fracture permeability, and are consistent with conditions where evaporative processes dominate over recharge. This has important implications for pit void behaviour, particularly in relation to the development of groundwater sinks at closure.

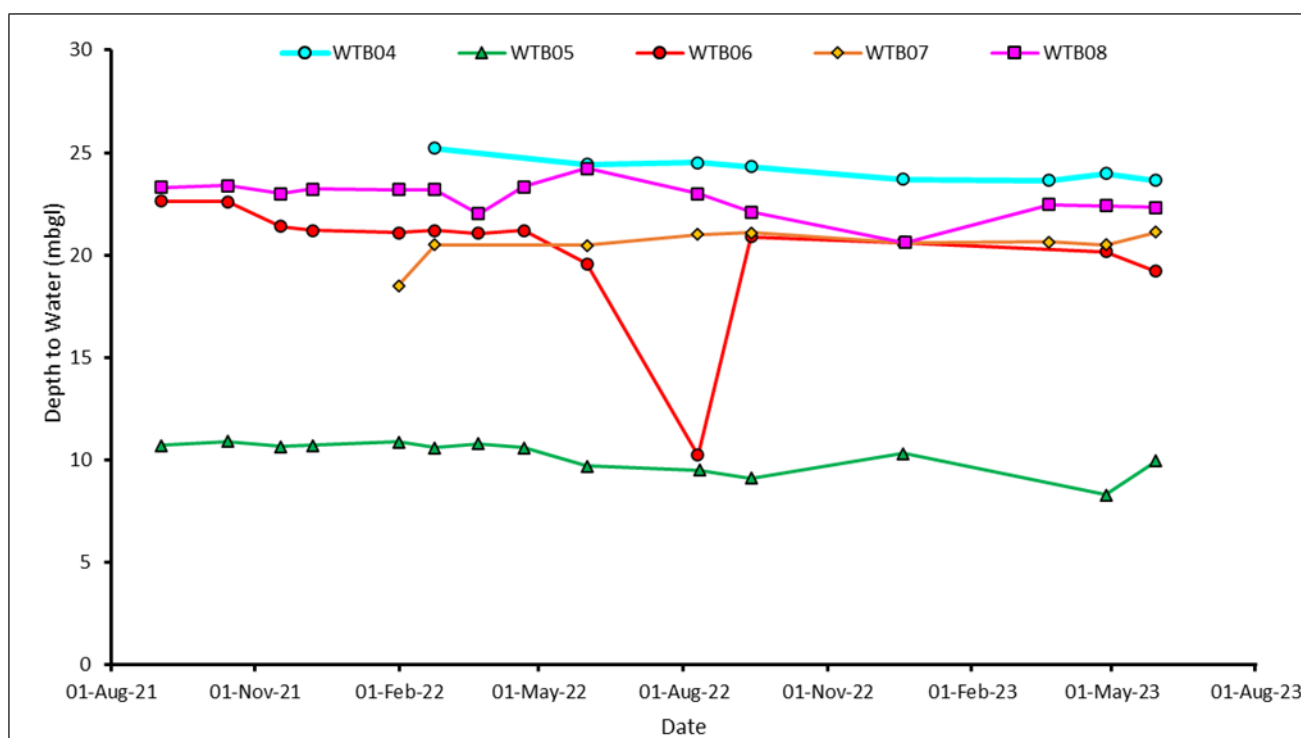


Figure 11 Groundwater Levels at Wirralie (mbgl)

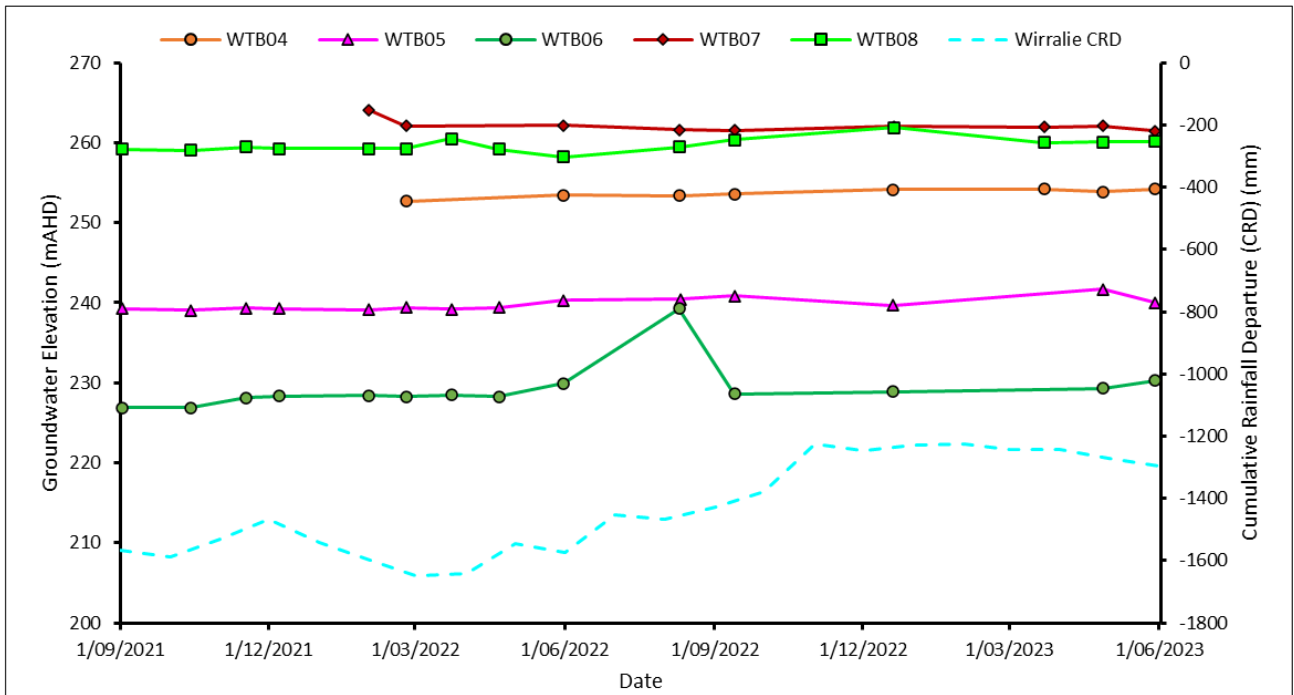


Figure 12 Groundwater Level (mAHD) at Wirralie

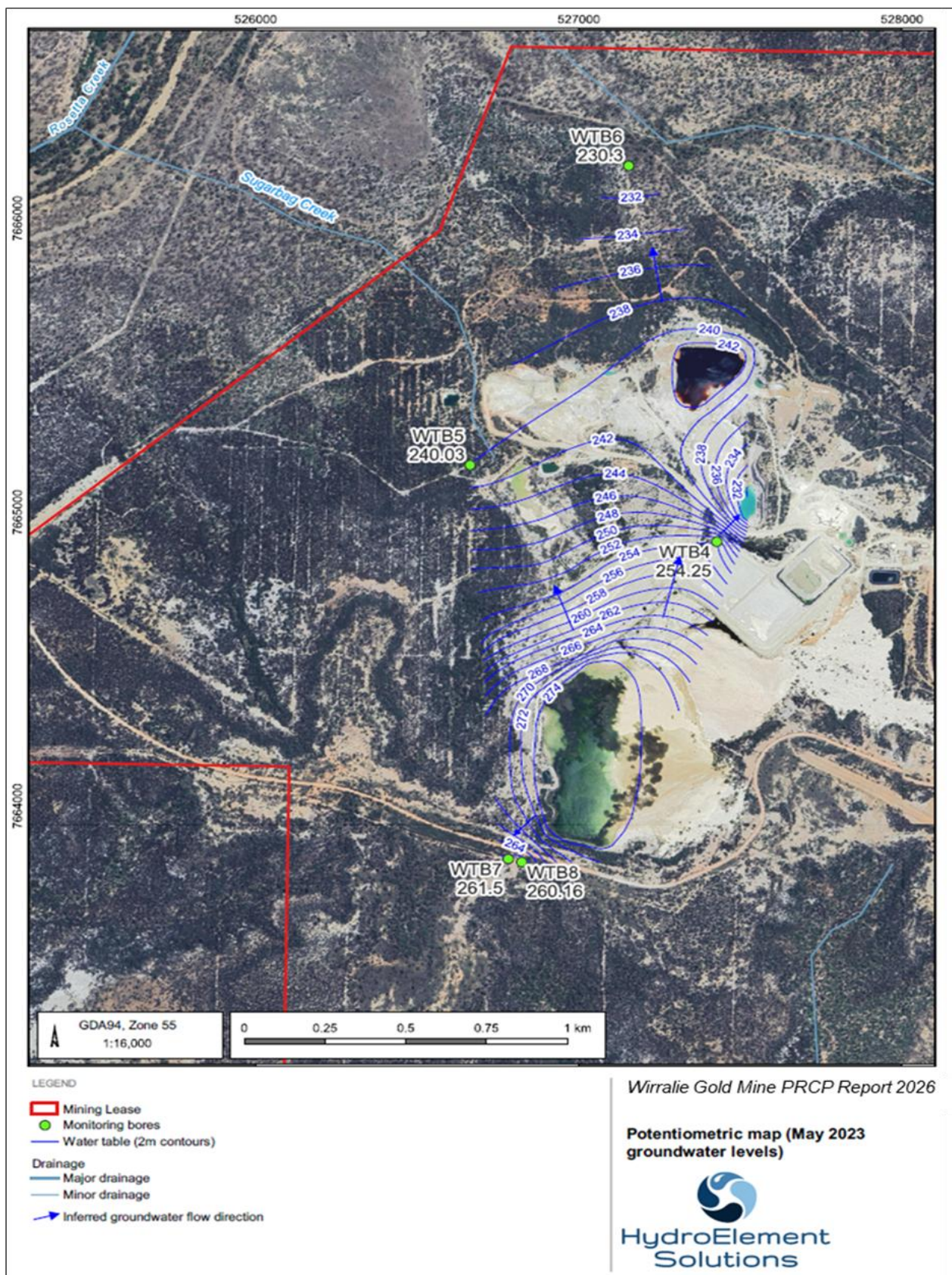


Figure 13 Potentiometric Map using Groundwater Level

7. Groundwater Recharge, Discharge and Interaction

7.1 Recharge

Groundwater recharge at Wirralie is limited and occurs primarily in response to episodic, high-intensity rainfall events (AGE, 2023). Recharge is most likely to occur within unconsolidated colluvial and alluvial sediments and within the weathered zones of the Suttor Formation, where infiltration is facilitated by higher permeability and surface exposure.

However, a significant proportion of rainfall is expected to be lost as surface runoff, particularly across elevated areas of the Suttor Formation, where slopes and soil characteristics promote rapid drainage. As such, effective recharge is likely to be low and spatially variable.

Recharge to the deeper Mount Wyatt Formation and Rosetta Creek Formation is inferred to occur indirectly via downward percolation from overlying units, lateral seepage, and preferential flow pathways associated with fractures and structural features. Overall, recharge is interpreted to be diffuse, limited, and controlled by climatic conditions and geological structure.

7.2 Discharge

Groundwater discharge at the site is dominated by evaporation and subsurface through-flow within the hydrostratigraphic units. Evaporative discharge may occur where groundwater levels are sufficiently shallow, particularly within unconsolidated sediments and weathered zones.

Vertical leakage between units is also likely, with groundwater moving from higher permeability units into lower permeability units or deeper formations. Within the Mount Wyatt Formation, groundwater discharge is expected to be controlled by fracture networks and structural features, which facilitate preferential flow.

Overall, the groundwater system is characterised by low discharge rates and limited surface expression of groundwater.

7.3 Groundwater Abstraction

Historical groundwater abstraction was undertaken from local borefields to support previous mining operations. The current operation extracts groundwater on an as-needed basis from the Rosetta Creek borefield for potable use and processing requirements.

No significant groundwater abstraction is currently known to occur in the vicinity of the site outside of operational requirements. Monitoring bores installed at the site are not used for abstraction and are dedicated to groundwater level and quality monitoring.

7.4 Groundwater–Surface Water Interaction

Surface water features in the vicinity of the site, including Rosetta Creek and associated drainage lines, are ephemeral and flow only in response to rainfall events. Groundwater levels are generally more than 20 m below ground level and remain below the base of nearby creek systems.

Based on the relative elevation of groundwater levels and surface water features, there is no evidence of groundwater discharge to surface water systems (i.e. no baseflow contribution). This is consistent with the absence of springs in the area and indicates that surface water systems are not sustained by groundwater inputs.

8. Groundwater Quality

Groundwater quality monitoring at Wirralie has been undertaken on a routine basis since August 2021, with data available from bores located within approximately 550 m of site infrastructure. Historical groundwater quality data prior to this period is limited.

Groundwater quality across the site is variable, with several parameters indicating potential influence from mining activities. At metalliferous mine sites, indicators of potential impact typically include low pH, elevated total dissolved solids (TDS), increased sulfate concentrations, elevated metal concentrations, and variations in sulfate to chloride ratios. At least one of these indicators is present in each monitoring bore; however, due to the absence of background reference locations, it is not possible to definitively distinguish between natural baseline conditions and mining-related impacts.

Groundwater pH across the monitoring network ranges from approximately 3 to 8. Groundwater in bores WTB06, WTB07, and WTB08 is generally circum-neutral to slightly acidic, which is within the range reasonably expected for groundwater in the region. In contrast, groundwater in WTB04 is acidic and groundwater in WTB05 is very acidic. These low pH values are not fully consistent with the 2021 waste rock characterisation results, which indicated that the sampled waste material generally had a low acid-forming potential. This apparent inconsistency may indicate that the sampled surface materials had already undergone oxidative leaching of sulfides prior to testing, or that other materials at site, including ore-related material not assessed in the waste rock study, have a greater acid-generating potential.

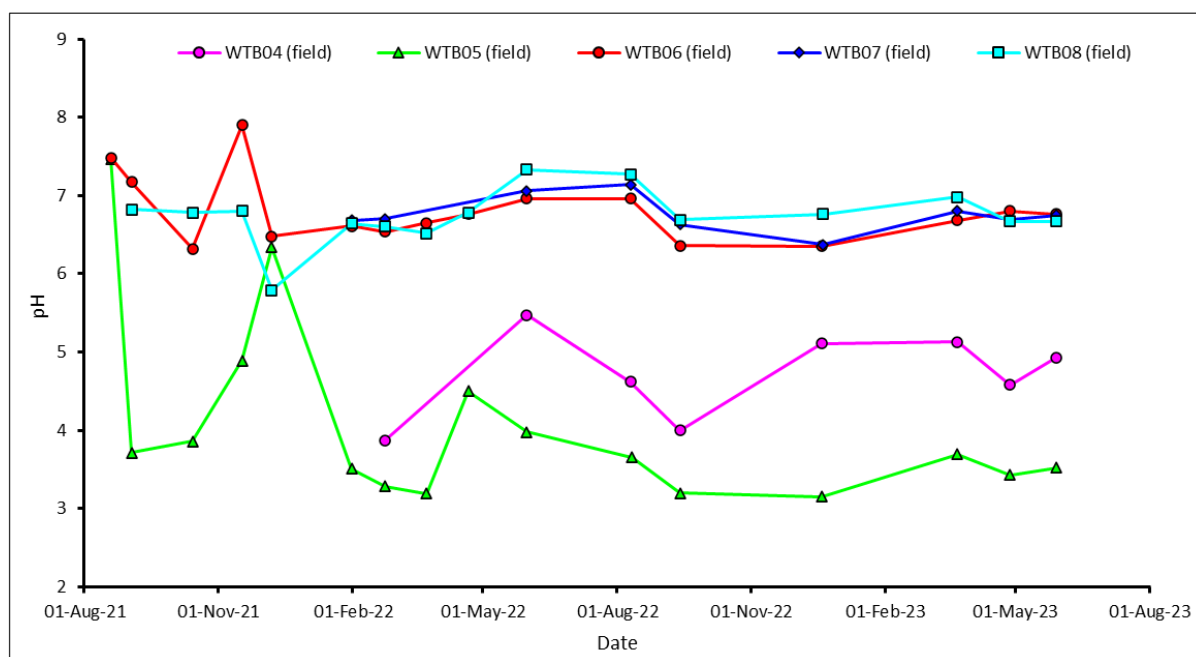


Figure 14 pH at Wirralie Groundwater Bores

TDS in groundwater ranges from approximately 283 to 15,700 mg/L, indicating fresh to saline groundwater conditions across the site. Saline groundwater with TDS greater than 10,000 mg/L occurs in WTB05 and WTB06. Relatively fresh groundwater is present in WTB04 and WTB08, while brackish groundwater is generally present in WTB07. Sulfate concentrations show patterns that broadly align with TDS trends, indicating that sulfate contributes significantly to overall salinity. However, the groundwater chemistry does not indicate a single uniform hydrogeochemical process across the site. Elevated salinity occurs in both circum-neutral groundwater, such as at WTB06, and acidic groundwater, such as at WTB05, while WTB04 exhibits acidic but relatively fresh groundwater. This indicates that groundwater evolution at Wirralie cannot be explained solely by sulfide oxidation and likely reflects a combination of processes, including sulfate generation, evapoconcentration, saline but circum-neutral drainage, and ongoing natural water-rock interaction.

Sulfate concentrations broadly correlate with TDS, indicating that salinity is influenced in part by sulfate. However, the relationship between pH and salinity is not consistent across the site, with both acidic and circum-neutral waters exhibiting elevated salinity. This suggests that groundwater chemistry cannot be explained solely by sulfide oxidation and may also reflect processes such as evapoconcentration, saline but neutral drainage, and natural water-rock interaction.

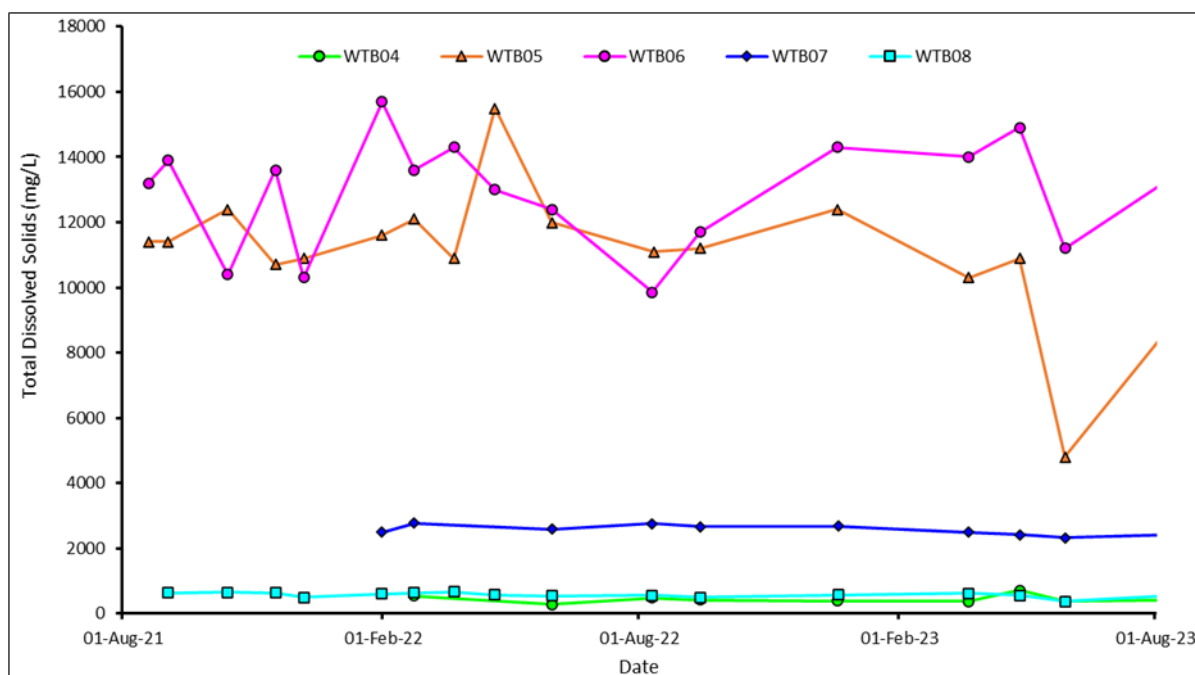


Figure 15 TDS at Wirralie Groundwater Bores

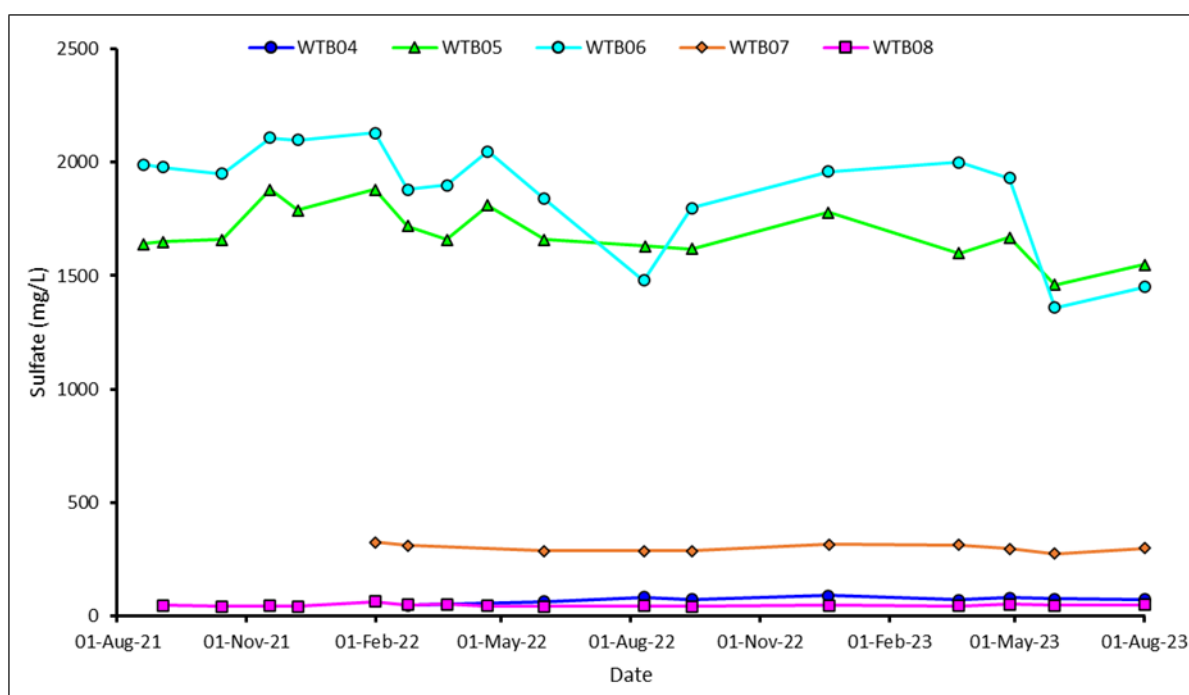


Figure 16 Sulfate at Wirralie Groundwater Bores

Dissolved metals including cadmium, copper, lead, and zinc have been detected in groundwater at the site. The highest dissolved copper concentrations occur in WTB05, which also has the highest TDS, and in WTB04, which has the lowest pH. This suggests that elevated dissolved metal concentrations may be associated with both acidic conditions and saline groundwater conditions at Wirralie. The observed metal distribution is therefore consistent with mobilisation under low pH

conditions in some areas, and under high ionic strength or mixed hydrogeochemical conditions in others.

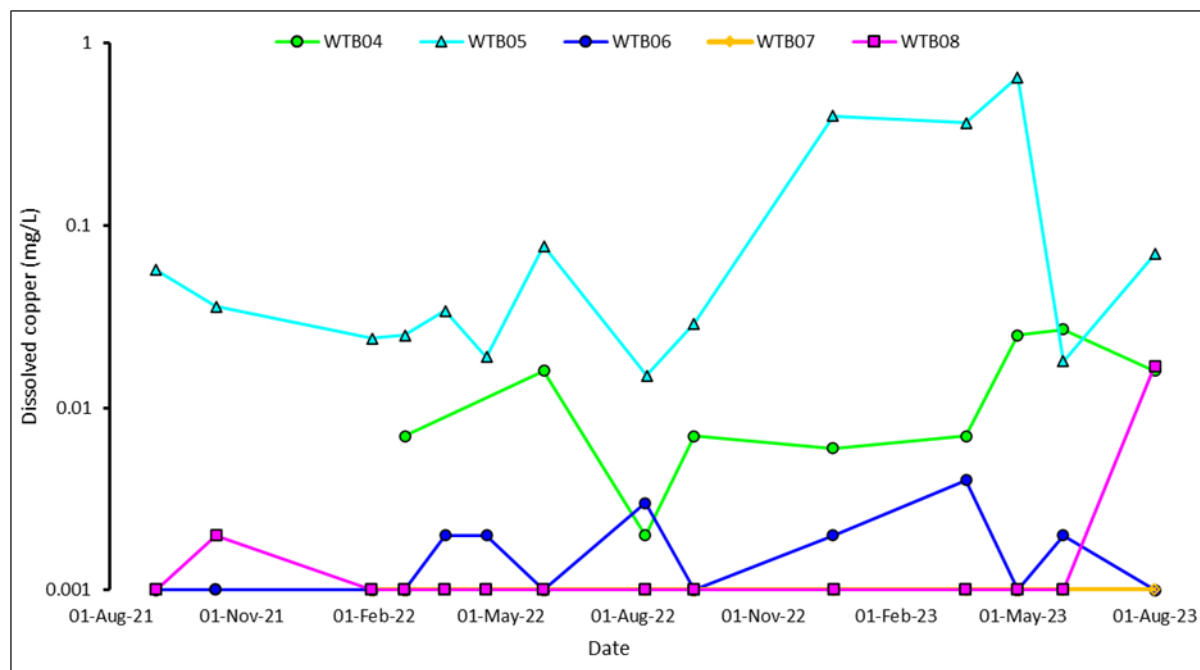


Figure 17 Copper at Wirralie Groundwater Bores

To further assess the processes controlling groundwater chemistry, sulfate to chloride ratios and Piper diagram interpretations were considered. Sulfate to chloride ratios are useful because chloride is relatively conservative and generally reflects meteoric and evaporative concentration processes, whereas sulfate may increase due to sulfide oxidation or other sulfate sources. At Wirralie, sulfate to chloride ratios in WTB05, WTB06, WTB07, and WTB08 are generally between 0.2 and 0.4, whereas WTB04 records a ratio greater than 0.5. The higher sulfate to chloride ratio in WTB04, together with its low pH, is consistent with sulfide oxidation contributing to acidic groundwater conditions. However, sulfate to chloride ratios alone do not clearly distinguish mining-derived solutes from natural sources across the site, because WTB05, which also exhibits low pH, elevated TDS, and elevated metals, has a sulfate to chloride ratio similar to bores WTB06, WTB07, and WTB08.

Major ion composition indicates that groundwater at Wirralie is predominantly sodium-potassium type with chloride or chloride-bicarbonate dominated anion chemistry. Relative to WTB05, WTB06, and WTB07, groundwater from WTB04 shows a stronger sulfate signature, while WTB08 shows a stronger bicarbonate signature. The differing composition at WTB08 is likely related to its location within a deeper and distinct hydrostratigraphic unit, namely the Rosetta Creek Formation, and/or reduced influence from mine-related solute sources compared with shallower bores.

Overall, groundwater quality at Wirralie is spatially variable and reflects a combination of natural geochemical processes and likely localised influence from historical and current mining activities. The available data indicate that some bores exhibit water quality characteristics consistent with mining-related seepage or geochemical influence; however, the absence of background reference bores means attribution cannot be made with certainty across the entire site. This uncertainty

should be recognised in the interpretation of potential source-pathway-receptor linkages and in the assessment of groundwater impacts under closure conditions.

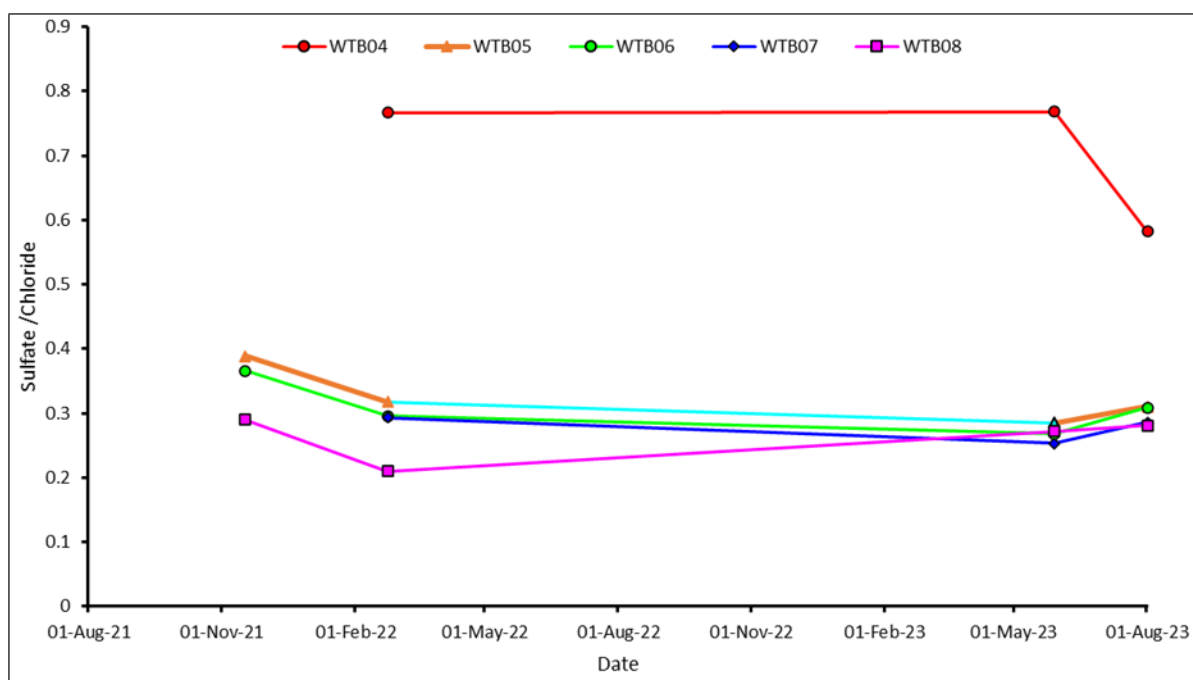


Figure 18 Sulfate-Chloride ratio at Wirralie Groundwater Bores

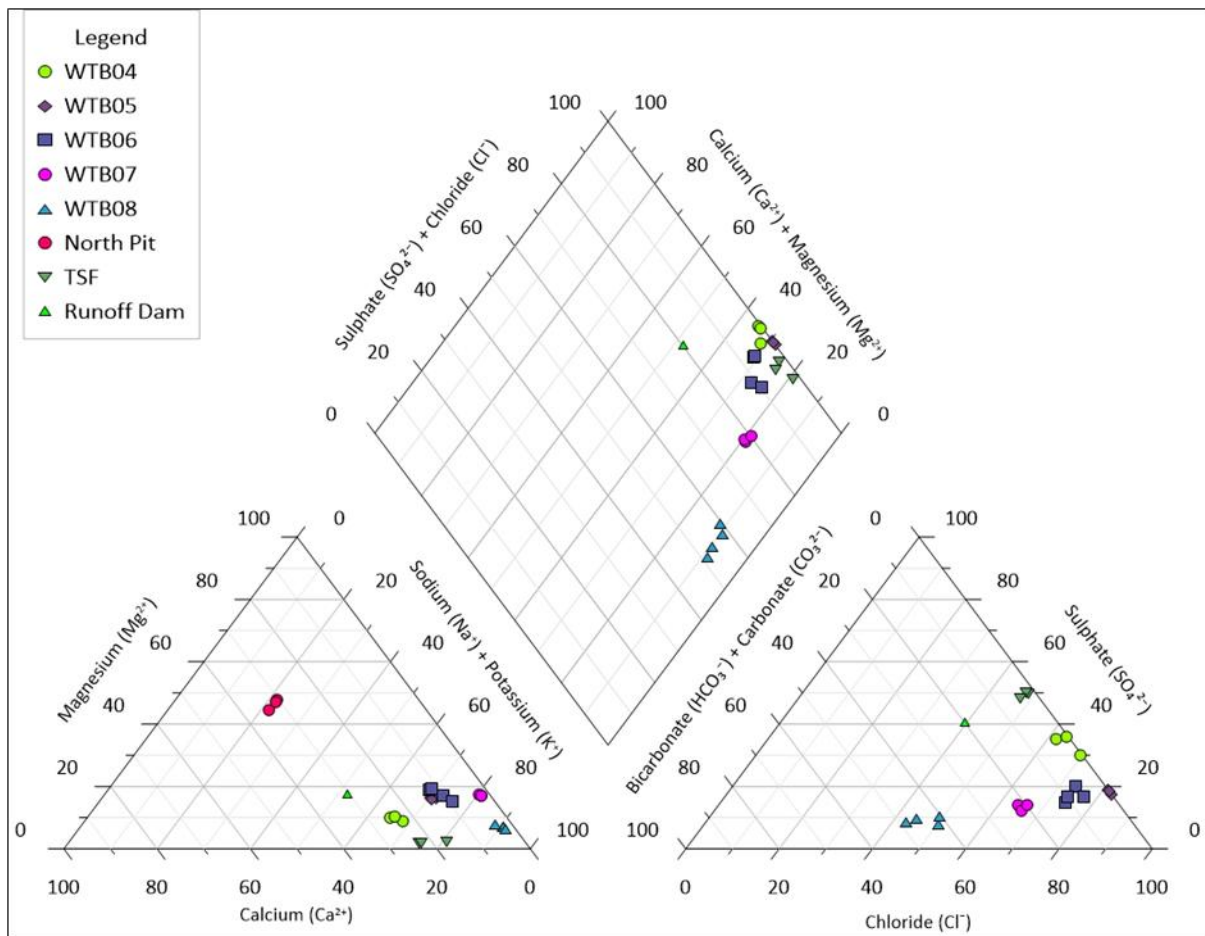


Figure 19 Piper Diagram of Wirralie Groundwater Bores

Table 3 Wirralie Groundwater Quality Summary

Bore ID	Analyte	pH	TDS	SO4	Ar	Cd	Cu	Fe	Pb	Mn	Mo	Se	Zn	Hg	Cyanide
	Units	pH units	g/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	LoR			1	0.001	0.0001	0.001	0.05	0.001	0.001	0.001	0.01	0.005	0.0001	0.004
WTB04	Min	3.87	283	46	0.0005	0.00005	0.002	0.025	0.0005	0.641	0.0005	0.005	0.024	0.00005	0.002
	Median	4.62	416	72	0.0005	0.0001	0.007	0.025	0.0005	0.773	0.0005	0.005	0.121	0.00005	0.002
	Max	5.47	720	88	0.008	0.0003	0.027	0.2	0.0005	0.902	0.002	0.005	0.268	0.00005	0.002
	No. of samples	9	9	9	9	9	9	3	9	3	9	9	9	9	9
WTB05	Min	3.15	4810	1460	0.007	0.0043	0.015	0.26	0.002	6.76	0.0005	0.005	2.28	0.00005	0.002
	Median	3.65	11400	1660	0.01	0.0046	0.035	0.34	0.0065	6.86	0.0005	0.0075	3.105	0.00005	0.002
	Max	7.47	15500	1880	0.023	0.0054	0.651	0.5	0.036	7.27	0.0005	0.02	4.63	0.0101	0.002
	No. of samples	17	17	17	14	14	14	3	14	3	14	14	14	14	17
WTB06	Min	6.32	9860	1360	0.002	0.00005	0.0005	0.025	0.0005	2.18	0.002	0.005	0.0025	0.00005	0.002
	Median	6.76	13600	1950	0.003	0.0002	0.001	0.025	0.0005	4.14	0.004	0.005	0.00475	0.00005	0.002
	Max	7.9	15700	2130	0.005	0.0024	0.004	0.025	0.0005	8.42	0.013	0.005	0.192	0.00005	0.002
	No. of samples	17	17	17	14	14	14	3	14	3	14	14	14	14	17
WTB07	Min	6.37	2330	273	0.0005	0.00005	0.0005	0.025	0.0005	0.0005	0.003	0.005	0.0025	0.00005	0.002
	Median	6.725	2545	295.5	0.0005	0.00005	0.00075	0.025	0.0005	0.102	0.0035	0.005	0.0075	0.00005	0.002
	Max	7.46	2770	323	0.002	0.0003	0.001	0.025	0.0005	0.81	0.01	0.005	0.035	0.00005	0.002
	No. of samples	10	10	10	10	10	10	3	10	3	10	10	10	10	10
WTB08	Min	5.79	378	40	0.0005	0.00005	0.0005	0.025	0.0005	0.004	0.0005	0.005	0.0025	0.00005	0.002
	Median	6.77	594	43.5	0.0005	0.00005	0.0005	0.025	0.0005	0.015	0.001	0.005	0.0025	0.00005	0.002
	Max	7.45	676	62	0.0005	0.00005	0.017	0.025	0.0005	0.026	0.002	0.005	0.07	0.00005	0.002
	No. of samples	16	16	16	14	14	14	3	14	3	14	14	14	14	16

9. Groundwater Flow and Velocity

9.1 Groundwater Flow Direction

Analysis of groundwater level elevations provides an understanding of groundwater flow patterns and their relationship to the stratigraphic and structural framework at Wirralie. Interpretation of the potentiometric surface indicates that groundwater flows from areas of higher hydraulic head to areas of lower hydraulic head, consistent with fundamental groundwater flow principles.

Groundwater flow across the site generally follows topographic gradients, with flow directed from south to north, moving from the mining and process areas towards Sugarbag Creek and Rosetta Creek. This interpretation is supported by both the potentiometric contour mapping and the conceptual cross-sections, which together indicate that groundwater movement is controlled by surface topography and the underlying hydrostratigraphic framework.

The potentiometric surface and conceptual cross-sections suggest potential hydraulic connectivity between groundwater and water bodies within Pit A, the Deep Lead Pit, and the TSF pond. The inferred hydraulic connection between the TSF pond and groundwater results in apparent mounding beneath the TSF. However, it is also plausible that an unsaturated zone exists beneath the TSF, such that the TSF pond may be partially or fully perched above the regional water table.

9.2 Groundwater Velocity

Groundwater flow velocity within the Mount Wyatt Formation was estimated using Darcy's Law, based on hydraulic gradients calculated between monitoring bores WTB05 and WTB06. These bores are screened within the same hydrostratigraphic unit and are approximately aligned along an interpreted groundwater flow path, making them suitable for first-order velocity estimation.

Average linear groundwater velocity was calculated using:

$$v = (K \times dh/dl) / n_e$$

where:

- K is hydraulic conductivity
- dh/dl is the hydraulic gradient between the two bores
- n_e is the effective porosity

Hydraulic gradients were calculated using measured groundwater levels (hydraulic heads) and the distance between bore screens. A range of hydraulic conductivity values was applied based on field-derived estimates, and effective porosity values of 5% and 15% were adopted to represent plausible lower and upper bounds for fractured rock systems.

Based on these assumptions, estimated average linear groundwater velocities within the Mount Wyatt Formation range from approximately 2.1 m/year to 69 m/year (**Table 4**). These velocity estimates provide an indication of the potential rate of groundwater movement within the fractured rock aquifer. However, they are derived from a single bore pair and therefore represent a simplified approximation of site conditions. Spatial variability in hydraulic conductivity, fracture density, and

structural controls means that actual groundwater velocities may vary across the site and may not be fully represented by this estimate.

Table 4 Groundwater Velocity Estimates

Up- gradie nt bore	Up- gradie nt head (mAHD)	Down- gradie nt bore	Down- gradie nt head (mAHD)	dh/d l (m/ m)	dh/dl as a ratio (1 to m)	K (m/d)	(K) comment	$v_{\max}$ if $n_e = 5\%$ (m/yr)	$v_{\min}$ if $n_e = 15\%$ (m/yr)
WTB0 5	240.0 3	WTB0 6	230.30	0.00 9	116	0.008	Min (based on field tests)	2.1	6.3
WTB0 5	240.0 3	WTB0 6	230.30	0.00 9	116	1.1	Max (based on field tests)	23	69

Notes:

Horizontal and vertical distance between bore screens used for calculation of dh/d.

Head = groundwater level.

mAHD = metres Australian Height Datum.

m/d = metres per day.

K = hydraulic conductivity

dh/dl = hydraulic gradient.

n_e = effective porosity, assumed to be 5% to 15%.

v = average linear velocity (Darcy velocity).

Potential Sources

1. Pit Voids

The Wirralie Gold Mine comprises five open-cut pits: Pit A, Pit B, North Pit, Deep Lead Pit, and the Blinky Pit. These voids represent key potential sources of groundwater and surface water interaction and are therefore important components of the hydrogeological assessment.

Development of Pit A and North Pit by previous operators is considered complete. Pit B is currently active and will continue to be mined, with no planned increase in surface footprint.

At closure, all pits are designated as Non-Use Management Areas. The remaining landforms will be re-shaped to promote stable, free-draining conditions away from the residual voids, and fencing will be installed to prevent access.

A summary of pit geometry and available water quality data is provided below.

1.1 Pit A

Pit A was mined between 1987 and 1993. The existing void is triangular in plan, with two extensions oriented to the south and east, and has an approximate surface area of 8.32 ha. Surrounding topography is approximately 270 m AHD, rising to about 290 m AHD to the west. Historical interpretation has assumed the pit base to be approximately 234 m AHD, based on an inferred depth of 5 m in the southern arm and 10 m in the northern part of the void.

Pit A contains a persistent pit lake. The updated 2026 pit survey recorded a water level of approximately 242.5 m AHD. The pit has a relatively small contributing catchment, although hydraulic and surface water linkage with North Pit may occur at elevated water levels. Historical interpretation also indicates that at sufficiently high-water levels, overflow from Pit A could occur towards Deep Lead Pit.

Available water quality data indicate that Pit A water is highly acidic and saline, with elevated sulfate and dissolved metal concentrations, including aluminium, arsenic, cadmium, copper, nickel, and zinc. The water has been described as dark with a reddish hue, consistent with strongly acidic and metalliferous conditions.

Table 5 Pit A Water Quality (Landline Consulting, 2003)

Site	Date	pH	TDS	SO ₄	Al	As	Cd	Cu	Mo	Ni	Pb	Zn	Total CN
		pH Unit	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Pit A (SW3)	26/08/2000	2.2	11200	7900	582	42.5	0.018	4.73	0.005	1.2	0.0005	11.2	
Pit A (SW3)	19/11/2000	2.2	12400	7420	544	40	0.095	4.3	0.21	1.18	0.0005	10.8	
Pit A (SW3)	31/01/2001	2.22	4680	8300	626	44.7	0.102	4.73	0.23	1.25	0.0005	11.4	

Pit A (SW3)	21/02/2001	2.2	12600	8370	581	42.7	0.105	4.64	0.16	1.18	0.001	10.9	0.005
Pit A (SW3)	11/05/2001	2.17	13300	7790	664	45.1	0.109	5.66	0.19	1.27	0.0005	11.1	0.0025
Pit A (SW3)	8/08/2001	2.13	12800	9580	707	48.6	0.108	4.98	0.22	1.39	0.0005	12.7	0.0025

1.2 Pit B

Pit B was initially mined between 1987 and 1993 and remains the principal active mining void. The pit has an approximate surface area of 7.27 ha, and mining is planned to continue without increasing the surface footprint. Mining had previously reached approximately 255 m AHD, and pit progression is expected to extend laterally to the east and west. Surrounding elevations range from approximately 280 to 290 m AHD to the north and approximately 250 to 258 m AHD to the west.

The updated 2026 pit survey recorded water at approximately 243 m AHD; however, the void is described as largely dry, apart from a small perched lake in the north-eastern corner.

Available pit water quality data are limited to a single historical sample, which indicated acidic conditions, moderate salinity, and detectable dissolved metals.

Table 6 Pit B water Quality (Landline Consulting, 2003)

Site	Date	pH	EC	TDS	SO4	Al	As	Cd	Cu	Mo	Ni	Pb	Zn	Hg
		pH Unit	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Pit B	Oct-01	2.84	2200	1100	516	61.4	0.008	0.001	0.443	0.005	0.06	0.0005	0.6	0.00005

1.3 North Pit

North Pit was developed between 1999 and 2001 and has a surface area of approximately 0.67 ha. The void narrows in the centre, with a small pit lake located on the north-western side. The pit extends approximately 100 m east to west and 65 m north to south at its widest point.

The updated 2026 pit survey recorded a water level of approximately 249 m AHD. Historical observations and recent imagery indicate that the size of the pit lake varies with climatic conditions. North Pit shares local topographic and catchment relationships with Pit A and may contribute flow towards Pit A under elevated water level conditions.

Available water quality data indicate that North Pit water is acidic and saline and contains elevated concentrations of manganese and zinc.

Table 7 North Pit Water Quality (AGE, 2023)

Location	Date	pH	EC	TDS	SO4	Cl	Ca	Mg	Na	K	CN
		pH Unit - lab	µS/cm - field	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Pit North	1/07/2002	2.7	4490	5090	3590	*	*	*	*	*	*
North Pit	17/11/2021	2.23	8052	10600	8760	173	141	135	114	3	<0.004

N PIT	23/03/2023	2.45	5010	4960	4040	93	86	69	62	2	<0.004
North Pit	29/05/2023	2.28	5625	7340	4520	114	96	88	77	2	<0.004
North Pit	2/08/2023	2.29	*	7020	5200	124	*	93	85	2	<0.004

1.4 Deep Lead Pit

Deep Lead Pit was developed between 1999 and 2001 and has an approximate surface area of 1.83 ha. The void is oblong in shape and contains a turquoise pit lake. Historical observations indicate water levels of approximately 229 to 230 m AHD, and the updated 2026 pit survey recorded a water level of approximately 229 m AHD.

Unlike the more acidic pit waters observed elsewhere at the site, available historical water quality data for Deep Lead Pit indicate circum-neutral pH, relatively fresh water, and comparatively low dissolved metal concentrations. Under the current closure basis, Deep Lead Pit remains as a residual void and is therefore included in the long-term hydrogeological assessment.

Table 8 Deep Lead Pit Water Quality (AGE, 2023)

Location	Date	pH	TDS	SO ₄	Al	As	Cd	Cu	Mo	Ni	Pb	Zn	Total CN
		pH Unit	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Pit - Deep Lead	May-01	7.84	526	106	0.36	0.006	0.002	0.002	0.005	0.005	0.0005	0.022	0.0025

1.5 Blinky Pit

Blinky Pit is included in the updated 2026 void inventory and forms part of the current residual void system at Wirralie. The updated pit survey recorded a water level of approximately 245 m AHD. Comparison between 2024 imagery and 2026 survey observations indicates that water has been present in the pit under both drier and wetter conditions, suggesting relatively persistent water storage within the void.

The updated assessment also indicates that Blinky Pit is hydraulically linked to the local pit system, with spill behaviour towards Pit B possible at elevated water levels. Detailed water quality information for Blinky Pit was not presented in the earlier hydrogeological report and should therefore be identified as unavailable unless additional data have since been collected.

2. Waste Rock Dumps (WRD)

Three operational waste rock dumps are present at Wirralie: WRD1 (approximately 1.7 ha; 340,000 tonnes), WRD2 (approximately 3.2 ha; 640,000 tonnes), and WRD3 (approximately 6.1 ha; 610,000 tonnes). In addition, a previously rehabilitated waste rock dump (approximately 14.3 ha; 2,860,000 tonnes) is located adjacent to WRD3.

Under the current closure basis, the WRDs are not expected to increase significantly in footprint. Earlier concepts proposed backfilling of the Deep Lead Pit with waste rock from Pit B; however, as all pits are now assumed to remain as residual voids, waste rock will remain within the existing WRD

landforms and be managed in situ as part of the final landform. This represents a key update to previous assumptions and is reflected in the current hydrogeological and closure assessments.

The WRDs are located on natural terrain and drain via overland flow towards lower-lying areas, including the site runoff dam. The rehabilitated WRD has undergone historical reshaping and revegetation with variable success, and continues to contribute runoff to the site drainage network.

At closure, all WRDs will be re-shaped to form stable, low-profile landforms, covered with suitable growth media, and revegetated to support the proposed post-mining land use of grassland.

2.1 Waste Rock Characterisation

Waste rock geochemical characterisation was undertaken by C&R Consulting in July 2021 to assess the potential for acid and metalliferous drainage and solute release. A total of 155 samples were collected across waste rock dumps, tailings storage facilities, and the heap leach pad.

For the WRDs specifically:

- 11 samples were collected from WRD1 (5 drillholes)
- 13 samples from WRD2 (8 drillholes)
- 29 samples from WRD3 (12 drillholes)
- 31 samples from the rehabilitated WRD (16 boreholes)

All samples underwent static geochemical testing, and a subset of five samples (including samples from WRD1, WRD2, WRD3, and the rehabilitated WRD) were subjected to kinetic leach column testing.

The results indicate that the waste rock is predominantly low risk in terms of acid generation:

- Fluid extract pH ranged from acidic (approximately 3.6) to basic (approximately 9.7)
- WRD2 material was generally alkaline (pH greater than 8)
- WRD1, WRD3, and rehabilitated WRD materials were typically slightly acidic (pH 4 to 6)
- Electrical conductivity was low (generally less than 300 $\mu\text{S}/\text{cm}$), indicating low soluble salt content

Total sulfur concentrations were low across most samples:

- The majority of waste rock was classified as barren (less than 0.1 percent total sulfur)
- Localised higher sulfur concentrations (up to approximately 0.6 percent) were identified in WRD3
- Only three samples were classified as potentially acid-forming, and these were associated with WRD3 and the rehabilitated WRD

Overall, the WRDs are considered to comprise predominantly non-acid forming or low acid generating material. However, the presence of minor potentially acid-forming material and variability in pH indicates that localised zones of reactivity may occur and should be considered in the assessment of seepage and drainage behaviour.

3. Tailings Storage Facility (TSF)

The tailings storage facility occupies approximately 72 ha and consists of an earth and rockfill embankment constructed across a broad, shallow valley that drains generally to the northwest. The facility was constructed in 1987 and has undergone multiple raises, with the most recent lift completed in 2000.

The downstream wall is reinforced by placement of waste rock extending from the crest of the embankment approximately 100 m downstream at a slope of approximately 3H:1V. The TSF includes an emergency spillway at approximately 277.3 mAHD and a design crest level of approximately 278.0 mAHD along the northern embankment.

The TSF stores tailings generated from historical ore processing and also receives surface runoff from the upstream catchment during wet season conditions. Ponding occurs within the western portion of the facility, with a saturated area of approximately 20.5 ha.

At closure, the TSF surface will be capped and regraded to achieve a free-draining landform that directs runoff away from the facility. Rehabilitation will be undertaken in stages, with appropriate controls implemented to manage runoff from disturbed surfaces. The proposed post-mining land use is grassland. The tailings dam will have a cover system installed at closure. It is not recommended that cattle graze on covers. Therefore, Solomons is proposing a land use of grassland which is substantially similar to the existing land description.

3.1 Tailings Characterisation

Tailings characterisation has been undertaken through multiple investigations, including studies by Environmental Geochemistry International and C&R Consulting.

Overall, the tailings are characterised by:

- Low or negligible acid forming potential
- Enrichment in several trace elements, including arsenic, mercury, antimony, cadmium, selenium, and locally silver

Earlier investigations identified:

- Net acid producing potential values ranging from 0 to 95 kg H₂SO₄/t
- NAG pH values generally between approximately 6.1 and 8.4
- Sulfur predominantly present as non-reactive salts, resulting in classification of most samples as non-acid forming

More recent characterisation by C&R (2022), based on surface crust and push-tube sampling to depths of approximately 2 m, confirmed that:

- All TSF samples were classified as non-acid forming
- Fluid extract pH ranged from acidic (approximately 3.6) to basic (approximately 9.3)
- Minor acidity observed in leachates is attributed to residual or locally developed acidity rather than ongoing sulfide oxidation

Salinity within the TSF shows clear vertical variability:

- Surface crust exhibits elevated salinity (typically 2000 to 3000 $\mu\text{S}/\text{cm}$, up to approximately 4860 $\mu\text{S}/\text{cm}$)
- Underlying tailings are less saline (typically 300 to 1500 $\mu\text{S}/\text{cm}$)
- Kinetic testing indicates that salinity may increase over time due to dissolution processes

The median sulfur concentration in the TSF is approximately 0.15 percent, which is higher than in the WRDs but remains largely non-reactive.

Although enriched in trace elements, kinetic testing indicates that key contaminants such as arsenic and mercury are relatively immobile under the tested conditions.

3.2 TSF Surface Pondage

A persistent ponded water body is present within the western portion of the TSF. Water quality monitoring indicates that the pond water is generally circum-neutral to alkaline and exhibits moderate to high salinity.

Water quality data indicate:

- Variable but generally elevated concentrations of arsenic, copper, molybdenum, and zinc
- Elevated sulfate concentrations in some samples, with concentrations up to approximately 14,900 mg/L
- Occasional detection of cyanide

The combination of high sulfate concentrations and alkaline pH, together with the presence of cyanide, suggests that historical processing inputs, including alkaline cyanide leach solutions, have influenced the chemistry of the ponded water.

Conceptual Hydrogeological Model

To conceptualise the groundwater flow system at Wirralie, available data including topography, geological interpretation, site infrastructure, and groundwater level measurements were compiled to develop interpretative hydrogeological cross sections. Two representative transects were prepared: a west to east section (**Figure 21**) and a north to south section (**Figure 20**).

The west to east cross section follows the alignment of Sugarbag Creek from the western mining lease boundary towards monitoring bore WTB05. The transect then trends northeast through Pit B before extending eastward to intersect Pit A and North Pit, capturing the primary pit void system and its relationship to local drainage features.

The north to south cross section extends from the northern mining lease boundary southwards past monitoring location WTB06 (located approximately 100 m off the section alignment), and continues through Pit A, WRD2, and WTB04. From WTB04, the transect trends southwest through the heap leach pad and tailings storage facility, passing monitoring locations WTB07 and WTB08 before terminating at the southern mining lease boundary. This section captures the relationship between key mine infrastructure, waste landforms, and groundwater monitoring locations across the site.

Surface elevations in the cross sections are based on the 2023 LiDAR dataset with approximately 1 m resolution. These elevations are combined with interpreted geological units derived from available drilling and mapping data. The extent of weathering is illustrated using a grey overlay, which visually darkens the underlying lithology to represent the transition from fresh to weathered rock.

The conceptual cross sections are subject to uncertainty due to limitations in the spatial and temporal coverage of available data. In particular, geological contacts and groundwater level interpretations are constrained by the distribution of borehole information and monitoring data. Where uncertainty exists, inferred geological boundaries and groundwater elevations are presented as dashed lines to distinguish them from more confidently defined features.

Groundwater receptors are not explicitly shown on the cross sections, as there are no confirmed groundwater users within the immediate area represented. However, potential off-lease receptors include the Rosetta Borefield and ecological receptors associated with Rosetta Creek. The general direction of these receptors relative to the site is indicated on the cross sections to provide broader hydrogeological context.

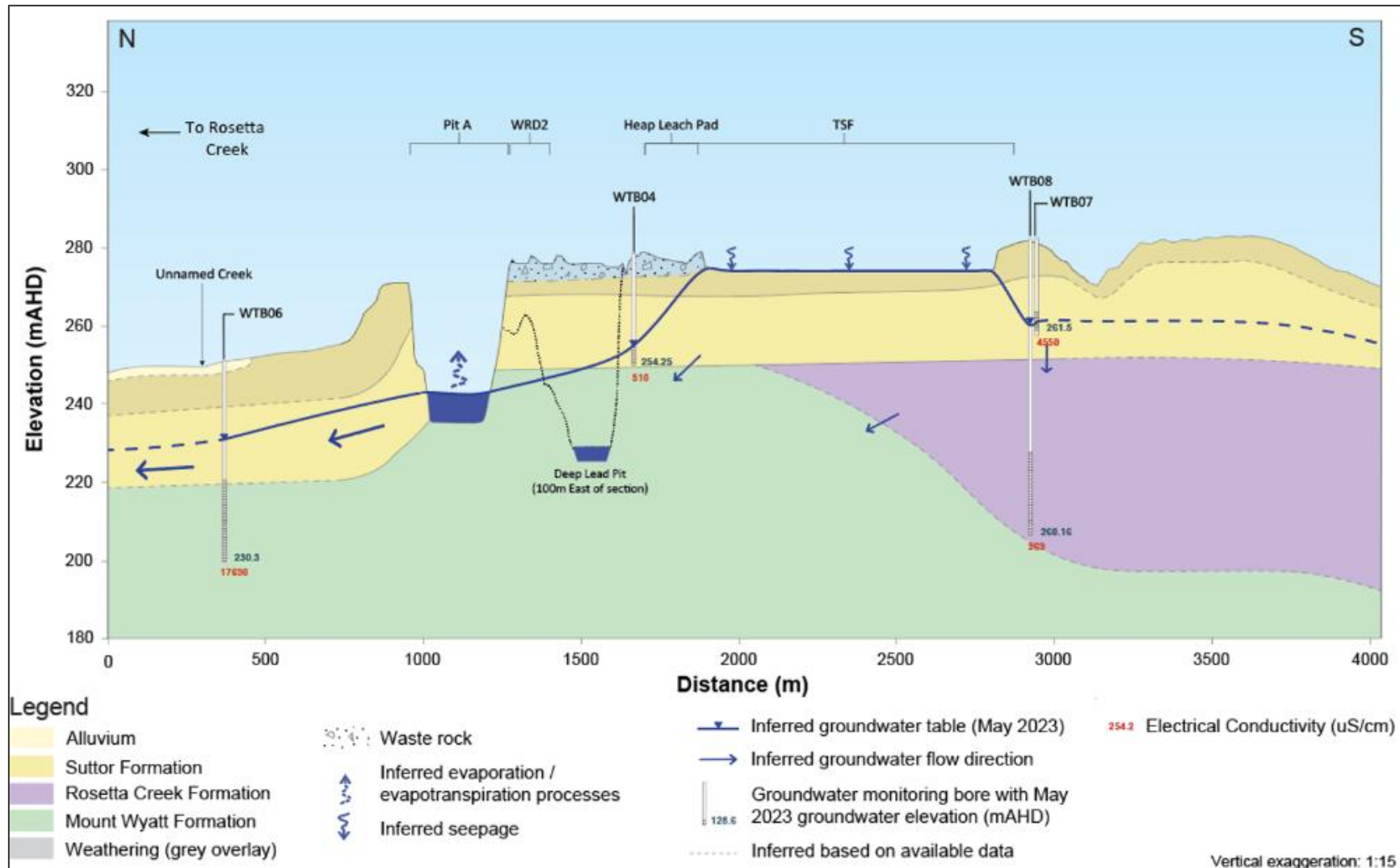


Figure 20 North to South Cross-section (AGE, 2023)

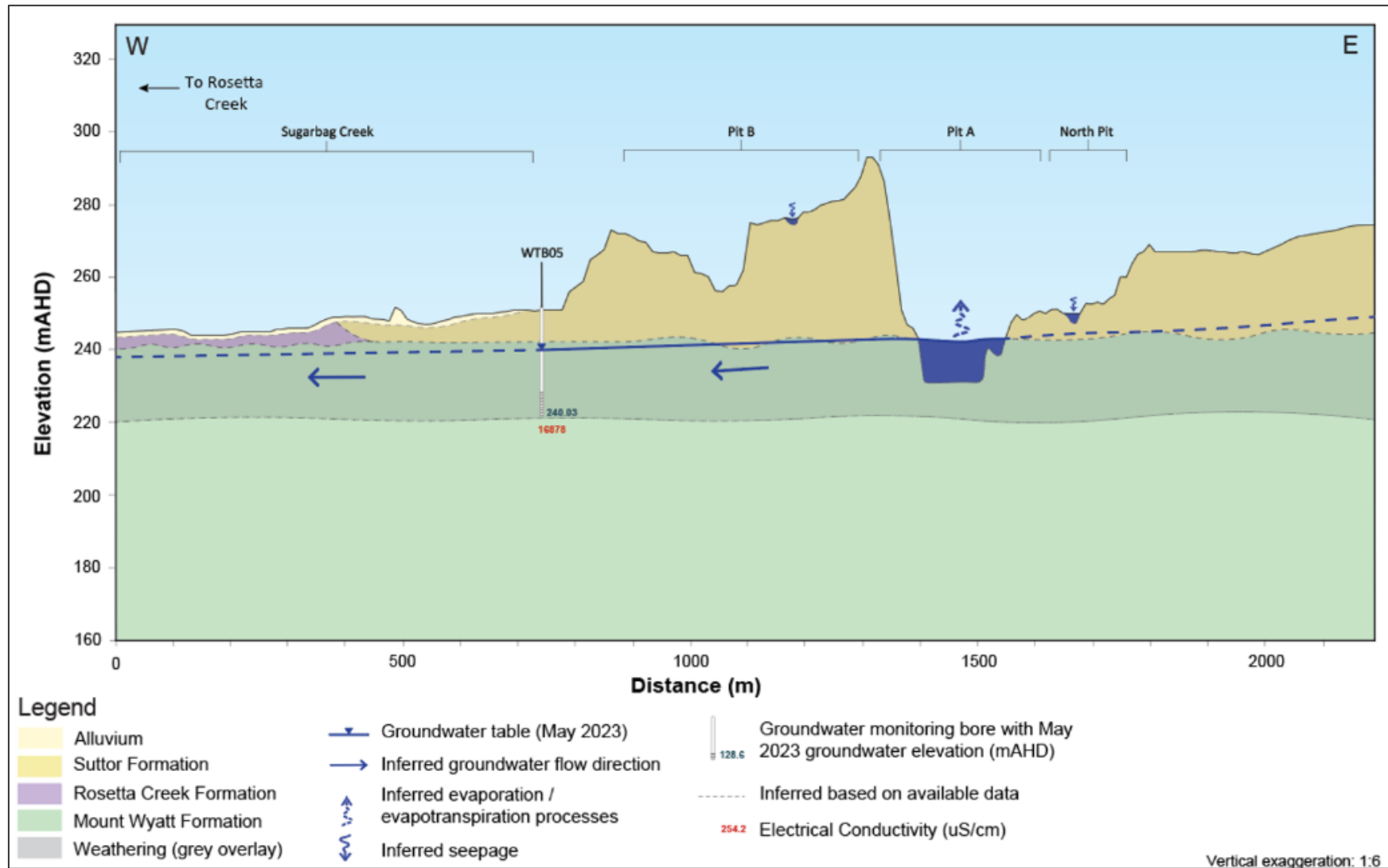


Figure 21 West to East Cross-section (AGE, 2023)

Void Modelling

Groundwater inflows and outflows at any given pit stage are controlled by the relationship between the elevation of the pit water level and the elevation of the surrounding groundwater table. Pit voids that intersect the groundwater table can be classified as:

- groundwater sinks
- sources,
- flow-through systems.

During mining, where pit development extends below the groundwater table, groundwater inflow to the pit is expected and is typically managed through dewatering to maintain safe and dry operating conditions. At cessation of mining or pumping, a hydraulic gradient generally exists from the surrounding groundwater system towards the pit void, particularly where the pit floor remains below the regional water table.

The magnitude and direction of this hydraulic gradient are governed by the difference in elevation between the pit water level and the surrounding groundwater table, as well as the hydraulic properties of the host geological units. Immediately following closure, this pit-ward hydraulic gradient typically results in groundwater inflow to the void, and recently active or deep voids are therefore commonly characterised as groundwater sinks under initial post-mining conditions.

During the post-closure recovery phase, pit water levels increase as a result of groundwater inflow, direct rainfall, and runoff, combined with the cessation of dewatering. As the pit lake level rises, the hydraulic gradient towards the pit decreases. Groundwater inflow is proportional to both the hydraulic gradient and the hydraulic conductivity of the surrounding geological materials. As hydraulic properties remain constant, inflows are generally greatest when pit water levels are lowest and decrease progressively as the pit fills and the gradient reduces.

Over time, the pit water balance approaches equilibrium or near-equilibrium conditions. Where the equilibrium water level remains below the regional groundwater table, the void will function as a terminal evaporative sink, with groundwater continuing to flow towards the pit. Such conditions are typically associated with relatively small contributing catchments and/or low hydraulic conductivity units, resulting in limited surface and groundwater inflows.

Alternatively, pit voids may function as groundwater sources where equilibrium water levels exceed the surrounding groundwater table. This condition arises where surface water inflows, including runoff and direct rainfall, exceed evaporative losses, resulting in a net positive water balance. Under these conditions, the hydraulic gradient is directed away from the pit, and water will migrate from the void into the surrounding groundwater system. Sustained groundwater outflow requires that surface water inputs remain sufficient to offset both evaporation and losses to groundwater.

A third possible condition is a flow-through system, where the pit water level is broadly comparable to the surrounding groundwater table. Under these conditions, groundwater inflows and outflows may both occur, depending on temporal variations in hydraulic gradients. Flow-through behaviour may arise where surface water inputs and evaporation are approximately balanced, or where groundwater fluxes are relatively large due to higher hydraulic conductivity. In environments with

variable climatic conditions, pit lakes may alternate between sink and source behaviour over time, and such systems are appropriately classified as flow-through features.

1. Existing and Future Void Conditions

The Wirralie Project comprises five open-cut voids: Pit A, Pit B, North Pit, Deep Lead Pit and Blinky Pit. All pits will remain as residual voids at closure and are designated as non-use management areas.

All pits represent legacy voids from previous mining operations and will retain their current geometry at closure. No backfilling of pit voids is proposed.

For the purposes of void water balance modelling, Pit A and North Pit were assessed together due to their shared catchment and potential for hydraulic interaction at elevated water levels. Deep Lead Pit and Blinky Pit were assessed independently. Pit B was not subject to detailed analytical modelling in the updated assessment due to its current hydrogeological setting indicating limited groundwater interaction; however, it remains part of the final void system.

Detailed assumptions regarding pit geometry, catchment areas and modelling configuration are provided in memorandum attached as Appendix A.

2. Water Balance Methodology

A pit water balance model was developed to estimate the long-term hydrological behaviour of the final voids at the Wirralie Project. The model incorporates climatic inputs, runoff, groundwater inflow and evaporation to assess equilibrium water levels and potential for overflow.

The water balance is represented as:

Change in storage = rainfall + runoff + groundwater inflow – evaporation – groundwater outflow

where rainfall represents direct precipitation onto the pit surface, runoff represents surface inflow from the contributing catchment, groundwater inflow represents subsurface inflow to the pit, evaporation represents losses from the water surface, and groundwater outflow occurs where pit water levels exceed surrounding groundwater levels.

The model was undertaken using a monthly time step and assessed over long-term climatic conditions to determine steady-state or equilibrium behaviour. The modelling approach is conceptual and is intended to support closure planning by assessing the likely hydrological behaviour of the pit voids rather than predicting exact water levels.

3. Water Balance Inputs

3.1 Climate

Climate inputs for the modelling were derived from long-term regional datasets. Mean annual rainfall and evaporation values adopted in the modelling are approximately 566 mm and 1891 mm, respectively.

Rainfall data was sourced from the Scientific Information for Land Owners (SILO) database. SILO is operated by DES with data contributions from BOM. The SILO database provides a weather record dataset that utilises neighbouring stations to infill missing data and accumulated days, spatially interpolated for specific locations between stations. The SILO dataset was used for the latitude - 21.5 and longitude 139.90. In addition to calculating monthly and annual averages, this dataset was used to calculate Annual Exceedance Probabilities (AEP) for rainfall. Rainfall variability was incorporated through the use of annual exceedance probability rainfall conditions to assess the sensitivity of pit behaviour to climatic variation.

The average monthly rainfall and AEP values for rainfall are presented in **Table 9** below.

Table 9 Rainfall and AEP for Void Model

Rainfall (mm)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1% AEP	256	315	205	200	122	126	118	94	64	110	191	214	1077
5% AEP	256	315	205	200	122	126	118	94	64	110	191	214	1077
10% AEP	223	256	142	91	79	81	89	41	42	75	119	172	943
20% AEP	167	188	116	49	52	55	45	29	16	48	86	148	779
30% AEP	142	144	72	38	31	36	20	14	10	37	65	105	682
40% AEP	120	131	63	29	22	23	11	7	4	27	48	87	624
50% AEP	109	95	47	15	12	16	5	2	2	13	37	71	557
60% AEP	82	85	40	6	3	5	1	0	1	8	28	57	511
70% AEP	66	66	28	2	1	2	0	0	0	4	18	44	473
80% AEP	52	36	14	0	0	0	0	0	0	2	12	34	382
90% AEP	30	20	6	0	0	0	0	0	0	0	3	21	313
95% AEP	18	12	1	0	0	0	0	0	0	0	1	14	280
99% AEP	5	2	0	0	0	0	0	0	0	0	0	2	241

3.2 Runoff

Runoff to each pit was estimated based on the contributing catchment area and an assumed runoff coefficient. A runoff coefficient of 0.35 was adopted, which is considered appropriate for the semi-arid conditions and surface characteristics of the site.

Catchment areas were defined based on topographic interpretation and drainage patterns, including the combined catchment of Pit A and North Pit.

3.3 Evaporation

Average pan evaporation data has been obtained from SILO and provides an indication of potential evaporation from open water surfaces. However, actual evaporation from pit voids is typically lower than pan evaporation due to factors such as reduced wind exposure and shading from pit walls. Accordingly, a correction factor is required to better represent in situ conditions. For deep pit voids, a correction factor of 0.7 is commonly applied to account for these effects (DES, 2023). The average monthly pan evaporation values derived from SILO are presented in **Table 10** below.

Table 10 Average Monthly Pan Evaporation Data

Month	Pan Evaporation (mm)
January	199
February	164
March	169
April	139
May	114
June	92
July	102
August	127
September	162
October	200
November	208
December	214
Annual value	1891

3.4 Pit Geometry

Pit geometry inputs, including pit surface area and depth relationships, were based on available survey and design information. These inputs were used to define stage volume relationships required for the water balance modelling.

Updated pit geometries for Pit A, North Pit, Deep Lead Pit and Blinky Pit were incorporated in the modelling. Pit lake surface areas and volumes as a function of lake height were calculated using generalised geometric assumptions. These estimates of pit lake area were cross checked by interpreting satellite images on the publicly available Queensland globe web. The model inputs are from the curves derived in **Figure 22, Figure 23 and Figure 24.**

Detailed geometry inputs are provided in Appendix A.

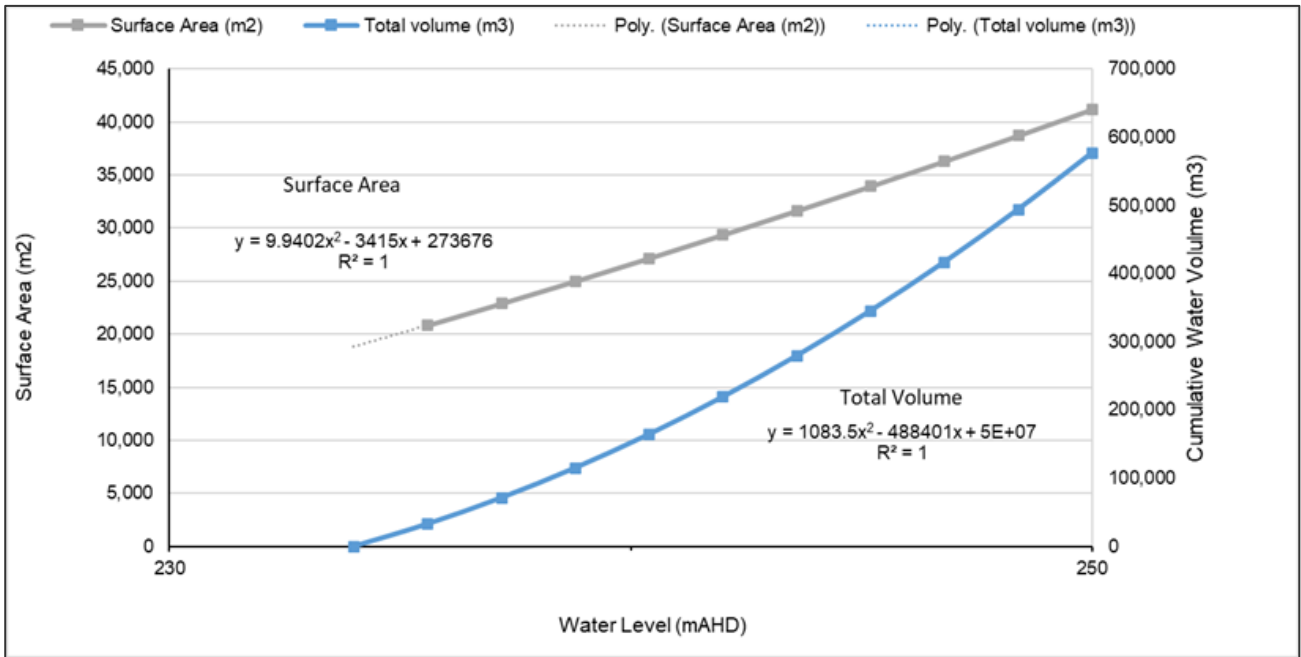


Figure 22 Pit Lake Surface Area and Volume Vs Lake Elevation for Pit A

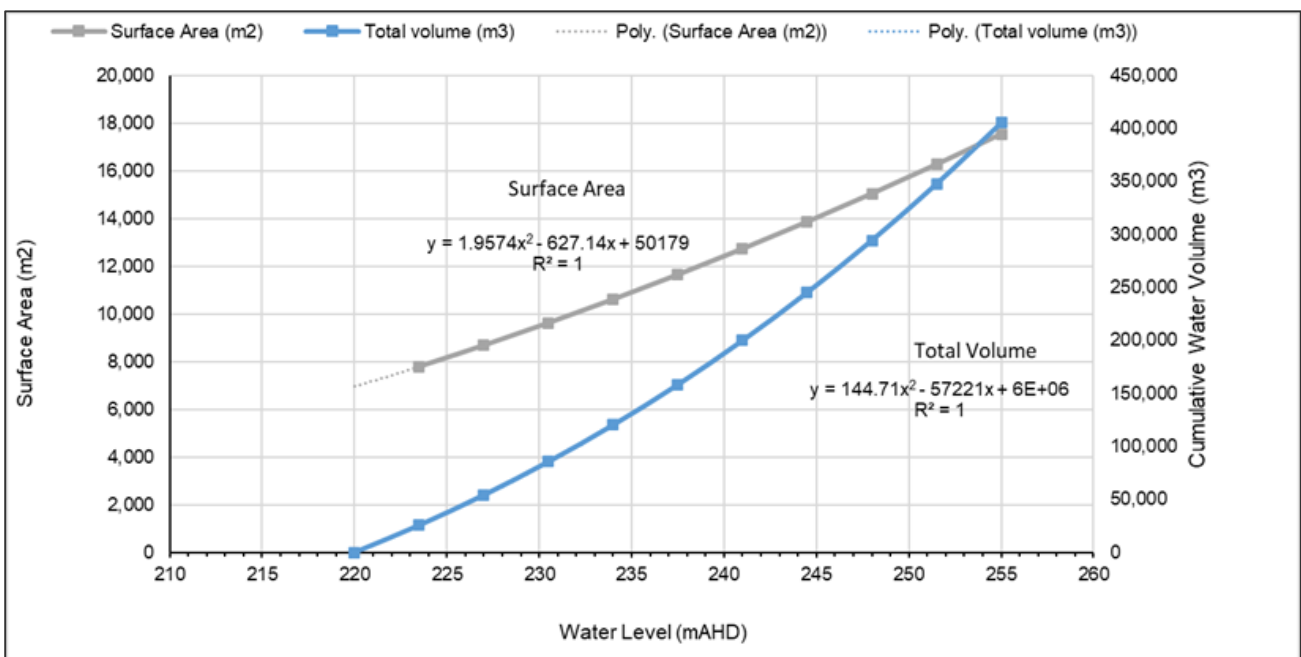


Figure 23 Pit Lake Surface Area and Volume Vs Lake Elevation for Deep Lead Pit

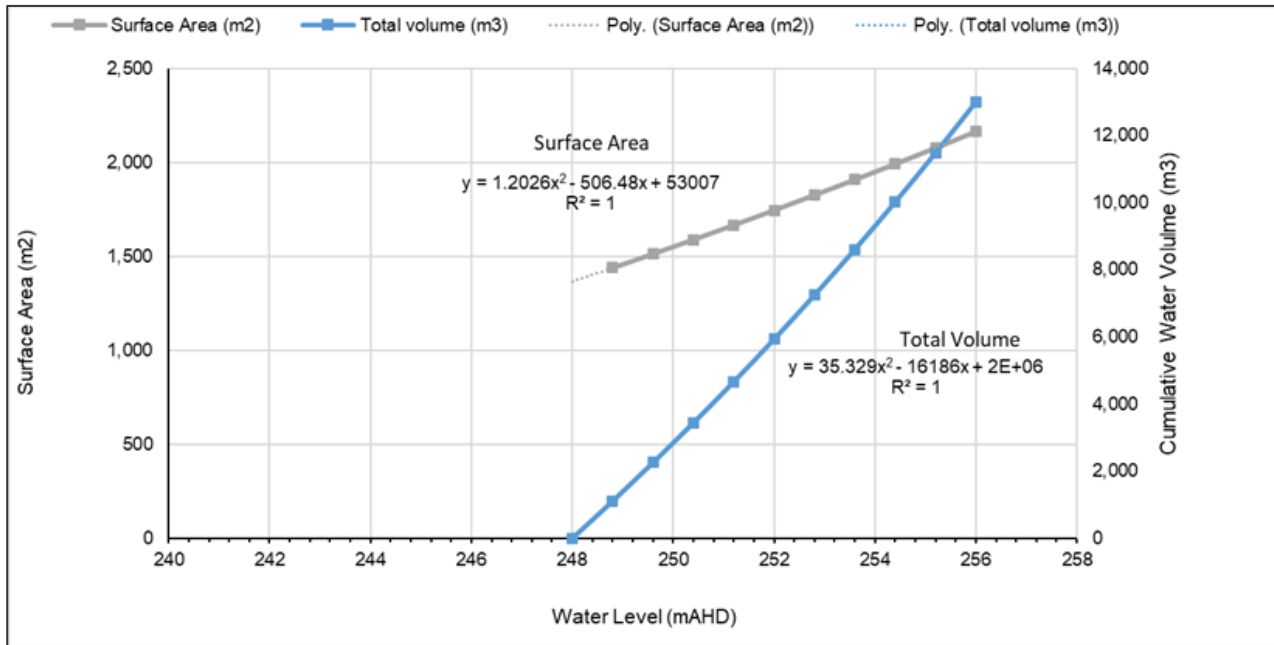


Figure 24 Pit Lake Surface Area and Volume Vs Lake Elevation for Blinky Pit

3.5 Groundwater Inflow Methodology

Groundwater inflow to the pit voids was estimated using analytical solutions for steady-state inflow to open pits. The adopted methodology is based on the approach described by Marinelli and Niccoli, with subsequent refinements by Arnold et al.

The analytical solution assumes:

- steady-state groundwater conditions
- unconfined groundwater flow
- radial flow towards the pit
- simplified pit geometry represented as an equivalent circular void

Recharge to groundwater was assumed to be approximately 1 percent of mean annual rainfall.

Hydraulic conductivity values were selected based on site-specific hydrogeological data and are representative of fractured rock conditions. A preferred hydraulic conductivity value of approximately 1.5×10^{-6} m/s was adopted for modelling, with sensitivity analysis undertaken across a reasonable range of values.

This approach provides an estimate of groundwater inflow suitable for conceptual modelling of pit lake behaviour. Further detail on parameter selection and calculations is provided in Appendix A.

The void water balance modelling is subject to several limitations and uncertainties, including:

- limited spatial distribution of hydrogeological data
- uncertainty in hydraulic parameters, including hydraulic conductivity and effective porosity
- simplified representation of pit geometry and catchment behaviour
- assumptions regarding recharge and groundwater boundary conditions

- variability in climatic inputs over time

The analytical groundwater inflow method assumes idealised conditions that may not fully represent site heterogeneity. As such, modelling results should be interpreted as indicative of long-term behaviour rather than precise predictions.

The updated modelling assessment considered:

- combined behaviour of Pit A and North Pit
- independent behaviour of Deep Lead Pit and Blinky Pit
- revised climate inputs and catchment conditions
- analytical groundwater inflow estimates consistent with site conditions

Pit B was not subject to detailed analytical modelling due to its current hydrogeological setting indicating limited groundwater interaction; however, it remains part of the final void system and is considered qualitatively in the closure assessment.

4. Results and Discussion

4.1 Sink, Source or Flow-Through Classification

Void water balance modelling for the Wirralie Project was undertaken by Terra Solutions, with the detailed methodology, assumptions, and outputs documented in the technical memorandum provided in Appendix A.

The modelling assessed the long-term hydrological behaviour of the final voids using site-specific inputs, including climate data, contributing catchments, pit geometries, and analytically derived groundwater inflows. The results consistently demonstrate that evaporation is the dominant component of the water balance across all assessed voids, exceeding the combined inputs from direct rainfall, runoff, and groundwater inflow under long-term average climatic conditions.

Groundwater inflow estimates, derived using analytical methods and site-representative hydraulic parameters, are relatively low compared to evaporative losses. Consistent with the adopted hydraulic conductivity range and low recharge conditions, inflows reduce significantly as pit water levels rise and the hydraulic gradient towards the void diminishes. As a result, all voids reach equilibrium conditions where water levels stabilise below the surrounding regional groundwater table.

For Pit A and North Pit, which were modelled as a combined system due to their potential hydraulic connectivity, the results indicate that pit lake levels may periodically rise sufficiently to enable hydraulic interaction between the two voids. However, even under these conditions, the combined system remains strongly evaporation-dominated. The predicted equilibrium water level for the combined system remains below the regional groundwater table, confirming that the system will function as a terminal evaporative sink. The rate of groundwater inflow decreases progressively as equilibrium is approached, consistent with the reduction in hydraulic gradient.

Deep Lead Pit exhibits a similar response, with modelling indicating that the combination of limited catchment area and low groundwater inflow is insufficient to offset evaporation. The equilibrium water level is predicted to remain below the surrounding groundwater table, and groundwater

inflows are minor relative to evaporative losses throughout the simulation period. Accordingly, Deep Lead Pit will function as a groundwater sink under post-closure conditions.

For Blinky Pit, the modelling results also indicate a net negative water balance. Despite contributions from runoff and groundwater inflow, evaporation remains the dominant flux. The predicted equilibrium condition is characterised by a stable water level below the regional groundwater table, confirming that Blinky Pit will operate as a groundwater sink.

Although Pit B was not subject to detailed quantitative modelling, its geometry, limited contributing catchment, and hydrogeological setting are consistent with the conditions modelled for the other voids. Based on these factors, and in the absence of any mechanism to sustain a positive water balance, Pit B is also expected to behave as a groundwater sink following closure.

Across all voids, the modelling does not identify any conditions under which equilibrium water levels exceed the surrounding groundwater table. As such, no voids are expected to function as groundwater sources. Similarly, the modelling does not indicate conditions where pit water levels stabilise at or near the regional groundwater table in a manner consistent with flow-through systems.

Short-term fluctuations in pit water levels may occur in response to episodic rainfall events or interannual climatic variability; however, these variations are not expected to materially influence the long-term equilibrium behaviour of the voids.

Overall, the modelling demonstrates that all final voids at the Wirralie Project will operate as terminal evaporative sinks. This outcome is consistent with site conditions, including a semi-arid climate, high evaporation rates, relatively small contributing catchments, and low to moderate hydraulic conductivity of the host geological units.

Table 11 Final Void Modelling Results

Pit Name	Behaviour Classification	Basis of Classification
Pit A	Sink	Equilibrium water level below groundwater table; evaporation exceeds inflows
North Pit	Sink	Hydraulically connected with Pit A; combined system behaves as sink
Pit A + North Pit (combined)	Sink	Modelled system; evaporation-dominated water balance
Deep Lead Pit	Sink	Limited inflows relative to evaporation; equilibrium below groundwater table
Blinky Pit	Sink	Net negative water balance; equilibrium below groundwater table
Pit B	Sink (qualitative)	Consistent hydrogeological setting and site-wide modelling outcomes

4.2 Overtopping Assessment

In accordance with PRCP guideline requirements, the potential for pit lake overtopping was assessed using a conservative water balance scenario based on a 1% Annual Exceedance Probability (AEP) rainfall event applied to existing elevated pit water levels. This approach represents a reasonable worst-case condition, where pits are already near higher water levels and are subjected to extreme rainfall inputs.

For Pit A, the contributing catchment of North Pit was included in the assessment due to the potential for hydraulic connectivity between the two voids under elevated water level conditions.

The results of the assessment indicate that all pits retain substantial freeboard under the 1% AEP scenario, with predicted water levels remaining well below pit crest elevations. This demonstrates that overtopping is not expected under extreme rainfall conditions.

For the combined Pit A and North Pit system, the simulated water level increases from approximately 242.5 mAHD to 244.1 mAHD under the 1% AEP event, which remains significantly below the pit crest elevation of 250 mAHD. This indicates that even under extreme rainfall conditions, there is sufficient storage capacity to prevent overtopping.

Similarly, Deep Lead Pit shows an increase in water level from approximately 229 mAHD to 231.5 mAHD under the same conditions, which is well below the crest elevation of 255 mAHD, indicating a very low overtopping risk.

For Blinky Pit, minimal change in water level is predicted under the 1% AEP scenario. While the pit has a crest elevation of approximately 251 mAHD and may hydraulically spill towards Pit B under extreme conditions, the modelling indicates that water levels remain well controlled and do not approach crest levels under the assessed scenario.

Overall, the overtopping assessment confirms that all pit voids have sufficient storage capacity to accommodate extreme rainfall events without overtopping. This outcome is consistent with the evaporation-dominated water balance identified in the modelling and further supports the classification of the voids as terminal sinks.

Table 12 Summary of Overtopping Assessment

Pit Name	Initial Water Level (mAHD)	Pit Crest Elevation (mAHD)	Water Level under 1% AEP (mAHD)	Available Freeboard (m)	Overtopping Risk
Pit A (including North Pit)	242.5	250.0	244.1	5.9	Low (No overtopping predicted)
Deep Lead Pit	229.0	255.0	231.5	23.5	Very Low (No overtopping predicted)
Blinky Pit	245.0	251.0*	Minimal change	~6.0	Low (No overtopping predicted; potential spill towards Pit B but only under extreme conditions)

4.3 PRCP Compliance Considerations

The predicted sink behaviour of all voids has important implications for closure performance and regulatory compliance. As equilibrium water levels remain below the surrounding groundwater table, there is no sustained hydraulic gradient driving water from the voids into the regional groundwater system. Accordingly, the final voids are not expected to result in off-site groundwater impacts.

The absence of source or flow-through conditions supports the conclusion that solute migration from pit lakes to surrounding groundwater receptors is unlikely under long-term equilibrium conditions. This outcome is consistent with PRCP requirements for minimising environmental risk, protecting downstream receptors, and ensuring long-term geochemical stability of post-mining landforms.

Residual risks are limited to localised groundwater inflow to the pits and internal water quality evolution within the voids, both of which are contained within the final landform. As such, the predicted behaviour of the voids is considered acceptable within the context of closure objectives and long-term site stability.

The absence of overtopping risk under extreme climatic conditions supports the long-term stability of the final landform and minimises the potential for uncontrolled release of pit water to the surrounding environment. This is consistent with PRCP requirements to ensure that post-mining landforms are stable, non-polluting, and do not pose an unacceptable risk to downstream environmental receptors.

Groundwater Environmental Values

Groundwater environmental values are defined in Queensland under Section 9 of the *Environmental Protection Act 1994*, and the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 provides a framework to protect and/or enhance the suitability of Queensland waters for various beneficial uses.

The Project is located within the Burdekin drainage basin and the Suttor River sub-catchment. The groundwater system is characterised by relatively deep water levels, limited recharge, absence of persistent baseflow to local creeks, and a semi-arid climate with strong evaporative dominance. No environmental values (EVs) or water quality objectives (WQOs) are specified for the Suttor River sub-basin under the Environmental Protection (Water and Wetland Biodiversity) Policy 2019. Draft EVs and WQOs for the Burdekin Basin, based on the Burdekin Region Water Quality Improvement Plan 2016 (NQ Dry Tropics 2016), were released for comment in 2017 and are still under review. Draft EVs for Rosetta Creek include:

- Aquatic ecosystems.
- Human uses.
- Irrigation.
- Livestock;
- Visual amenity.
- Drinking water.
- Industrial uses.
- Cultural and spiritual.

For the purposes of this assessment, the potentially relevant groundwater environmental values are:

- biological integrity of ecosystems, particularly terrestrial groundwater dependent ecosystems if present
- industrial use of groundwater
- and, conservatively, cultural and spiritual values to the extent that groundwater may support connected surface water values or broader environmental functions.

Other environmental values listed under the policy, including drinking water, irrigation, aquaculture, production of foods for human consumption, and primary or secondary recreation, are not considered applicable in the immediate Project area based on available evidence of groundwater use and receptor presence.

As part of this EV assessment, a review of registered groundwater bores within 10 km of the site was undertaken (**Figure 25**). Apart from the Wirralie monitoring network bores and the older Rosetta and Harry Marsh borefields (comprised of unregistered bores), there are five registered

bores within 10 km of the site (**Table 13**), and all have been plugged/destroyed and abandoned. The original purpose of most of these bores is not listed in their registration records (**Table 13**).

Table 13 Registered Bores within 10Km of Wirralie

Bore ID	Eastin g (GDA9 4 z54)	Northi ng (GDA9 4 z54)	Drilled date	Bore depth (mBG L)	Screen ed interval (mBGL)	Groun d RL (mAH D)	Screen ed Litholo gy	Bore Status	Origin al name	Facility
BH0014 77	52087 9	766140 8	30/01/19 87	NR	NR	NR	NR	Plugged and abandone d	Mount Coolon 6	GSQ Referen ce
25863	53699 3	766037 0	04/05/19 65	15.24	NR	313.91	NR	Abandon ed and destroye d	Wirral ee No.1	Sub- Artesian
25864	53555 6	766282 9	05/05/19 65	33.52	NR	NR	NR	Abandon ed and destroye d	Wirral ee No. 2	Sub- Artesian
25865	53570 3	766390 5	06/05/19 65	18.28	NR	286.49	NR	Abandon ed and destroye d	Wirral ee No. 3	Sub- Artesian
182745	52645 5	766871 0	14/11/20 20	36.00	NR	NR	NR	Abandon ed and destroye d	NR	Sub- Artesian

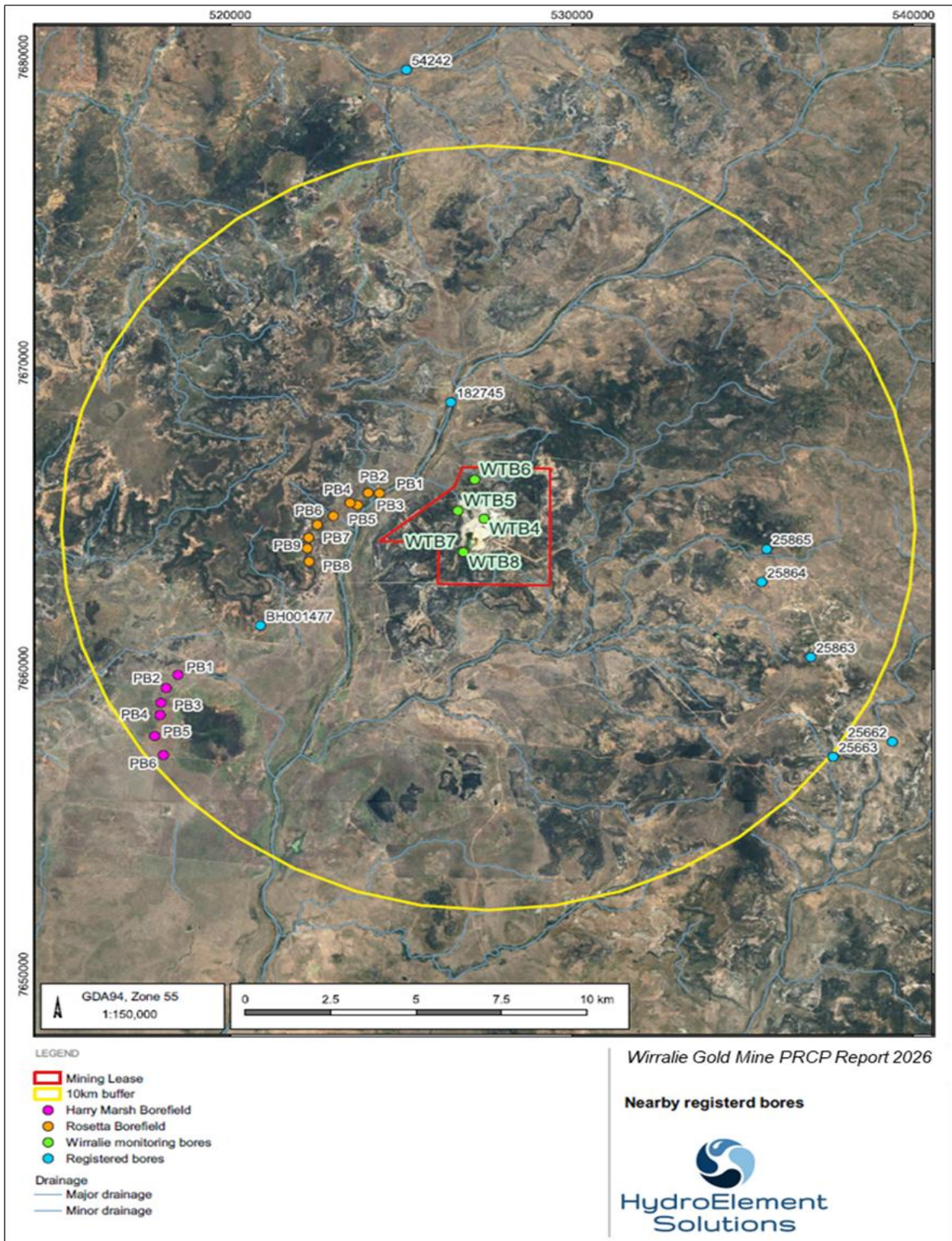


Figure 25 Registered Bores within 10Km Buffer

1. Aquatic Groundwater Dependent Ecosystems

Potential aquatic groundwater-dependent ecosystems were assessed as part of the receptor screening.

The hydrogeological setting indicates that groundwater levels are generally too deep to support shallow aquatic dependency within the Project area. Surface water features in the vicinity, including local drainage lines and Rosetta Creek, are ephemeral and show no evidence of sustained baseflow contribution from groundwater.

Based on these conditions, aquatic GDEs are considered unlikely to occur within the Project area or in nearby drainage systems. While retained as a conservative receptor in the assessment, the likelihood of groundwater-dependent aquatic ecosystems being present and hydraulically connected to the site is low.

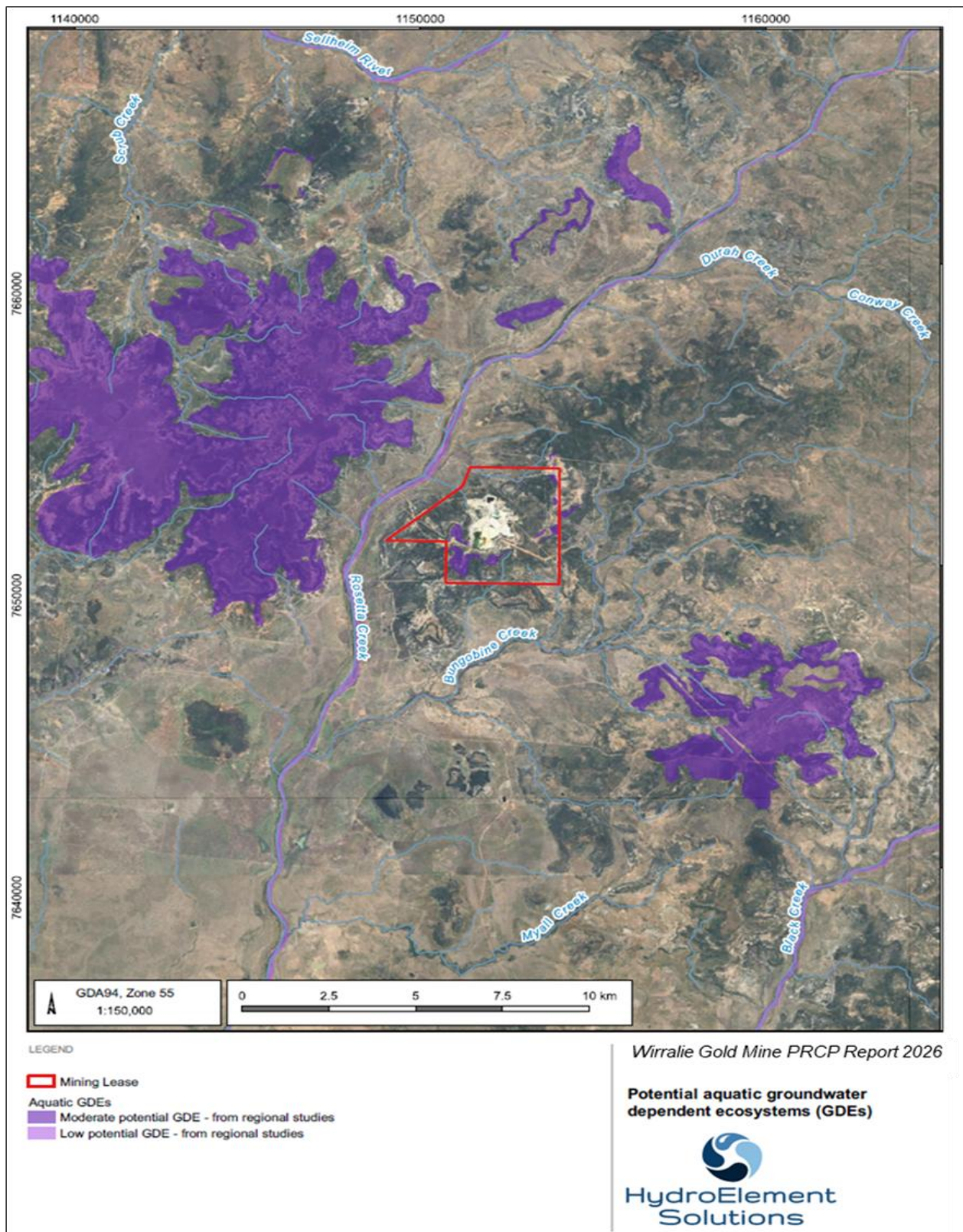


Figure 26 Potential Aquatic GDE Map

2. Terrestrial Groundwater Dependent Ecosystems

Terrestrial groundwater dependent ecosystems were assessed as a potential receptor due to the possibility that deep-rooted vegetation may access groundwater under suitable conditions.

Groundwater depths in the broader region are typically on the order of approximately 10 to 30 metres below ground level, which may fall within the rooting depth of certain vegetation communities. The most plausible locations for terrestrial GDEs are along lower-lying areas and drainage features, including the Rosetta Creek corridor.

However, the presence of terrestrial GDEs has not been confirmed within or immediately adjacent to the Project area. Accordingly, terrestrial GDEs are treated as a potential, but unconfirmed, receptor. This approach is conservative and appropriate for closure assessment, allowing both groundwater level and groundwater quality pathways to be considered.

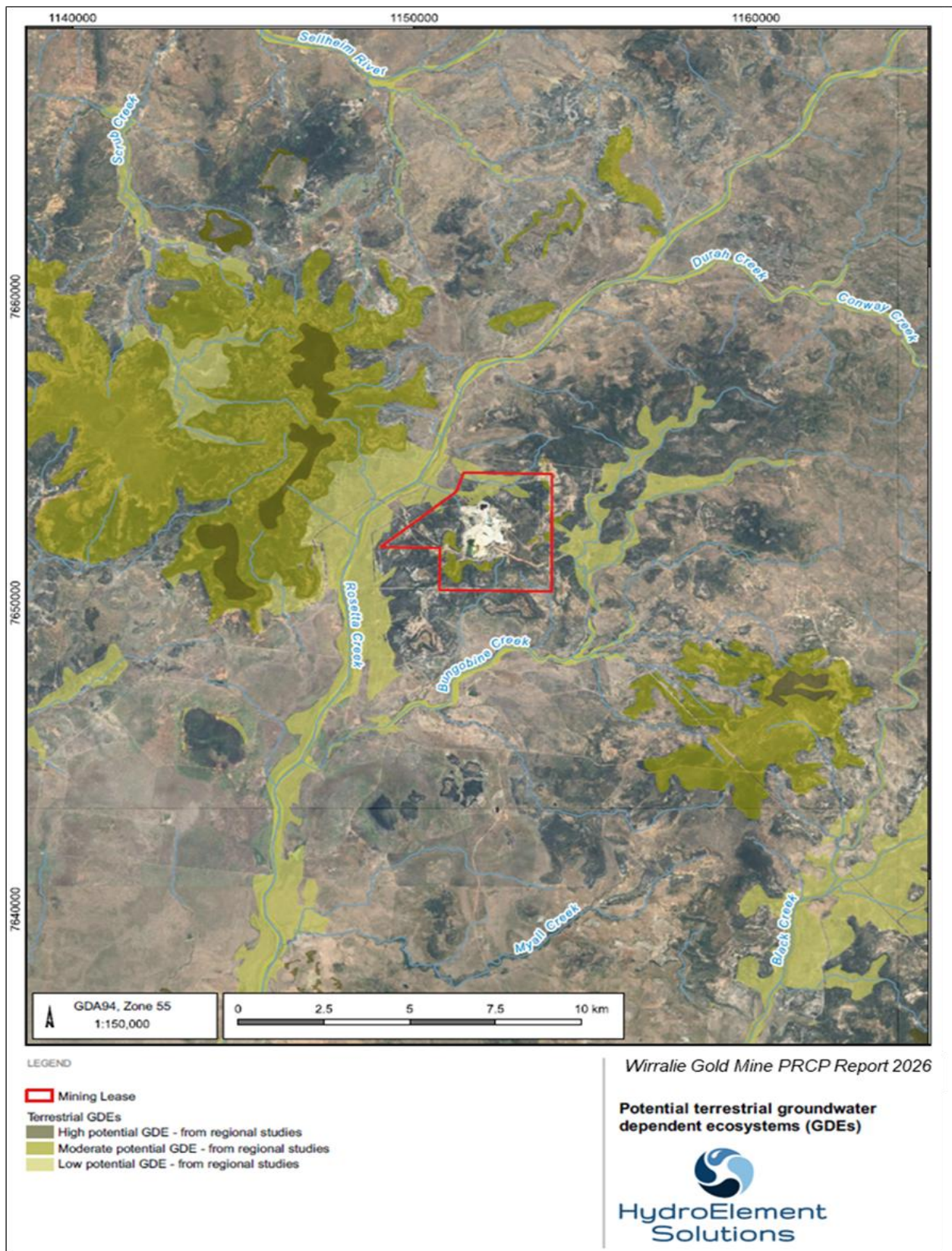


Figure 27 Potential Terrestrial GDE Map

3. Subterranean Groundwater Dependent Ecosystems

Subterranean groundwater dependent ecosystems, such as cave or karst-associated systems, were assessed as part of the receptor screening.

There are no mapped subterranean GDEs, cave systems, or karst features identified within the Project area or its immediate vicinity. On this basis, subterranean GDEs are not considered a relevant environmental value for groundwater at the Project.

4. Beneficial Use in Production of Foods for Human Consumption

There is no evidence that groundwater in the vicinity of the Project is used for the production of foods for human consumption. This environmental value is therefore not considered applicable to groundwater at the Project.

5. Beneficial Use in Aquaculture

There is no evidence of groundwater use for aquaculture in the vicinity of the Project. This environmental value is not considered applicable.

6. Beneficial Use in Agriculture

Groundwater use for irrigation or stock watering has not been identified within the immediate Project area. The absence of active bores and limited evidence of groundwater abstraction indicates that agriculture is not a current groundwater-dependent use in the vicinity of the site.

Accordingly, this environmental value is not considered relevant for the purposes of groundwater impact assessment.

7. Suitability for Primary, Secondary, or Visual Recreational Use

Groundwater is not used for primary, secondary, or visual recreation in the region and this environmental value is not considered applicable to groundwater at the Project.

8. Suitability of the Water for Supply as Drinking Water

Groundwater is not currently used as a drinking water supply in the vicinity of the Project. Although historical mining operations sourced water from nearby borefields for operational purposes, no evidence has been identified of nearby third-party groundwater use for potable supply in the immediate Project area. This environmental value is therefore not considered applicable as a current receptor-based groundwater environmental value for the Project.

9. Suitability of the Water for Industrial Use

Industrial use of groundwater is considered a relevant environmental value due to historical and potential future use associated with mining activities in the region.

Groundwater has previously been abstracted for operational purposes within the broader Project area. However, no third-party industrial groundwater users have been identified in the immediate vicinity of the site.

For closure assessment, industrial use is retained as a relevant environmental value, although the sensitivity of this receptor is considered low due to the absence of nearby users.

10. Cultural and Spiritual Values of the Water

No documented groundwater-specific cultural or spiritual environmental values were identified for the Project area. However, groundwater may contribute indirectly to the broader environmental function of connected landscapes and surface waters. On that basis, cultural and spiritual values are recognised qualitatively and conservatively, but no specific groundwater receptor attributable to this value has been identified in the immediate vicinity of the Project.

Impact Assessment (Source, Pathway, Receptor)

A source-pathway-receptor assessment has been undertaken to evaluate the potential for site sources to affect groundwater environmental values during current operations and under post-closure conditions. The assessment considers both changes in groundwater quality and changes in groundwater level, and focuses on those sources, pathways and receptors that are relevant to the Project hydrogeological setting.

The principal site sources with the potential to affect groundwater are the pit voids, waste rock dumps, tailings storage facility, heap leach pad, former and current ROM areas, and smaller mine water storages. Of these, the most material sources are the pit voids, WRDs, and TSF. Historical pit water quality indicates a clear capacity for generation and storage of acidic, sulfate-rich and metalliferous waters, particularly in Pit A and North Pit. The groundwater monitoring results also indicate that groundwater at the site has at least some characteristics consistent with historical or current mine-related influence. In contrast, waste rock and tailings characterisation indicate that most WRD and TSF materials are non-acid forming or low acid generating, although minor localised reactivity and elevated salinity or metalloid concentrations remain relevant source considerations.

The most relevant contaminants or stressors for groundwater are:

- acidity
- sulfate
- salinity
- dissolved metals and metalloids
- localised groundwater level change associated with pit-water interaction

The principal pathway assessed in this hydrogeological report is groundwater. A groundwater pathway is only considered relevant where hydraulic gradients, groundwater levels, groundwater flow directions, and transport conditions indicate that contaminants or drawdown could migrate from a source to a receptor.

The updated void modelling indicates that all residual voids are expected to behave as groundwater sinks under closure conditions, with no void predicted to behave as a sustained source or flow-through system. In addition, overtopping risk is low, with all modelled pits remaining below crest under the 1% AEP event. These outcomes mean that the residual pits are expected to act as local hydraulic receptors and evaporative sinks, which substantially reduces the likelihood of post-closure off-site migration of pit-derived solutes through groundwater.

1. Potential Impacts on Aquatic GDE Receptors

Potential aquatic GDEs are considered a low-likelihood receptor because:

- groundwater levels are generally too deep to sustain shallow aquatic dependency near the site;
- local surface water features are ephemeral;
- no baseflow-supported conditions have been identified; and
- aquatic GDEs are unlikely both onsite and along nearby creek systems.

For current and historical conditions, a theoretical groundwater quality pathway from pits, TSF or WRDs to downgradient aquatic receptors cannot be ruled out solely on conceptual grounds because Rosetta Creek lies downgradient and groundwater quality indicators show evidence of mine-derived solutes at the site. However, any such pathway would require contaminant migration over substantial distance without attenuation and would also require the receptor to be genuinely groundwater-dependent, which is highly unlikely.

For closure conditions, the updated sink behaviour of all residual pits further reduces the likelihood of any future pathway from pit waters to downgradient aquatic receptors, because hydraulic gradients are directed toward the voids rather than away from them. On this basis, no material future impact to aquatic GDEs is predicted from pit lakes under closure conditions.

Overall, impacts to aquatic GDE environmental values are assessed as highly unlikely for both current and future (post closure) conditions.

2. Potential Impacts on Terrestrial GDE Receptors

Potential terrestrial GDEs are a more plausible receptor than aquatic GDEs because vegetation along Rosetta Creek or other low-lying areas may potentially access deeper moisture or groundwater where hydrogeological conditions permit. The review of environmental values indicated terrestrial GDEs as a possible receptor class, particularly downgradient of the site.

The relevant pathways are:

- groundwater level change, if drawdown or altered hydraulic gradients reduce access to groundwater by deep-rooted vegetation; and
- groundwater quality change, if mine-derived solutes migrate to areas supporting groundwater-dependent vegetation.

Under the revised closure model, all residual voids are predicted to function as sinks. This means groundwater gradients in the vicinity of the pits are directed toward the voids, and solute migration from pit lakes to downgradient terrestrial receptors is not expected to be sustained under equilibrium conditions. Likewise, while localised groundwater level effects may occur in the immediate vicinity of the residual voids, the updated closure behaviour does not indicate a mechanism for broad-scale off-site drawdown propagation that would materially affect downgradient vegetation communities.

Potential impacts from WRDs, TSF, and other infrastructure are more conservatively assessed because these sources are not themselves evaporative sinks and may historically have contributed solutes to groundwater. However, the evidence base still indicates that any groundwater pathway to downgradient terrestrial receptors would be long, uncertain, and subject to attenuation. In addition, the presence of terrestrial GDEs remains unconfirmed. On this basis, future impacts to

terrestrial GDEs are assessed as low to highly unlikely, with the most conservative interpretation being that localised past or present influence may have occurred but significant off-site future impacts are not expected.

3. Potential Impacts on Industrial Use Receptors

Industrial use remains a relevant groundwater environmental value because groundwater has historically been used by the Project and former operators. However, no known third-party industrial users of groundwater have been identified in the immediate vicinity of the site, and there are no functioning registered bores within 10 km of Wirralie.

As a result:

- there is little evidence of a current off-site industrial receptor;
- closure sink behaviour of the pits reduces the likelihood of off-site migration from pit waters; and
- any residual groundwater quality issues are expected to remain localised to the site and immediate mine area.

Accordingly, impacts to industrial groundwater use are assessed as inconsequential to low.

4. Potential Impacts on Other Environmental Values

Other environmental values, including drinking water, agriculture, aquaculture, food production, and recreation, are not considered relevant groundwater receptors in the immediate Project area based on current evidence of use and receptor presence. Cultural and spiritual values are recognised qualitatively; however, no specific groundwater receptor has been identified. Consequently, no material groundwater impact is predicted for these environmental values in the context of the current hydrogeological assessment.

5. Overall Impact Assessment

The overall source-pathway-receptor assessment indicates that:

- the principal potential groundwater sources are the pits, WRDs, TSF, and secondarily the HLP, ROM and smaller water storages;
- the principal stressors are acidity, sulfate, salinity, metals/metalloids, and localised groundwater level change;
- the only material pathway considered is groundwater; and
- the most relevant receptors are potential terrestrial GDEs, with aquatic GDEs considered low likelihood and industrial groundwater use considered low sensitivity in the local receptor context.

The most important conclusion from the updated closure modelling is that all residual pits are predicted to act as groundwater sinks rather than sources. This significantly reduces the likelihood of future off-site migration of pit-derived solutes and supports the conclusion that any potential post-closure groundwater impacts are expected to be localised and contained within the mine area.

Overtopping risk is also low, further reducing the likelihood of uncontrolled release from pit water bodies.

On this basis:

- impacts on aquatic GDE are assessed as highly unlikely;
- impacts on terrestrial GDE are assessed as low to highly unlikely;
- impacts on industrial groundwater use are assessed as inconsequential to low; and
- no material off-site groundwater impacts are predicted under closure conditions.

Table 14 Source, Pathway, Receptor Impact Assessment

Source	Principal Risk / Contaminants	Receptor	Pathway	Evidence for Pathway	Predicted Impact
Residual pit voids	Acidic, sulfate-rich, saline and metalliferous pit waters; localised groundwater level effects	Potential aquatic GDEs	Groundwater quality migration or groundwater level change	Low likelihood receptor; no evidence of baseflow; pits predicted to be sinks in closure	Highly unlikely
Residual pit voids	Acidic, sulfate-rich, saline and metalliferous pit waters; localised groundwater level effects	Potential terrestrial GDEs	Groundwater quality migration or groundwater level change	Receptor possible but unconfirmed; downgradient distance substantial; closure sink behaviour directs flow toward voids	Low to highly unlikely
Residual pit voids	Groundwater level change and groundwater quality change	Industrial groundwater use	Groundwater	No known third-party industrial users nearby; no functioning registered bores within 10 km; pits act as sinks in closure	Inconsequential to low
WRDs	Minor localised acidity, sulfate, salinity and metals from low-reactivity waste material	Potential aquatic GDEs	Groundwater quality migration	Low likelihood receptor; long downgradient pathway; no confirmed groundwater-supported aquatic system	Highly unlikely
WRDs	Minor localised acidity, sulfate, salinity and metals from low-reactivity waste material	Potential terrestrial GDEs	Groundwater quality migration	Possible but uncertain pathway; receptor unconfirmed; attenuation likely	Low to highly unlikely
TSF and TSF pondage	Salinity, sulfate, arsenic, copper, molybdenum, zinc, residual process-related solutes including occasional cyanide detection	Potential aquatic GDEs	Groundwater quality migration	Groundwater quality indicators suggest historical site influence, but receptor likelihood low and pathway long	Highly unlikely
TSF and TSF pondage	Salinity, sulfate, metalloids and process-related solutes	Potential terrestrial GDEs	Groundwater quality migration	Possible but uncertain downgradient pathway; receptor unconfirmed; no evidence of widespread off-site impact	Low to highly unlikely
HLP, ROM, minor water storages	Secondary source of salinity, sulfate and metals	Potential terrestrial GDEs / industrial use	Groundwater	Secondary source only; pathway uncertain and likely localised	Low
All sources collectively under closure conditions	Residual solute generation and groundwater interaction	All relevant EVs	Groundwater	Residual pits predicted to act as sinks; low overtopping risk; impacts contained within mine area	No material off-site impact predicted

Summary and Conclusion

This assessment has evaluated the hydrogeological conditions, groundwater environmental values, and potential impacts associated with the final voids at the Wirralie Project.

Void water balance modelling undertaken indicates that all final voids will function as groundwater sinks under post-closure conditions. Equilibrium water levels are predicted to remain below the surrounding groundwater table, resulting in persistent inward hydraulic gradients towards the voids.

Evaporation is the dominant component of the water balance across all voids, exceeding combined inputs from rainfall, runoff, and groundwater inflow. As a result, pit lakes are expected to operate as terminal evaporative systems with stable long-term behaviour.

Assessment of extreme rainfall conditions demonstrates that all voids retain sufficient freeboard under a 1% AEP event, and overtopping is not expected.

The source-pathway-receptor assessment indicates that:

- no potential pathways exist for off-site migration of groundwater contaminants.
- any potential groundwater level impacts are localised and diminish with distance from the voids
- potential ecological receptors, including groundwater-dependent ecosystems, are unlikely to be adversely affected.

Overall, the final voids are expected to remain stable, hydraulically contained, and environmentally acceptable over the long term. The proposed closure configuration is consistent with the requirements of the Progressive Rehabilitation and Closure Plan and does not present a material risk to groundwater environmental values.

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Appendix A

Ref: 26043-01

20 March 2026

Solomons Gold Pty Ltd

Woree,

Queensland 4868

Dear Ashish,

RE: Wirralie Void Models

We refer to recent discussions and fee proposal acceptance between Ashish Mishra of HydroElement Solutions Limited (HydroElement) and Christa Placzek of Terra Solutions Pty Ltd (Terra Solutions) to provide updated void modelling for Wirralie Gold Mine.

1 Project understanding

The Environmental Protection Act 1994 (EP Act) was amended on 30 November 2018 to require new and existing mining operations with a site-specific EA to actively commit to and implement a Progressive Rehabilitation and Closure Plan (PRCP). The PRCP guideline (DES, 2023) sets out the types of information needed to fulfil the PRCP requirements. A key scope item of the PRCP is a hydrogeologic report. Wirralie Gold Mine has requested HydroElement revise an existing report to conform to the hydrogeology assessment component of the PRCP for the Project. HydroElement has requested that Terra Solutions undertake the void modelling to support this report.

2 Status of project pits

There are five pits present in the Project area with these pits being:

- Pit A
- Pit B
- The North Pit
- The Deep Lead Pit, and
- The Blinky Pit

The closure configuration of these pits is identical to the current pit geometry. The regional climate is such that annual pan evaporation rates far exceed annual rainfall rates (Table 1). As such, isolated pits (i.e. pits without large catchment areas) tend to be seasonally dry unless they intersect the water table. In parts of Queensland with very high seasonal and interannual variability in rainfall, pits that have relatively small groundwater influxes (i.e. they are not very far below the regional water table) tend to have pit lakes that are small, but seasonally variable as a result of surface water inputs.

A pit water balance model was created to better understand the relationship between the pit voids and groundwater at Wirralie. The configuration of the pit voids in closure will not change from the current configuration, so the final void status of the pits, is best determined from current observations. As such the modelling intent was to determine the following:

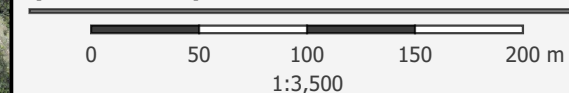
- The magnitude of the groundwater flux into the pits, and
- The risk of pit pits overtopping



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FIGURE 1: PIT WATER LEVELS
(26/02/26)



LEGEND:

Pits

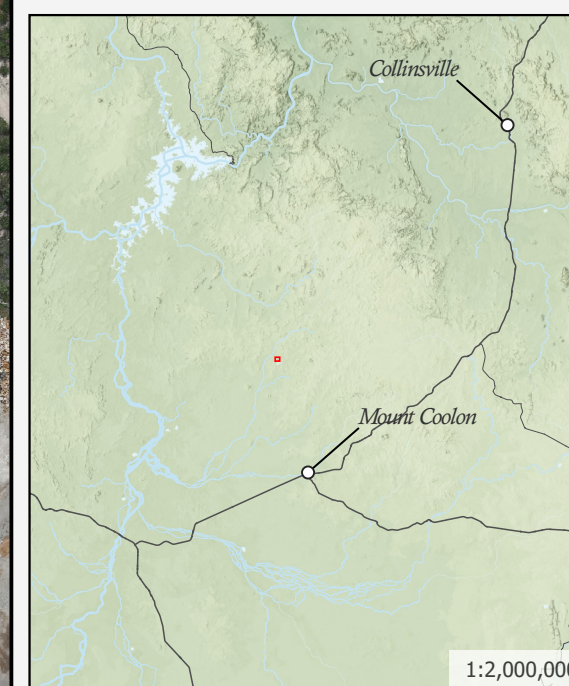
— Water Levels (metres AHD)

Wirralie Drone RGB

■ Band 1: red (Red)

■ Band 2: green (Green)

■ Band 3: blue (Blue)



PAGE SIZE: A3

CLIENT: Solomons Gold

DATE: 19/03/2026

AUTHOR: D.CASE

COORDINATE SYSTEM: GDA2020 / MGA zone 55

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Table 1: SILO climate averages for the Project (Jan 1912-Dec 2025, -21.5°S; 139.9°E)

STATISTIC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Mean Rainfall (mm)	114	112	59	31	26	26	22	13	10	25	47	80	566
Mean Potential Evaporation (mm)	199	164	169	139	114	92	102	127	162	200	208	214	1891

2.1 Void status

The status of each void (Table 2) was assessed with using the relationship between the inferred regional potentiometric surface (from AGE, 2023 unless otherwise specified) and recent and historical pit water levels. The data sources for this assessment are:

- The regional potentiometric surface was inferred from the cross-sections and potentiometric mapping of AGE (2023).
 - The density and spatial distribution of water level monitoring points results in several meters of uncertainty in the inferred regional potentiometric surface.
 - Hydrographs from the Project area are relatively flat, so variability in groundwater levels over time are within the error of extrapolation of the potentiometric surface.
- The 2026 elevation data was collected via UAV photogrammetry surveys on the 26th of February 2026. All UAV data was processed through the mapping platform GeoNadir to create Digital Elevation Models (DEMs). The elevation for the DEM was adjusted based on previous surveys at the site to minimise z-value variation between surveys. From the raster DEM files, 0.5 m contour shapefiles were created for mapping and display purposes (Figure 1). This data corresponds to a period when the Project area had recently experienced heavy rainfall.
 - The observations from Figure 1 and Figure 2 have changed the inferred regional potentiometric surface interpolated for Pit A and the North Pit to 250 mAHD, which corresponds to the water level in the North Pit.
 - The reinterpretation is based on the climatic data (Table 1), which suggests that this pit would not contain water year-round if it did not intersect the groundwater table.
- Pit water levels were qualitatively assess using satellite imagery from 20 July 2024 (Figure 2). The pit configuration at this time was similar to that of 2026; however, these images correspond to a dry period.

As a result of this assessment, Pit B was not modelled as it has minimal connections to groundwater. Due to a shared catchment, Pit A and the North Pit were lumped together for modelling purposes.

Table 2: Summary of void status for all voids

PIT	2026 WATER LEVEL (MAHD)	2024 WATER LEVEL OBSERVATIONS	REGIONAL POTENTIOMETRIC SURFACE (MAHD)	FINAL VOID STATUS
Pit A	242.5	Pit lake is slightly smaller than in 2026	250	Sink
North Pit	249	Pit lake is considerably smaller than in 2026	250	Sink
Pit B	243	Except for a small, perched lake in the north east corner, the pit is dry	242	Almost dry, generally a sink, with a small, perched lake
Deep Lead	229	Pit lake is considerably smaller than in 2026	244	Sink
Blinky	245	Pit lake is about the same extent in as in 2026	242	Sink



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FIGURE 2: PIT CONDITIONS
(20/07/2024)

0 50 100 150 200 m
1:3,500

LEGEND:

Pits

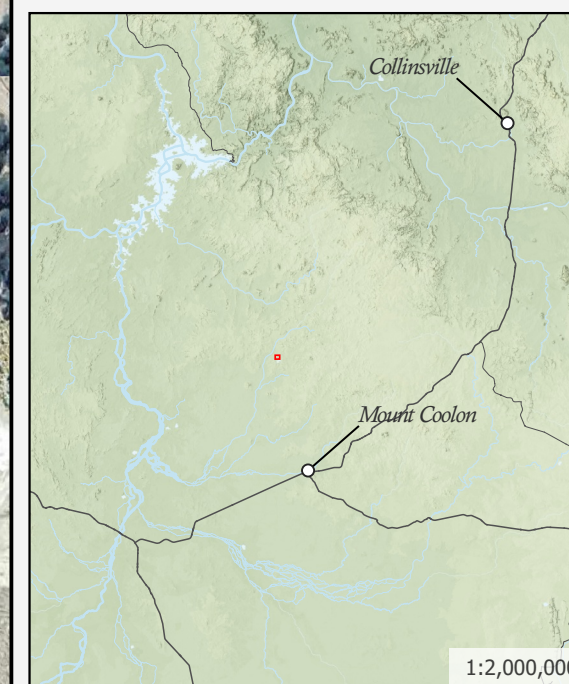
Blinky Pit

Pit B

Pit A

North Pit

Deep Lead Pit



PAGE SIZE: A3
CLIENT: Solomons Gold
DATE: 19/03/2026
AUTHOR: D.CASE
COORDINATE SYSTEM: GDA2020 / MGA zone 55

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3 Modelling Methodology

3.1 Water balance

The water balance was calculated on a monthly basis, but the results are presented on an annual basis. The principal water balance components used herein are as follows:

Inputs:

runoff (calculated as average rainfall over the catchment area, multiplied by a runoff coefficient);

direct rainfall over the pit; and

groundwater inflow (if applicable).

Outputs:

evaporation (calculated as average pan evaporation multiplied by a coefficient);

and groundwater outflow (if applicable).

As such, the water balance (in m³/month) for a void is as follows, with the variables described in Table 3, is given by:

$$W = [Rn * C_{ro} * (S_{ac} - S_{ap})] + [S_{ap} * Rn] + / - [GW] - [C_E * ET * S_{al}]$$

Table 3: Parameters used in the void water balance

PARAMETER	SYMBOL	UNITS (SECONDARY UNIT)
Monthly water balance	W	m ³
Rainfall	Rn	m/month (mm/month)
Surface area of catchment	S_{ac}	m ²
Surface area of pit	S_{ap}	m ²
Surface area of pit lake	S_{al}	m ²
Runoff coefficient	C_{ro}	fraction (%)
Mean pan evaporation	ET	m/month(mm/month)
Evaporation coefficient	C_E	fraction (%)
Groundwater Inflow or outflow	GW	m ³ /month (L/s)

3.2 Water balance inputs

Rainfall

Rainfall data was sourced from the Scientific Information for Land Owners (SILO) database. SILO is operated by DES with data contributions from BOM. The SILO database provides a weather record dataset that utilises neighbouring stations to infill missing data and accumulated days, spatially interpolated for specific locations between stations. The SILO dataset was used for the latitude -21.5 and longitude 139.90. In addition to calculating monthly and annual averages, this dataset was used to calculate Annual Exceedance Probabilities (AEP) for rainfall. The formula for calculating AEP is:

$$P=100 \times (m/(n+1))$$

Where:

P is the AEP expressed as a percentage;

m is the rank of the rainfall value with 1 being the largest possible value; and

n is the total number of events or data points on record.

The average monthly rainfall and AEP values for rainfall are presented in Table 4.

Table 4: Rainfall and AEP data

RAINFALL (MM)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1% AEP	256	315	205	200	122	126	118	94	64	110	191	214	1077
5% AEP	256	315	205	200	122	126	118	94	64	110	191	214	1077
10% AEP	223	256	142	91	79	81	89	41	42	75	119	172	943
20% AEP	167	188	116	49	52	55	45	29	16	48	86	148	779
30% AEP	142	144	72	38	31	36	20	14	10	37	65	105	682
40% AEP	120	131	63	29	22	23	11	7	4	27	48	87	624
50% AEP	109	95	47	15	12	16	5	2	2	13	37	71	557
60% AEP	82	85	40	6	3	5	1	0	1	8	28	57	511
70% AEP	66	66	28	2	1	2	0	0	0	4	18	44	473
80% AEP	52	36	14	0	0	0	0	0	0	2	12	34	382
90% AEP	30	20	6	0	0	0	0	0	0	0	3	21	313
95% AEP	18	12	1	0	0	0	0	0	0	0	1	14	280
99% AEP	5	2	0	0	0	0	0	0	0	0	0	2	241

Runoff coefficients

The proportion of rainfall that exits a catchment as surface drainage is the runoff coefficient. Broadly, the runoff

coefficient increases with steeper slope, decreased vegetation, lower hillside roughness, and lower rates of water infiltration into the soil. In detail, runoff produced during a specific rainfall event varies depending on the conditions of the catchment; for example, rainfall events that fall on soil that is already saturated with water produce larger runoff volumes than those falling on dry soil. For this reason and a number of additional factors, the runoff coefficient is higher for higher magnitude rainfall events.

Rainfall runoff values for the one-year annual recurrence interval (ARI) rainfall events in a sparsely vegetated north Queensland landscape are presented in Table 5. A default runoff coefficient of 0.35 was used in the void models presented here; this corresponds to the runoff coefficient for a 1-year ARI rainfall event on a rolling land slope with high permeability soils (Table 5).

Table 5 Runoff coefficients in north Queensland (from Soil Conservation Guidelines for Queensland, 2015)

Land slope	1-year ARI runoff coefficients		
	soil permeability		
	high	medium	low
Rolling (2–10%)	0.3	0.5	0.6
Hilly (10–30%)	0.4	0.6	0.7

Evaporation

Average pan evaporation data is also available from SILO. These values are indicative of the amount of water evaporating from open water; however, actual evaporation values from a void are generally less than the pan evaporation and it is necessary to apply a correction factor that adjusts the evaporation rate to be more representative of the actual evaporation. For deep voids, which are shaded by the pit walls and protected from surface wind currents, a correction factor of 0.7 is commonly applied (DES, 2023). The average monthly pan evaporation values from SILO are presented in Table 6.

Table 6: Average Monthly pan evaporation data

Month	Pan Evaporation (mm)
January	199
February	164
March	169
April	139
May	114
June	92
July	102
August	127
September	162
October	200
November	208
December	214
Annual value	1891

Void surface area and volume

Pit lake surface areas and volumes as a function of lake height were calculated using generalised geometric assumptions. These estimates of pit lake area were cross checked by interpreting satellite images on the publicly available Queensland globe web. The model inputs are from the curves derived in Figure 3, Figure 4, and Figure 5.

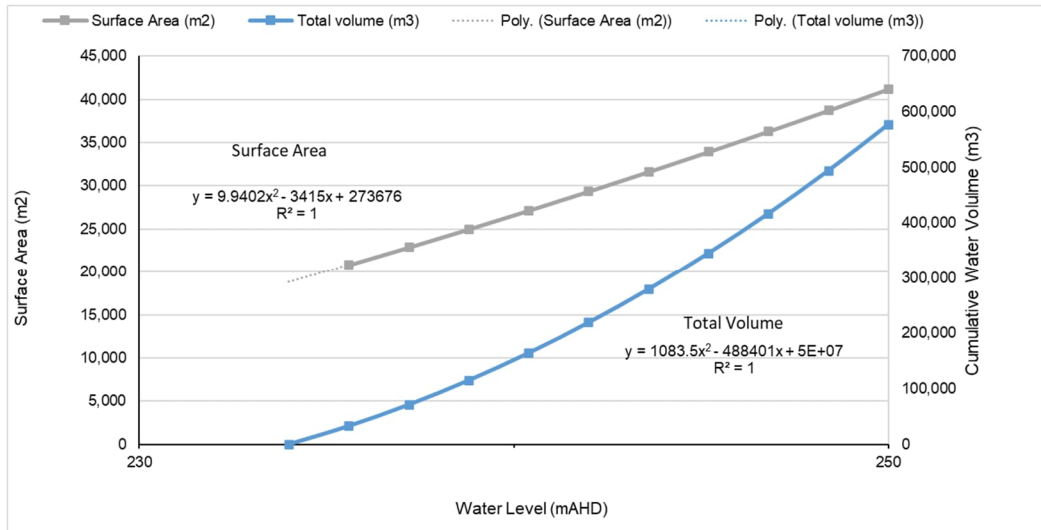


Figure 3: Pit lake surface area and volume verses lake elevation for Pit A

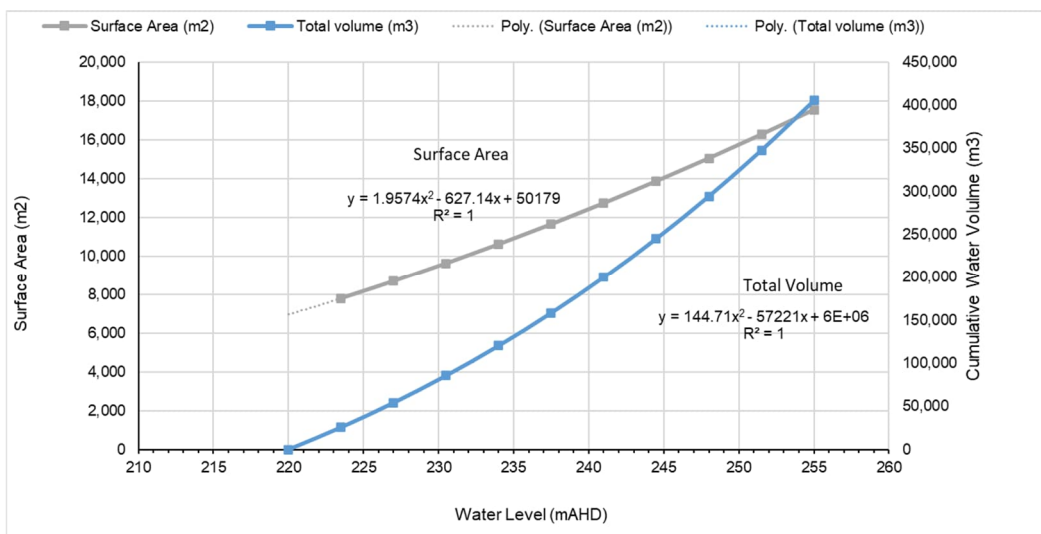


Figure 4: Pit lake surface area and volume verses lake elevation for Deep Lead Pit

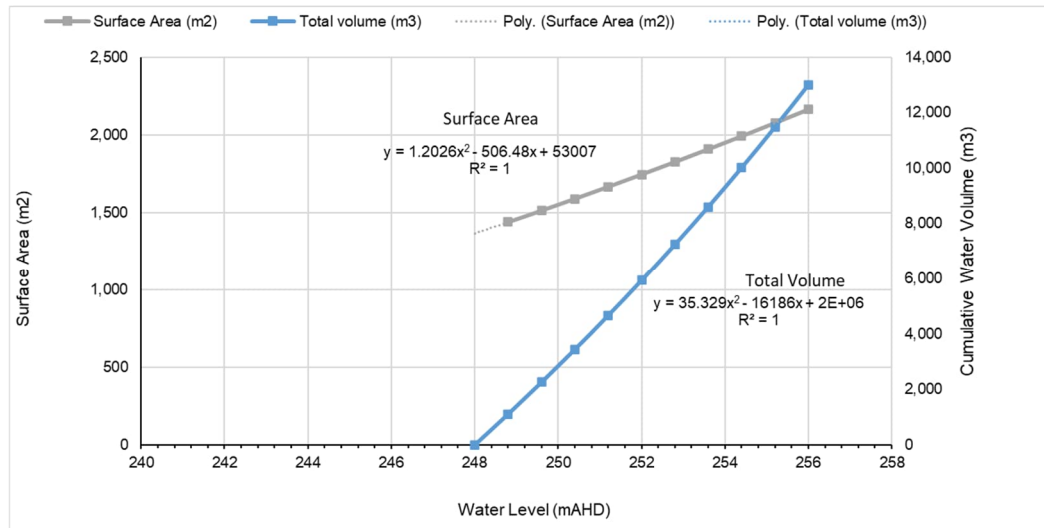


Figure 5: Pit lake surface area and volume verses lake elevation for Blinky Pit

Catchment area

The catchment area was delineated with the catchment area defined by the DEM model. For Pit A, the catchment area of the North Pit was included, as it flows into Pit A at water levels >251m AHD.

Table 7: Catchment area of pits (including pit lakes)

PIT	CATCHMENT AREA (M ²)
Pit A (including North Pit)	130,525
Deep Lead Pit	33,400
Blinky Pit	7,500

3.3 Groundwater flux

Groundwater inflow (and outflows) at any given pit stage is dependent on the hydrogeologic properties of the strata and on the relationship between water level in the pit and the surrounding water table, with lesser inflow occurring when the hydraulic conductivity is smaller and/or when the hydraulic gradient is less.

The approach to estimating groundwater inflow is adopted from Marinelli and Niccoli (2000) (Figure 6) and the updated Marinelli and Niccoli equation by Arnold, Langer, and Paschke (2003).

- o The solutions result from iterative calculations of three equations (Table 8), with the total inflow being the summation of Q1 and Q2 as per the equations and variables in Table 8.
- o The solutions consider the effect of decreased saturated thickness near the pit walls, distributed recharge to the water table, and upward flow through the bottom of the pit.
- o The method assumes steady-state, unconfined, horizontal, and axially symmetrical flow towards the area of the pit within a porous media.
- o The pit geometry is idealised as a circular cylinder.

- The assumptions of this analytical model are general in nature and not intended to be a detailed representation of the geology of the Project site on a local scale. Site geology is somewhat heterogenous, with different groundwater levels and flows in the various hydrostratigraphic units and with different degrees of fracturing. However, if validated, the estimates from these types of models are effective in providing representative predictions of inflows/outflows.
 - o Overestimation of the groundwater inflow and radii of influence occur when the mine life is short as the model assumes equilibrium conditions.
- As with all models, the solution provides an estimate with inherent uncertainty; however, historically this type of model has provided sound predictions of groundwater behaviour to inform management decision making.

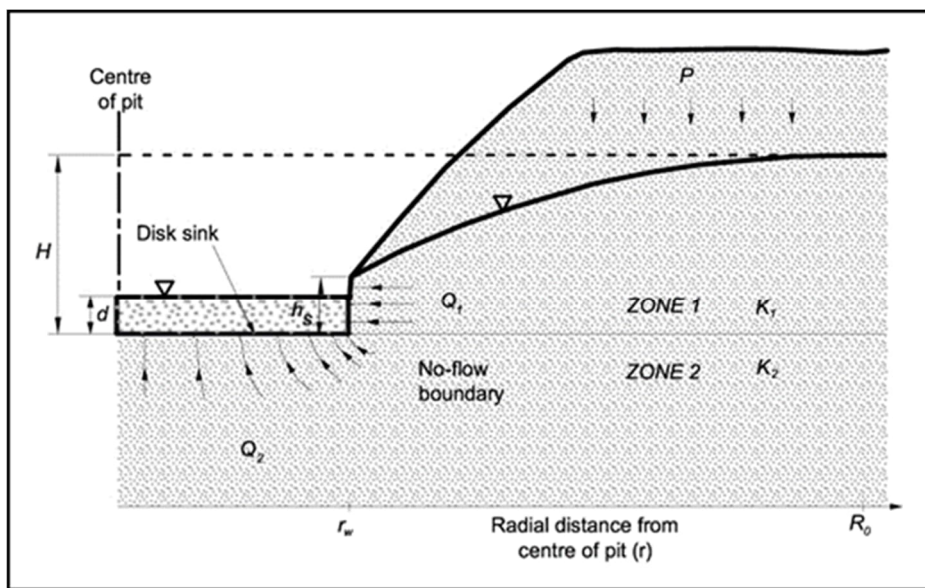


Figure 6: Diagram of the conceptual inputs for pit estimations (after Marinelli and Niccoli, 2000)

Table 8: Analytical modelling equations and variables

EQUATION/VARIABLE	FORUMALA/DEFINITION
Equation 1	$Q_1 = P\pi(R_0^2 - r_w^2)$
Equation 2	$Q_2 = 4 r_p \left(\frac{K_{h2}}{m_2} \right) (h_o - d)$
Equation 3	$H = \sqrt{h_s^2 + \frac{P}{K_{h1}} \left[R_0^2 \ln \left(\frac{R_0}{r_w} \right) - \frac{R_0^2 - r_w^2}{2} \right]}$

EQUATION/VARIABLE	FORUMALA/DEFINITION
m_2 (anisotropy)	$m_2 = \sqrt{\frac{K_{h2}}{K_{v2}}}$
Q_1	Inflow though seepage face (m ³ /s)
Q_2	Inflow though mine base (m ³ /s)
H	Height of radius of influence (m)
d	Depth of ponded area (m)
K_{h2}	Horizonal hydraulic conductivity (m/s)
K_{v2}	Vertical hydraulic conductivity (m/s)
P	Distributed recharge (m/s)
r_w	Radius of pit (m)
R_0	Radius of influence (m)
hs	Saturated thickness to seepage face.

3.4 Input parameters

- The groundwater pit models used the fixed and variable values listed in Table 9.
- The model is sensitive to all the input parameters, so no single solution is possible for prediction.

Table 9: Analytical modelling variables

PARAMETER	SYMBOL	UNITS	VALUE	COMMENTS
Height of radius of influence	H	m	Determined from regional potentiometric surface (See Table 2)	Regional potentiometric surface determined from the conceptual model and groundwater contours (AGE, 2023); Assumed regional potentiometric surface for Pit A is 250mAHD
Pit water level	-	mAHD	Variable values	-
Depth of ponded area	d	m	Variable values	Calculated
Radius of Influence	R_0	m	Determined iteratively within the model	Calculated within the model
Recharge	P	m/s (% of rainfall)	1.85×10^{-10} (1.0%)	AGE (2023) and climate data
Radius of pit	r_w	m	Variable values	Calculated from pit geometry
Horizonal	K_h	m/s	1.5×10^{-6}	Consistent with observed values

conductivity		(m/d)	(1.3)	(AGE, 2023)
Vertical conductivity	Kv	m/s (m/d)	1.5 x 10 ⁻⁶ (1.3)	Consistent with observed values (AGE, 2023)
Anisotropy	m	-	1	Determined from K _h and Kv

4 Results

4.1 Groundwater fluxes

The three modelled pit lakes are relatively small, with seasonal fluctuations in the size of the pit lake. As such, the focus of the models was to verify the water budget model to calculate overtopping risk. To do so, the water balance was solved several times at mean climate conditions, with variable inputs for hydraulic conductivity; these results are summarised in Table 10.

Based on the results shown in Table 10, the best solutions are for a hydraulic conductivity (K) of $\sim 1.5 \times 10^{-6}$ m/s; higher hydraulic conductivity results in groundwater inflow that are too large (i.e. significantly higher than surface water fluxes) and low hydraulic conductivity results in inflow that are too low to maintain a pit lake (i.e. a negative water budget). The model for Blinky Pit could not successfully be solved due to the very small area of the pit and the very small difference between pit water levels and the inferred regional potentiometric surface.

As previously discussed, both the groundwater and surface water budgets are sensitive to all the parameters outlined above, so no single solution is possible for prediction; however, when combined, the predictions gave solutions that approximate conditions of the Pits.

Table 10: Summary of influx modelling results

PIT WATER LEVEL (MAHD)	SURFACE WATER FLUX (M ³ /YR)	GROUNDWATER INFLUX (M ² /YR)	WATER BUDGET (M ³ /YR)	K (M/S)	RO-M (M)
Pit A (including North Pit)					
242.5	-21180	14	-6280	1.0x10 ⁻⁷	215
242.5	-21180	6300	7650	1.5x10 ⁻⁶	430
242.5	-21180	145500	124320	1.0x10 ⁻⁵	830
Deep Lead					
229	-8950	5190	-3760	1.0x10 ⁻⁷	340
229	-8950	6172	52770	1.5x10 ⁻⁶	930
229	-8950	381470	372520	1.0x10 ⁻⁵	2030
Blinky					
245	-905	375	-529	1.0x10 ⁻⁷	~10
245	-905	37366	37366	1.5x10 ⁻⁵	~10

The PRCP guidelines require assessment of the potential for voids to overtop. This was evaluated by simulating a yearly water budget for 1% AEP of precipitation on a pit lake at the current water level. For Pit A, the additional catchment area of the North Pit was included in this water budget. All pits are predicted to remain well below their crest, with significant remaining capacity when 1% AEP climate conditions are imposed on pit water levels that are already elevated (Table 11).

Table 11: Summary of overtopping risk

PIT	INITIAL PIT WATER LEVEL (MAHD)	PIT CREST (MAHD)	WATER LEVEL AFTER 1% AEP
Pit A (including North Pit)	242.5	250	244.1
Deep Lead	229	255	231.5
Blinky	245	251, spills to Pit B	Minimal change

5 References

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