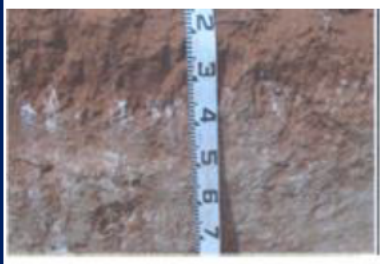

WESTGOLD

HIGGINSVILLE GOLD PROJECT

HIDDEN SECRET IN-PIT TAILINGS STORAGE FACILITY

WORKS APPROVAL APPLICATION SUPPORTING DOCUMENT

[redacted]

October 2024

CLARK LINDBECK & ASSOCIATES PTY LTD
Environmental Management Consultants

Table of Contents

Figures

Tables

Appendices

1 INTRODUCTION

1.1 BACKGROUND

Karora (Higginsville) Pty Ltd (Higginsville) operates the Higginsville Gold Operations (HGO) located approximately 110km south-southeast of Kalgoorlie (Figure 1). Westgold Resources Pty Ltd acquired Higginsville in August 2024. The HGO mining area consists of:

- Higginsville (processing plant, paste plant, TSF1-4, Aphrodite IPTSF, Vine IPTSF, Fairplay North IPTSF, Trident underground, Aquarius and Two Boys boxcuts, Poseidon, Swagman, Fairplay, and Graveyard Pits).
- Palaeochannel (Challenger Pit and Mitchell Pit - historical).
- Lake Cowan (Napoleon, Joesphine, Atreides, Louisa and Bridgette Pits).
- Baloo-Eundynie (Hidden Secret and Mousehollow).

Baloo-Eundynie is a satellite mining operation that supplied gold ore to the HGO processing plant, located approximately 10 km northeast, during mining activities from 2019 to 2024. Mining occurred from the Baloo open pit, located on Lake Cowan, and the Hidden Secret and Mousehollow open pits (Eundynie) located approximately 3 km west of Baloo (Figure 2).

Karora currently holds Licence L9155/2018/1 under Part V of the *Environmental Protection Act 1986* for the HGO Prescribed Premises which includes the Baloo-Eundynie Project area (Figure 2).

Mining is currently undertaken at the Aquarius and Two Boys underground mines and the Pioneer open pit.

Tailings storage at HGO comprises four above-ground, paddock-type facilities, TSF1, TSF2, TSF3 and TSF4, and three in-pit tailings storage facilities (IPTSF), Aphrodite IPTSF, Fairplay IPTSF and Vine IPTSF. Tailings deposition at HGO is currently into TSF2-4SC (super cell). This is expected to reach capacity in late 2025, when another lift will be required. Before constructing the lift, it is proposed that Higginsville utilise the Hidden Secret open pit as an IPTSF.

1.2 OBJECTIVE

The objective of this document is to provide supporting information for Karora's Works Approval (WApp) application to utilise the Hidden Pit open pit for use as an IPTSF.

1.3 OWNERSHIP AND TENURE

The Project is 100% owned by Karora (Higginsville) Pty Ltd. The tenements part of this WApp are listed in Table 1. These tenements are all part of the existing prescribed premises boundary for L9155/2018/1 (Figure 2).

Table 1: Tenements part of this WApp

Tenement	Tenement Holder
G15/19	Karora (Higginsville) Pty Ltd
M15/348	Karora (Higginsville) Pty Ltd
M15/506	Karora (Higginsville) Pty Ltd
M15/507	Karora (Higginsville) Pty Ltd
M15/580	Karora (Higginsville) Pty Ltd
M15/597	Karora (Higginsville) Pty Ltd
M15/1873	Karora (Higginsville) Pty Ltd
L15/347	Karora (Higginsville) Pty Ltd

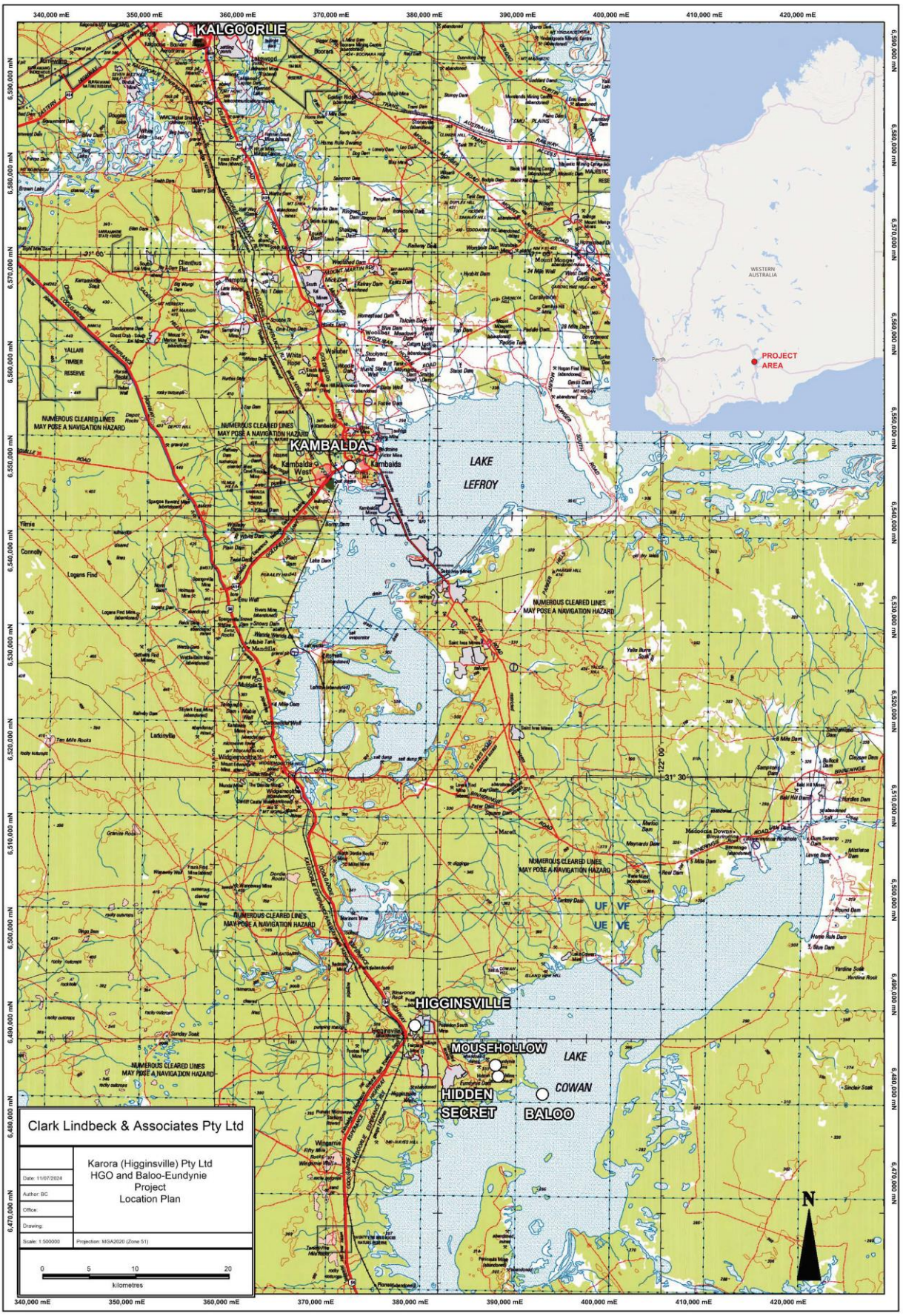

Figure 1: Location of Project

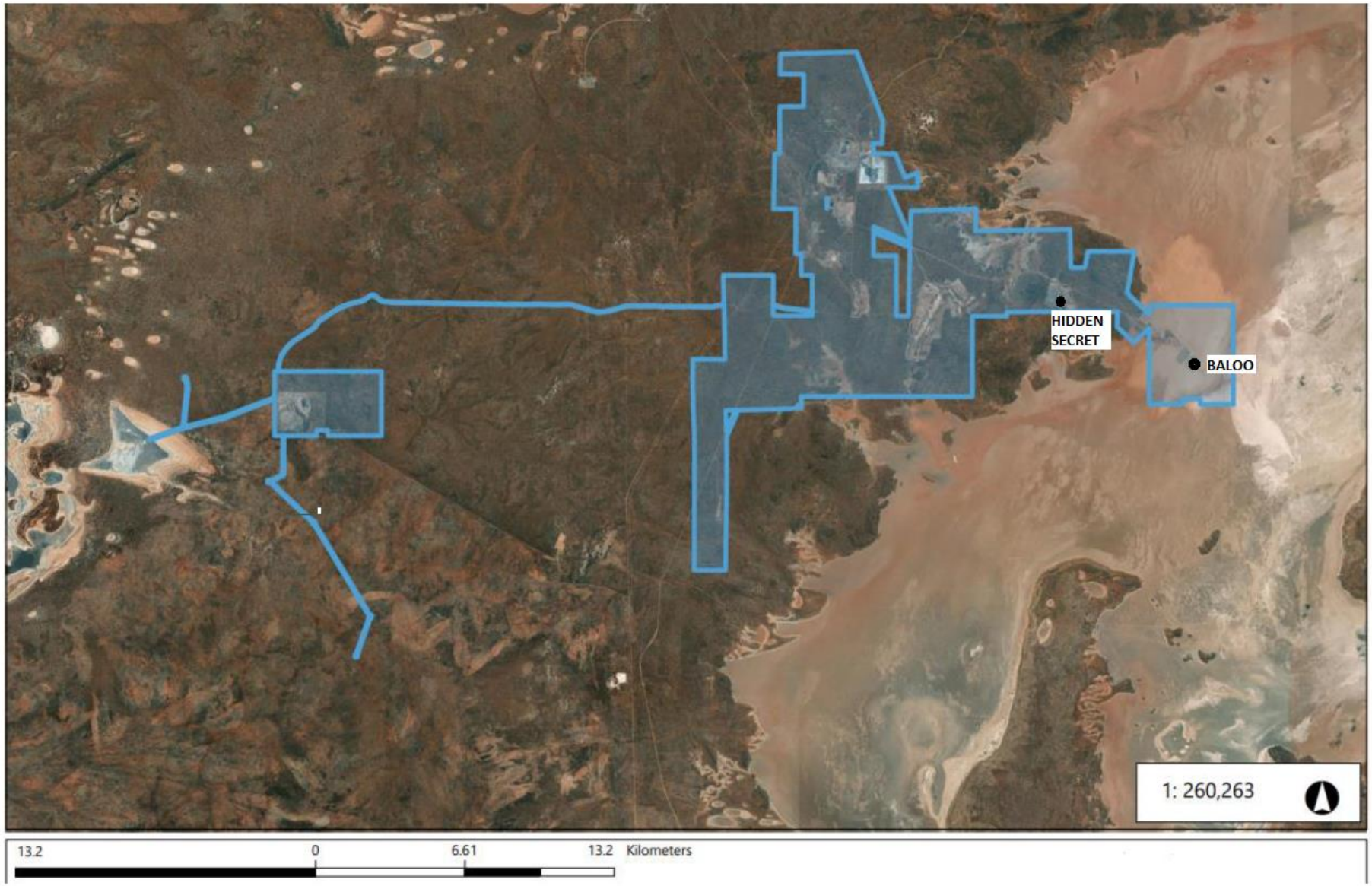

Figure 2: Prescribed Premises Boundary as shown in Schedule 1 of L9155/2018/1 – Hidden Secret location is marked

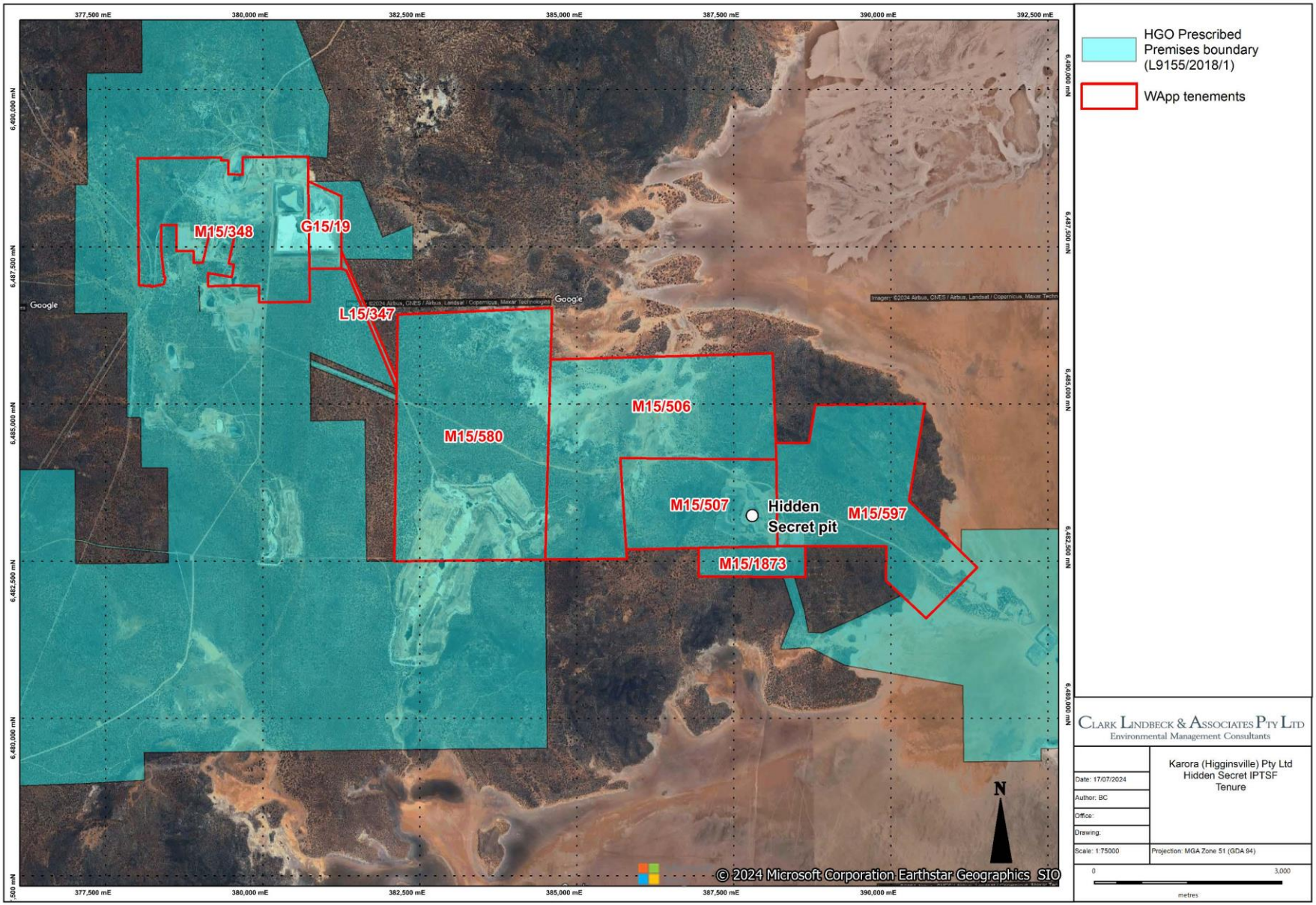

Figure 3: Project Tenure

4 ATTACHMENT 4 – SITE PLAN

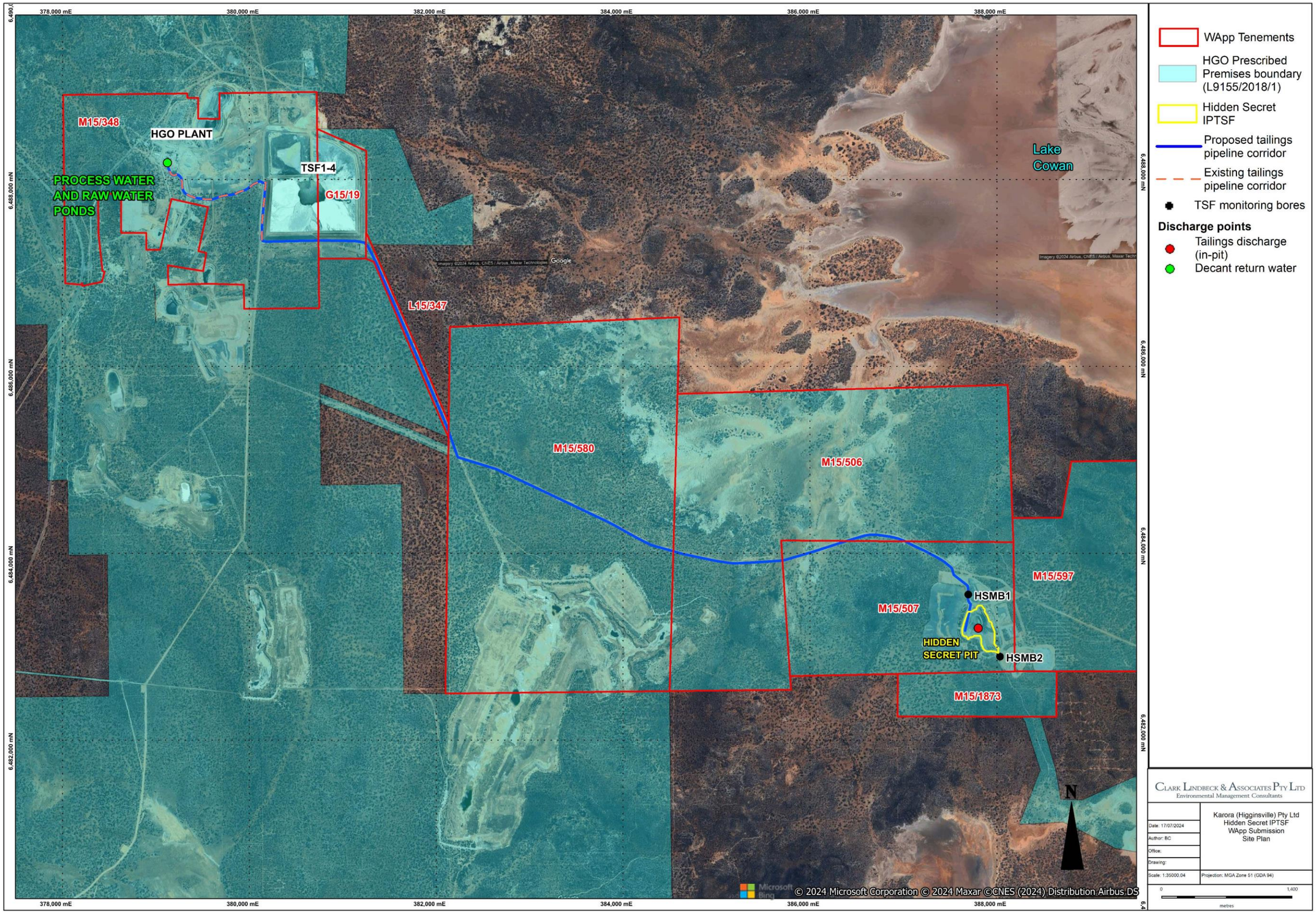

Figure 4: Hidden Secret IPTSF site plan

5 ATTACHMENT 3B – PROPOSED ACTIVITIES

5.1 OVERVIEW

The Hidden Secret open pit is located approximately 10 km southeast of the HGO Processing Plant.

Mining of this pit was completed in January 2022 to a maximum depth of 79m and has the capacity to store approximately 1.77 Mm^3 of tailings. This will provide an equivalent total storage capacity of approximately 2.57 Mt, corresponding to approximately 21 months storage based on an advised design production tonnage of 1.5 Mtpa and an adopted tailings dry density of 1.45 t/m^3.

There is currently 75,000 m^3 of water in the Hidden Secret pit and mine dewatering of the pit will occur prior to tailings deposition. This mine dewater will be transferred, via the tailings return water pipeline, to the HGO plant for use.

Tetra Tech Coffey (Coffey) prepared a TSF design report (TTC 2024) for the Hidden Secret IPTSF which is attached as Appendix 1 and includes the detail design elements. The information from the following sections is largely sourced from TTC (2024).

Tailings deposition into the TSF will be from three single-point discharges positioned along the eastern rim of the pit. Deposition will be performed in two stages for direction of the supernatant pond along the pit access ramp to support decant operations. Tailings will be transported from the processing plant to the proposed IPTSF via a large diameter HDPE pipe. The tailings distribution pipeline will be bunded with the return water pipeline. Water recovered by the decant pump will be pumped back to the processing plant for re-use.

The IPTSF has been classified with a 'Low – Category 3' hazard rating and a Dam Failure Consequence Category of 'Very Low' due to 'Minor' impact/damage level and a population at risk (TTC 2024).

Two monitoring bores will be drilled along strike from Hidden Secret Pit to measure any changes in water level and water quality that occur when the pit is filled with tailings. Installation of further new monitoring bores around the IPTSF will be considered during operations if required.

Detailed design drawings of the IPTSF are included as Appendix E in Appendix 1 (TSF Design Report).

5.2 PRESCRIBED PREMISES

Higginsville currently holds Part V Operating Licence L9155/2018/1, which includes the following Prescribed Premises categories:

- Category 5: Processing or beneficiation of metallic or non-metallic ore – 1.5 Mtpa.
- Category 6: Mine dewatering – 5.15 Mtpa.
- Category 54: Sewage facility – No more than 200m^3/yr.
- Category 64: Class I or II putrescible landfill – >20 tpa.

The prescribed premises boundary associated with this WApp is consistent with that presented in Licence L9155/2018/1 and no changes are required.

The proposed Hidden Secret IPTSF construction and operation are part of the following prescribed category:

- Category 5: Processing or beneficiation of metallic or non-metallic ore.

Figure 4 shows the location of the proposed IPTSF and tailings pipeline. Cleared vegetation and topsoil will be stockpiled adjacent to the pipeline corridor for use in rehabilitation works.

5.3 KEY INFRASTRUCTURE AND EQUIPMENT

The key infrastructure to be constructed is summarised in Table 2, with further details on the Hidden Secret IPTSF provided in the following sections.

Table 2: Hidden Secret IPTSF design and requirements

Infrastructure	Requirements
Design and construction	
Decant infrastructure	• A decant pond will be developed and maintained adjacent to the pit access ramp to enable operator access to the pontoon mounted pump and adjustment of the pump location.
Tailings/return water pipelines	• Installation of 11.95 km x 10m (maximum) tailings pipeline corridor which will include – tailings discharge, decant water return pipelines and access track. • Tailings pipelines will run alongside the existing road on M15/507, M15/506, M15/508, G15/19 and M15/348 i.e. clearing required limited to pipeline and bunding only. Widening of the existing track is required on L15/347. • The tailings pipeline corridor will have a nominal width of 10 m – allowance for maximum of 6m wide pipeline and containment bund and 4m wide access road. • Containment bunds installed along both sides of the pipeline corridor to a minimum height of 0.6 m. • The material for the containment bunds will be sourced in-situ using a grader. If additional material is required it will be sourced from benign waste rock Mousehollow or Fairplay waste dumps. • Tailings pipelines will be placed within the existing tailings bunded corridor west of TSF1-4 (refer to Figure 4). • Flowmeters installed on pipelines at the processing plant and at the discharge point within the telemetry into the control system. *NB Please note the location of the tailing pipeline as presented in Appendix 1 has been revised as the tenure was not compatible. The design, as included in Appendix E of Appendix 1 (TSF design report) remains unchanged.
Scour pits	• Provision for construction of 2-3 scour pits (in each tenement) at low points alongside the tailings pipeline corridor. These pits are designed to contain any potential spills/leaks from the pipeline (outside of the containment bunding) before the automatic cut-off system activates. • Dimensions of 40m x 40m. • The location of and final number of scour pits to be constructed will be determined during the final pipelines design phases following further site survey.
Groundwater monitoring bores	• Installation of a minimum of two monitoring bores (HSMB1, HSMB2). Provision for installation of additional monitoring bores if required. • Bores designed and constructed in accordance with ASTM D5092/D5092M-16: Standard practice for design and installation of groundwater monitoring bores. • Following development of the bores by air-lifting, they will be sampled to provide base-line conditions prior to operation of the IPTSF.

Infrastructure	Requirements
Time-limited Operations	
Hidden Secret IPTSF	• Minimum 2.0 m operating freeboard. • 3 spigots around the pit rim • The spigots will be opened sequentially so that the tailings are released evenly and the decant pond is located adjacent to the pit access ramp. • Continuous process control monitoring of flow meters at either end of the delivery lines with automatic shut off triggers. • Physical inspection of the pipeline corridors at least once per shift in accordance with the facility operating manual and DEMIRS safety requirements. • Annual calibration of pipeline telemetry systems. • Annual pipeline corridor audit to ensure pipeline bunding capacity is maintained. • Monitoring and daily inspections of the TSF and pipelines will be undertaken as per the parameter and analyses listed in Condition 21 and 22 of the HGO DWER Licence (L9155/2018/1). • All operations undertaken in accordance with the Tailings Operating Manual.

5.4 CONSTRUCTION WORKS

There is minimal construction work required for implementation of the IPTSF. The construction work required includes:

- Installation of a tailings discharge pipeline from the plant to the TSF.
- Installation of a decant water return pipeline from the supernatant pond pontoon (pump) to the process plant.
- Installation of specific tailings discharge pipelines over the wall of the pit.
- Installation of two (2) monitoring bores.

Construction works are expected to take 6-8 weeks and planned to commence in Q4 2025. An assessment of the potential risks associated with the construction phase and proposed management measures to be implemented is included in Section 8.2.

5.5 HIDDEN SECRET IPTSF

5.5.1 Storage Characteristics

The storage characteristics of the Hidden Secret IPTSF include:

- Width 270 m, length 525 m, orientation N-S
- Minimum pit rim: RL 300.5 m(S); Maximum pit rim: RL 312.0 m (W)
- Pit surface area: 10.3 ha
- Approximate maximum tailings depth: 79 m
- Indicative tailings storage volume: 1.77 Mm^3
- Indicative tailings storage capacity: 2.57 Mm^3
- Indicative life of operations: 21 months (1.7 years) (TTC 2024).

It is noted that an assumed tailings beach slope of 1:100 (V:H) and the stormwater volume (from a 1:100-years AEP, 72-hour storm event) temporarily stored on top of the TSF and above the normal operating pond level were considered in the storage capacity calculations.

5.5.2 Tailings Deposition

Tailings will be transported from the processing plant to the proposed TSF via a large diameter HDPE pipe. The tailings distribution pipeline will be bunded along with the return water pipeline (Table 2).

Tailings will be deposited into the TSF from single-discharge points along the eastern perimeter of the pit to progressively develop and push the supernatant pond at the opposite side and along the pit access ramp(s). The pit access ramp(s) will be utilised as part of water recovery operations. Pontoon-mounted pump(s) will be deployed and moved up the access ramp(s) when the tailings and water levels rise within the pit, to recover water from the facility and return it to the processing plant for re-use.

Tailings deposition into the IPTSF is proposed to be performed from the eastern pit wall perimeter in two stages. The first stage of deposition will be from the southern extent (Position 1), and north of the platform (Position 2), allowing for the supernatant pond to form towards the northern extent of the pit. The second stage of deposition will commence when the tailings beach develops onto the northern section of the access ramp. Including deposition from the northern extent (Position 3) will direct the supernatant pond to follow the access ramp west and south.

The location of the TSF discharge points are shown in Appendix E of Appendix 1 (TSF Design report, pp 60). The discharge locations are indicative and may need to be moved / adjusted during operations, after reviewing the progressive tailings beach development and supernatant pond formation to optimise water recovery. The operating procedures are detailed in the Operations Manual (Appendix H which is included in Appendix 1 – TSF Design Report).

The Operations Manual also includes an Emergency Action Plan (EAP) and a qualitative operational risk assessment for operations at the IPTSF.

Given the general expected consolidation of tailings during and post-operation, a topping-up process is expected to be required prior to decommissioning. The topping-up process will enable the storage capacity of the pit to be maximised by filling in any depressions on the tailing surface (due to consolidation) and depositing tailings from around the perimeter of the pit where excess freeboard remains. This will be further addressed in the Licence application.

5.5.3 Water Recovery

Supernatant water liberated from the tailings slurry will be recovered using a pontoon-mounted pump or similar deployed along the existing access ramp within the pit. Supernatant (decant) water recovered from the facility will be pumped back to the processing plant for re-use.

The tailings deposition plan was assessed to position the supernatant water pond adjacent to the pit access ramp, and at the opposite side of the pit from the discharge points. As the tailings and water levels rise within the pit, the supernatant water pond will move up the pit access ramp, with the pump to be moved up the ramp. The ramp will provide access to the pump for operational and maintenance purposes.

No underdrainage system is proposed for the IPTSF, due to the relatively short operational life, good settling characteristics of the tailings allowing reclaim of supernatant water, and the low potential for environmental damage as the groundwater in the area/region is hypersaline.

5.6 GEOTECHNICAL ASSESSMENT

A geotechnical and stability assessment for the feasibility of using the Hidden Secret Pit as an IPTSF, was undertaken and findings were reported in “Hidden Secret – Geotechnical Inspection & assessment

for in-pit tailings deposition" by Entech (2024). This report is included as Appendix D in Appendix 1 (TSF Design Report) and summarised in section 7.0 of Appendix 1 (pp 13-15).

As part of the HSTSF design, a site visit was conducted for visual inspection of the pit wall stability by Tetratech, for verification of actual site conditions findings and is included in this Appendix (and summarised in Section 7 of Appendix 1, pp 13-15). The site observations included:

- The pit is approximately 270 m wide, 525 m long, and orientated N-S. The maximum pit depth varies to approximately 79 m. The pit volume is approximately 1.76Mm^3 (estimated based on the survey data provided by Karora).
- Several pit wall failures along the western, northern, and eastern pit walls were observed. These observations are in line with the recent inspection by Entech (2024)17.
- The existing ramp provides safe access to the pit floor area. The ramp starts at the north-western end of the pit wall and continues along the western, northern and eastern wall slopes.
- The pit circumference does not present potential unstable areas and will not cause issues during future tailing operations.

The main pit wall stability will likely improve as the deposited tailings abut the toe of the walls and any existing failures.

5.7 TAILINGS CHARACTERISATION

Mining at HGO is currently undertaken at the Two Boys underground mine and the Pioneer open pit. Tailings generated from processing of these deposits is currently discharged to TSF2-4SC and the tailings to be discharged to the Hidden Secret IPTSF is considered to be consistent with these tailings.

5.7.1 Tailings Geochemistry

Additional test work on tailings was carried out as part of the Hidden Secret IPTSF design and involved sampling at the HGO Mill from the hopper from where tailings are pumped to the TSF. Assessment of the geochemical properties of ex-mill process tailings was performed by Graeme Campbell & Associates (GCA, 2024). The geochemical characterisation report is included as Appendix J in the attached Appendix 1 (TSF Design Report, TTC 2024).

The GCA (2024) assessment identified the following:

- The tailings were classified as non-acid forming (NAF).
- Tailings were variably enriched with Arsenic (As), and Sulphur (S) with S levels ranging from 0.46 to 0.76%.
- The tailings slurry water sample was alkaline (pH 8-9) and hyper-saline (TDS of 220 g/L) with most of the Weak-Acid-Dissociable-Cyanide (CN_{WAD}) forms corresponding to Free-Cyanide (CN_{FREE}).
- The chief cyanide-complexing metals in solution were Iron (Fe) and Copper (Cu) with subordinate Cobalt (Co) and Nickel (Ni).

GCA (2024) noted that following discharge from spigots into the TSF, a range of physical and biochemical processes will degrade cyanide forms and CNWAD concentration to below the threshold of 50 mg/L.

GCA (2024) identified that apart from managing hyper-salinity at TSF decommissioning and rehabilitation stages, there are no geochemical implications for continued tailings management at HGO or geochemical demands for the design of the Hidden Secret IPTSF.

5.7.2 Geotechnical Testing

A geotechnical investigation was conducted by Coffey in 2023 as part of the current TSF2-4SC Stage 5 raise design at HGO. Tailings deposited into the proposed Hidden Secret IPTS is expected to have the same physical properties as the tailings deposited into the TSF2-4SC.

Additional laboratory testing was undertaken in 2024 on selected tailings samples to determine engineering properties of the materials for comparison against historical results and to provide recent tailings properties for use in the HSTSF design (refer to Section 4.2 and Section 4.3 in Appendix 1).

A summary of the design parameters and tailings engineering properties for the TSF design, as presented in TTC (2024) is provided in Table 3.

Table 3: Summary of design parameters and tailings engineering properties

Properties	Parameter	Comment
Tailings production rate	1.5 Mtpa	Based on Coffey audit report (Coffey 2023b).
Slurry density ex-plant	45%	Based on 2024 geotechnical lab test.
Tailings (dry) density	1.45 t/m^3	Based on Rowe Cell test result this density is adopted for design purposes.
Specific gravity (SG)	2.81	Based on 2024 geotechnical lab test.
Particle size distribution (PSD)	100% passing 2 mm 73% passing 75 µm	Based on 2024 geotechnical lab test.
Atterberg limits	PI = Non-plastic	Based on the 2023 lab test (Coffey 2023a).
Retained moisture content (MC)	Adopted avg. MC = 35.5%	Based on 2024 geotechnical lab test.
Angle of internal friction and cohesion (c')	Angle = 39.1° C' = 11.9 kPa	Based on the 2023 lab test (Coffey 2023a).
Hydraulic conductivity/vertical permeability	1 x 10^{-7} to 1.5 x 10^{-8} m/s	Based on Rowe Cell test result (i.e. calculated using the reported C_v and m_v values at different vertical effective stresses of 100 to 1600 kPa)
Consolidation coefficient (C_v)	32.4 to 54.5 (m^2/year)	Based on Rowe Cell test result (at different vertical effective stresses of 100 to 1600 kPa).
Tailings beach slope	0.67 to 1%	Based on Coffey report (2018).

5.8 FREEBOARD

The catchment area of the proposed TSF will primarily involve the impoundment pit surface area due to the elevated location of the pit. Aside from supernatant water from tailings slurry, the primary ingress of water into the TSF will be from incident rainfall (i.e., rainfall-runoff water from the limited external catchment and the impoundment pit surface areas – approximately 2.1 ha and 10.5 ha, respectively).

Flood and freeboard requirements for the Hidden Secret IPTSF have been designed in accordance with DMP (2015) guidelines as follows. DMIRS freeboard criteria are:

- 1:100-year AEP, 72 hour storm event - ~0.15 m
- Pit wall freeboard – minimum 0.5 m
- Equivalent storm water depth – 1.5 m

- Equivalent total freeboard – minimum 2.0 m.

The top tailings surface of the HSTSF will assume a "wedge formation", with a beach sloping towards the decant location. The TSF is designed such that the stormwater volume from a 1:100-year AEP, 72-hour storm event can be temporarily stored on top of the facility and above the normal operating pond level. The normal operating pond level/extent is adopted at 15% to 20% of the tailings surface area under normal operating conditions, which is equivalent to 2 to 3 days of slurry water volume.

Provision is made for a minimum pit wall freeboard of 0.5 m (vertical height between the stormwater and minimum pit rim levels).

It has been calculated that the volume of water produced from a 1:100 year, 72 hour storm event will be 17,025 m^3 with the designed water storage allowance being 326,380 m^3.

The design assumes correct operational controls are adhered to and decant/rainfall water is continually removed, such that minimum freeboard allowances are maintained. Adherence to these controls will ensure adequate stormwater storage within the facility and that freeboard criteria are met. It should be noted that critical freeboard criteria are particularly relevant when the tailings beach level approaches the pit rim level, that is when the facility is almost full and at closure.

5.9 WATER BALANCE

Water balance analyses for the proposed Hidden Secret IPTSF during operations was undertaken using a mathematical simulation to examine the expected inflows and outflows from the facility (refer to Appendix 1, Section 9, pp 21-22 and Appendix F in Appendix 1).

Inflows and outflows for the facility were estimated on a month basis and under average climatic conditions. The analyses examined the annual/monthly rainfall and evaporation under average climatic conditions for the year-to-year operations of TSF. The following assumptions/parameters were used in the analyses:

- Average annual rainfall: 279.2 mm
- Average annual evaporation: 1,802 mm
- Slurry inputs: 1.5 Mtpa at 45% solids (TTC, 2023b)
- Impoundment pit surface area = 10.3 ha
- Runoff coefficient within the HSTSF impoundment pit surface area: 1.0 (assumed)
- External catchment above pit area: 0.21 ha
- Runoff coefficient from the external catchment above the pit area: 0.5 (estimated (Inst. Of Engineers, 1998))
- Evaporation pan factor of 0.74 (Luke G J *et al*, 2003)
- Supernatant pond area (under normal operating conditions, (based on tailings deposition modelling using the Muk3d software program): 15% to 20% of the tailings surface area
- Running beach area varies slightly for each stage of operations (based on tailings deposition modelling Muk3d software program) and is assumed as 50% of the staged tailings surface area remains wet;
- Retained tailings moisture content: 35.0%
- The average hydraulic conductivity (permeability) of the tailings: 1×10^{-7} m/s.

Water balance and charts are included in Appendix F appended to Appendix 1 attached to this Supporting Document. The results of the analyses (under average climatic conditions) suggest the following:

- An annual average water return of 71.5% of tailings slurry water deposited into the IPTSF will be available for recovery.
- The annual average water available for recovery from the IPTSF during operations will be around 1,310,716 m^3.

To maximise the water recovery, the IPTSF will be operated to ensure the water pond is as small as practical and located at the proposed decant pump facility.

5.10 SEEPAGE ASSESSMENT

Rockwater (2024) completed a seepage assessment for the Hidden Secret IPTSF. The assessment report is included as Appendix I to Appendix 1 (TSF Design Report).

Previous seepage assessments have been completed by Rockwater at the HGO (for Aphrodite West and Central pits IPTSF (in late 2016 to late 2018), Fairplay East Pit IPTSF (in early to late 2019) and Vine Pit IPTSF (in late 2019 to late 2020). Consistent with the previous studies, Rockwater (2024) used a groundwater model to predict the extent of groundwater mounding that will occur when the Hidden Secret IPTSF is filled with tailings to 300m AHD (refer to Section 9.1 of Rockwater (2024)).

The following is taken direct from Rockwater (2024):

"*The bedrock at Hidden Secret and Mouse Hollow is fairly massive and impermeable.*

Minor seepage zones, possibly associated with shears, can be identified in an aerial photograph of HS taken shortly after the completion of mining. Significant inflows (in the order of 1-2 L/s) were, however, at that time being produced by an RC hole drilled in the lower part of the ramp. Presumably, the hole had intersected a fracture zone at depth in which the groundwater was under pressure, causing it to discharge at the surface.

The pre-mining water level at HS was about 270 mAHD, which equates to a water table depth of 40-55 m below ground level (mbgl) depending on location. The pre-mining water level coincides approximately with the top of fresh bedrock, so that the oxidised and transitional zones were unsaturated and did not contribute to groundwater inflow during mining. Some outward seepage through the oxidised and transitional zones may occur when the pit is filled with tailings, but this is not expected to be significantly greater than that which currently occurs inwards through the fresh bedrock.

Hidden Secret will be the fourth occasion in which a pit has been used to dispose of tailings at Higginsville. Previous occasions were the Aphrodite West and Central pits (in late 2016 to late 2018), Fairplay East Pit (in early to late 2019) and Vine Pit (in late 2019 to late 2020). Groundwater mounds were produced around all of the pits when they were filled with tailings. However, the mounds are fairly steep-sided and narrow, and in the case of Fairplay East, which like Hidden Secret was excavated into fresh bedrock, have dissipated since tailings deposition.

The results of a simple one-layer groundwater model indicate that a steep-sided groundwater mound, with a maximum radius of about 300 m, will be produced when Hidden Secret Pit is filled with tailings. This is not expected to result in any detrimental impacts to the fractured bedrock aquifer or the surrounding vegetation".

The contour plot resulting from the model is included as Figure 5.

Based on the results of Rockwater (2024), no artificial liners will be installed due to the pre-existing hypersaline groundwater conditions and the low permeability of the surrounding country rock.

A brief review of the mounding produced by the historical HGO in-pit TSFs is provided in Section 8 of Rockwater (2024) (Appendix I of Appendix 1 – TSF Design Report) to provide an indication of what may also occur at Hidden Secret.

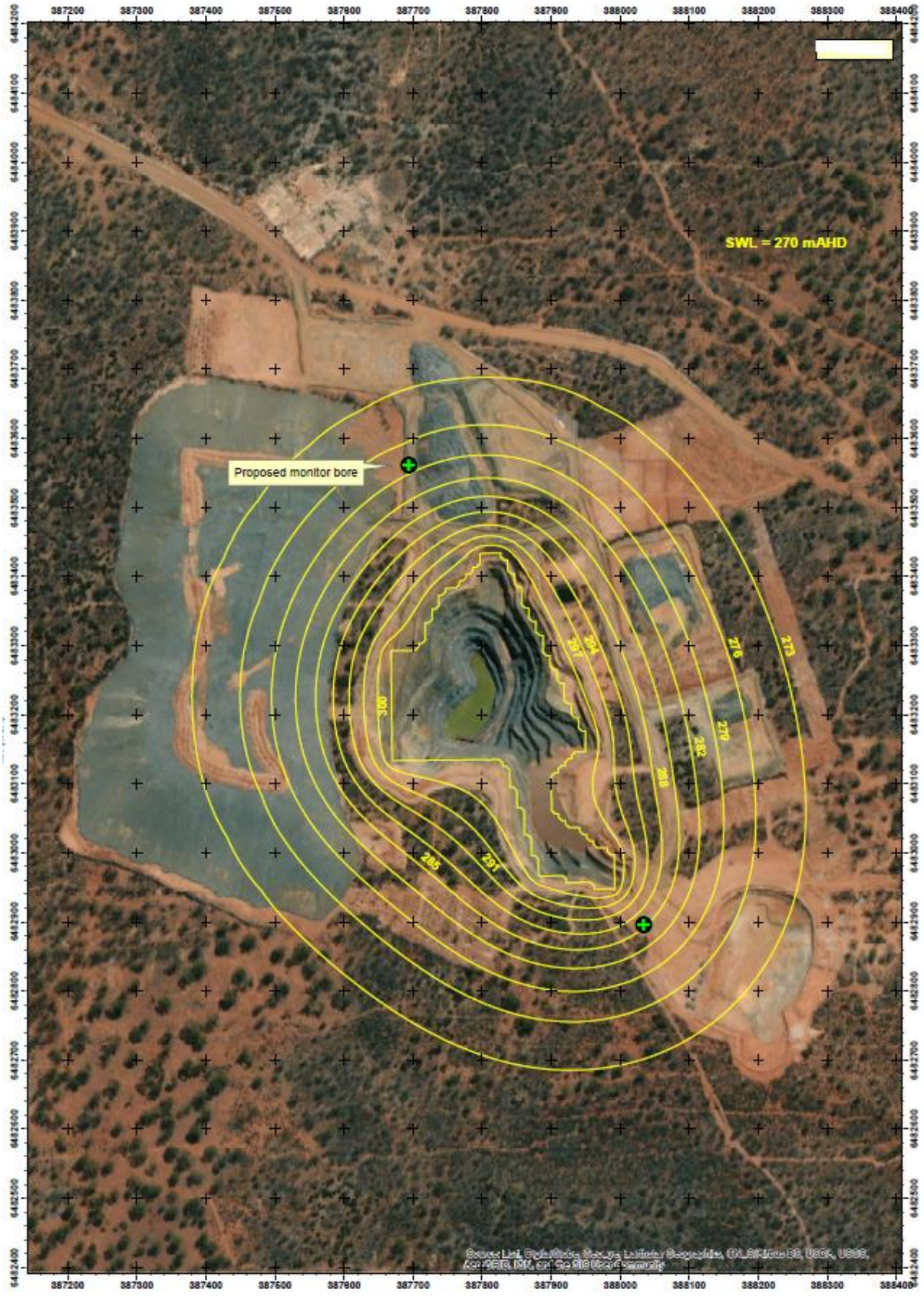

Figure 5: Modelled Groundwater Mound with Pit water Level at 300m (from Rockwater 2024)

5.11 SURFACE WATER MANAGEMENT

The Hidden Secret IPTSF occurs in hilly, rocky terrain in the central part of the peninsula, where the land-surface elevation is approximately 315 mAHD – 50 m higher than the western shore of Lake Cowan. The surrounding terrain slopes away from the HSTSF site and there are no nearby drainage lines that could cause flooding of the project area (Rockwater 2024).

The Hidden Secret pit is located at a higher elevation than the surrounding water drainage lines and catchment areas, thus there is no requirement to assess the external upstream catchments that could impact the IPTSF (refer to Section 9.10) i.e. surface water flows is away from this area. In addition, an abandonment bund wall has been constructed around the Hidden Secret open pit and could be considered as a "flood control" bund, though this is not required.

A summary of the surface water hydrology for the Hidden Secret -Mousehollow Project areas, as completed by Rockwater (2019a) is provided in Section 9.10.

6 ATTACHMENT 3A – COMMISSIONING PLAN AND TIME LIMITED OPERATIONS

6.1 COMMISSIONING

Commissioning of the IPTSF will commence immediately post development and installation of the pontoon-mounted pump, pipelines and spigots and submission of the WApp Compliance Report.

The first stage will involve progressive testing and commissioning of all systems and this will be undertaken as part of mine dewatering of the 75,000 m^3 of water contained in the Hidden Secret pit.

Commissioning activities required for the Hidden Secret IPTSF will be undertaken in two stages:

- Decant water line commissioning – used initially for mine dewatering activities.
    - Initial testing of decant pump and pipeline under expected pressure and flow rates.
    - Full commissioning to ensure pump, pipeline and telemetry are operational.
    - Ongoing mine dewatering to HGO plant.
- Tailings line commissioning.
    - Initial testing of booster pump and pipeline under expected pressure and flow rates.
    - Full commissioning to ensure pump, pipeline and telemetry are operational.

The final stage of commissioning and will see the introduction of tailings to the discharge pipeline and ultimately to the TSF.

Commissioning will be completed within eight weeks of installing the proposed IPTSF infrastructure.

Following commissioning, and submission of the commissioning report, Karora will submit an amendment to the existing DWER Licence for ongoing operation of the Hidden Secret IPTSF and associated infrastructure.

An assessment of the potential impacts resulting from commissioning and management measures to be implemented to ensure the risks are reduced to ALARP is included in Section 8.2.

6.2 TIME-LIMITED OPERATIONS

Time limited operations are proposed to commence immediately upon the completion of commissioning until the DWER Licence is granted. All operations will be undertaken in accordance with the Operations Manual.

An assessment of the potential impacts resulting from Time-limited operations and management measures to be implemented to ensure the risks are reduced to ALARP is included in Section 8.2.

6.3 MANAGEMENT AND MONITORING

6.3.1 Commissioning

During commissioning, the tailings and return water pipelines will be inspected a minimum of twice per day to ensure the integrity of the pipelines are maintained.

Karora will ensure that prior to commencement of tailings discharge to the IPTSF, groundwater samples have been collected from the TSF monitoring bores (HSMB1 and HSMB2) and analysed to provide further baseline data.

6.3.2 Time-Limited Operations

Sampling of bores HSMB1 and HSMB2 will be integrated into the existing monitoring program to enable assessment of the IPTSF performance. Water samples will be collected at least once each month and analysed for the parameters recorded in Table 14 of DWER Licence L9155/2018/1.

Daily inspections of the tailings and return water pipelines will be undertaken to check the integrity of the pipelines, bunding and scour pits.

Process monitoring will be undertaken consistent with Table 13 (Condition 21) of DWER Licence L9155/2018/1 and include monthly records of the volumes of tailings deposited and water recovered from the TSF.

6.3.3 Environmental targets and limits

A summary of the proposed targets and limits during the commissioning and Time-limited operations phase is included in Table 4.

Table 4: Commissioning and TLO limits/targets

Infrastructure	Targets/Limits
Commissioning	
Tailings and return water pipelines	Target - No release of saline water tailings from the pipelines and outside of the containment bunds to the surrounding vegetation.
Time-limited operations	
IPTSF and pipelines	Target - No release of saline water tailings from the pipelines and outside of the containment bunds to the surrounding vegetation.
Monitoring bores	Limit – CN_{WAD} <0.5 mg/L.
	Limit– SWL >4 mbgl.

6.3.4 Emissions and Discharges

The emissions and discharges relating to commissioning and time limited operations, with the proposed controls are provided in Attachment 6A, Section 8.

6.3.5 Contingencies

If the SWL or WAD CN limits are exceeded or release of tailings or return water to surrounding vegetation occurs, the source will be investigated, and remedial actions implemented as required.

In the event that the SWL continues to be exceeded, Karora will consider the use of the monitoring bores as seepage recovery bores to maintain the SWL >4 mbgl.

Given the short duration of operation of the Hidden Secret IPTSF, it is considered highly unlikely this will be required.

6.3.6 Management of Malfunctions

During the commissioning and Time-limited operations phase, malfunction of equipment may occur. If a failure occurs, then the system will be shut down until the fault is rectified.

6.4 REPORTING

All environmental incidents will be recorded and investigated under an internal incident reporting system in place at HGO. Reporting of incidents other than minor incidents shall follow the requirements set out in s72 of the *Environmental Protection Act 1986*.

Should any of the emission targets (stated above) be exceeded during the final stages of commissioning with the possibility that the targets may need to be amended, Karora will provide the DWER with the following information:

- The non-conforming emission/discharge and extent to which the target was exceeded.
- Management responses to the exceedance and their effect on the emission/discharge.
- An explanation as to why the exceedance may have occurred and any corrective actions taken to minimise the risk of a re-occurrence.

6.5 RESPONSIBILITIES

To ensure that the commissioning plan is appropriately implemented the following responsibilities have been assigned in relation to key tasks and commitments (Table 5).

Table 5: Commissioning plan responsibilities

Task/Commitment	Responsible Person
Undertake daily visual inspections of the pipelines during construction/installation in accordance with Commissioning Plan	Project Manager and Processing Manager
Undertake the required monitoring	Environment Manager
Implement contingency actions in accordance with Commissioning Plan	Environment Manager
Report any emission exceedances to the DWER	Environment Manager
Undertake reporting commitments in accordance with Commissioning Plan	Environment Manager
Submit a Commissioning Report to the DWER summarising relevant monitoring data and management actions upon completion of commissioning	Environment Manager

7 ATTACHMENT 5 – OTHER APPROVALS AND CONSULTATION / ENVIRONMENTAL LEGISLATIVE FRAMEWORK

7.1 OTHER STATUTORY APPROVALS

Table 6 summarises the statutory approvals required for the proposed TSF1 embankment raises.

Table 6: Environmental Legislative Framework for the activities outlined in this Supporting Document

RELEVANT LEGISLATION	ENVIRONMENTAL FACTOR REGULATED/AFFECTED	RELEVANT APPROVAL REQUIREMENT
APPROVALS		
Aboriginal Heritage Act 1972	Aboriginal heritage	Nil – no known Aboriginal sites impacted.
Environment Protection and Biodiversity Conservation Act 1999	Biodiversity Land and Soils	Not required – no clearing or triggers for referral.
Environmental Protection Act 1986 (EP Act) Part IV (and Administrative Procedures 2012)	Biodiversity Land and Soils	No significant impact to any environmental factors resulting from the Project.
Environmental Protection Act 1986 (Part V) - Licensing	Water Resources Land and Soils	This Works Approval application is to obtain approval for construction of the Hidden Secret IPTSF. An application to amend the existing Operating Licence (L9155/2018/1) will be submitted to incorporate the operation of the IPTSF at completion of commissioning.
Environmental Protection Act 1986 (Part V); Environmental Protection (Clearing of Native Vegetation) Regulations 2004	Biodiversity	All clearing required will be undertaken in accordance with CPS 8152/4 which authorises 1,082.81 ha of native vegetation clearing.
Mining Act 1978 and Mining Regulations 1981	Biodiversity Land and Soils Rehabilitation and Mine Closure	An updated MP will be submitted concurrently with this Works Approval for the proposed IPTSF.
Rights in Water and Irrigation Act 1914	Water resources	Approval to construct proposed TSF monitoring bores.
Biodiversity Conservation Act 2016	Biodiversity	No approvals required.

7.2 CONSULTATION

Consultation with stakeholders is continuous and undertaken to discuss identified issues or concerns over the life of the operation. Karora's strategy is to identify and annually review key stakeholders for the operation. Regular contact is maintained to discuss current or future proposals that may cause impact requiring stakeholder input. Plans are presented and discussed to obtain relevant feedback. The aim is to communicate appropriately and reach understanding in order to proceed with agreeable and suitable options for both parties.

The submission of this Works Approval for the IPTSF has been communicated with DWER in previous submissions.

8 ATTACHMENT 6A – EMISSIONS, DISCHARGES AND WASTE

8.1 POTENTIAL EMISSIONS

Potential emissions arising from the construction, commissioning and time-limited operation of the prescribed premises are:

- Noise during construction activities
- Dust during construction and time-limited operations
- Potentially contaminated stormwater from tailings and decant water return pipelines to the surrounding area
- Leachate resulting from potential seepage from the IPTSF.

The management measures and controls to be implemented are summarised in the risk assessment presented in Table 7.

8.2 RISK ASSESSMENT AND MANAGEMENT SUMMARY

A summary of the potential environmental risks relevant to the Works Approval application and the associated environmental management measures to be implemented to reduce these risks to an acceptable level, are summarised in Table 7.

The siting is consistent with that assessed by DWER as part of the assessment of the Licence amendment submissions approved in the past 12 months (W6605/2021/1; W6635/2021/1).

The residual risk assessment ratings are consistent with the risk assessment matrix used by DWER as shown in (Table 8).

Table 7: Risk assessment and management summary for the proposed IPTSF

Activity	Potential Emission Type and Source	Potential Receptors	Potential Pathway	Potential adverse Impacts	Impact Assessment/ Proposed Controls	Residual Risk		
						LIKELIHOOD	CONSEQUQ	PRIORITY
CONSTRUCTION								
Construction of tailings discharge and decant return water pipelines and the installation of the decant pond pump pontoon.	Noise – Equipment, machinery and vehicles used during construction works	Local fauna Residential – none within 30km.	Air / wind dispersion	Amenity impacts	Any noise generated during construction will be short term and unlikely to result in significant emissions above that already generated by the operations. Operations will comply with the *Environmental Protection (Noise) Regulations 1997*.	Unlikely	Slight	Low
	Fugitive Dust resulting from - Clearing and earthworks associated with construction Vehicle movements	Flora and vegetation Residential – none.	Air / wind dispersion	Adverse impacts to human health and amenity; vegetation health	Any dust generated during construction will be short term and unlikely to result in significant emissions. Water trucks will be utilised on roads and during construction activities to control dust as required. Implementation of speed limits to reduce dust generation.	Unlikely	Slight	Low
	Light emissions	Local fauna Residential – none within 30km	Air dispersion.	Light spill may disrupt nocturnal foraging behaviour: Amenity impacts	Construction activities will occur only during dayshift.	Unlikely	Slight	Low
	Hydrocarbons - hydraulic equipment failure and spills	Flora and vegetation. Lake Cowan located >1.8km from IPTSF.	Direct discharge to land and infiltration to soil	Soil contamination inhibiting vegetation growth and survival, and health impacts to fauna.	Hydrocarbon spills will be removed by absorbent material and/or excavation. Contaminated soils will be removed and treated at the site bioremediation facility. Contaminated waste materials from spill clean ups (filters, rags, hydrocarbon absorbent materials) will be collected in appropriately labelled waste containers and will be removed from site by a licensed contractor for recycling/disposal at an appropriate facility.	Unlikely	Slight	Low
COMMISSIONING								
Pipeline commissioning	Spills or leaks of saline water or tailings from pipeline and outside of containment bunding during commissioning.	Soil and vegetation adjacent to the pipelines. Lake Cowan located >1.8km from IPTSF.	Direct discharge to land and infiltration to soil	Soil contamination inhibiting vegetation growth and survival, and health impacts to fauna.	The tailings line from the process plant to the HSTSF and the return water line from the decant area to the process plant are to be located inside a 0.6m high containment bund to contain any spillage of materials resulting from pipeline that develop leaks or burst during operation. Scour pits will be constructed at low points along the pipeline (based on survey). These pits are designed to contain any potential spills/leaks from the pipeline (outside of the containment bunding) before the automatic cut-off system activates. Continuous process control monitoring of flow meters at either end of the delivery lines with automatic shut off triggers. Visual inspection of the pipeline corridor at least once per shift in accordance with the Operations Manual. In the event of a leak being identified, pumping will cease immediately to allow repair of the leak. Clean up of any associated spillage or repair to the pipeline corridor bunds will commence within 24 hours of the leak repair. Select personnel shall be trained in spill response procedures.	Unlikely	Minor	Medium

Activity	Potential Emission Type and Source	Potential Receptors	Potential Pathway	Potential adverse Impacts	Impact Assessment/ Proposed Controls	Residual Risk		
						LIKELIHOOD	CONSEQUQ	PRIORITY
	Hydrocarbons - hydraulic equipment failure and spills	Flora and vegetation	Direct discharge to land and infiltration to soil	Soil contamination inhibiting vegetation growth and survival, and health impacts to fauna.	Hydrocarbon spills will be removed by absorbent material and/or excavation. Contaminated soils will be removed offsite. Contaminated waste materials from spill clean ups (filters, rags, hydrocarbon absorbent materials) will be collected in appropriately labelled waste containers and will be removed from site by a licensed contractor for disposal at an appropriate facility.	Unlikely	Slight	Low
OPERATIONS (INCLUDING TIME-LIMITED OPERATIONS)								
Tailings discharge and decant return water pipelines	Process tailings and /or return water spillages, overtopping bunds and releasing to surrounding areas of native vegetation	Soil and vegetation adjacent to the pipelines. Lake Cowan located >1.8km from IPTSF.	Direct discharge to land and infiltration to soil	Soil contamination inhibiting vegetation growth and survival, and health impacts to fauna.	The tailings line from the process plant to the HSTSF and the return water line from the decant area to the process plant are to be located inside a 0.6m high containment bund to contain any spillage of materials resulting from pipeline that develop leaks or burst during operation. Scour pits will be constructed at low points along the pipeline (based on survey). These pits are designed to contain any potential spills/leaks from the pipeline (outside of the containment bunding) before the automatic cut-off system activates. Continuous process control monitoring of flow meters at either end of the delivery lines with automatic shut off triggers. Visual inspection of the pipeline corridor at least once per shift in accordance with the Operations Manual. In the event of a leak being identified, pumping will cease immediately to allow repair of the leak. Clean up of any associated spillage or repair to the pipeline corridor bunds will commence within 24 hours of the leak repair. Select personnel shall be trained in spill response procedures.	Unlikely	Minor	Medium
Tailings storage	IPTSF tailings and stormwater overtopping embankments and releasing to surrounding areas of native vegetation (towards end of pit life).	Soil and vegetation surrounding the IPTSF – IPTSF is largely surrounded by cleared mine infrastructure areas. Lake Cowan located >1.8km from IPTSF.	Direct discharge to land and infiltration to soil	Soil contamination inhibiting vegetation growth and survival, and health impacts to fauna.	Design and freeboard requirements have been undertaken in accordance with DMP (2015) guidelines '*Guide to the preparation of a design report for Tailings Storage Facilities (TSFs)*'. Provision is made for a minimum pit wall freeboard of 0.5 m (vertical height between the stormwater and minimum pit rim levels). Provision is made for containment of rainfall-runoff water (from a 1:100-year AEP, 72-hour storm event) from the external catchment area (2.1 ha) and the impoundment pit surface area (10.3 ha) within the facility. This is accounted in the design water storage allowance (DSA) for storing of stormwater volume on top of the facility. The DSA within the facility is greater than the stormwater volume from a 1:100-year AEP, 72-hour storm event. Thus, pit wall overtopping (of tailings) is assessed to be unlikely. Maintenance of the decant pond as far as practically possible away from the pit walls. Regulating the size of surface water (decant) pond will reduce seepage and evaporation from the TSF and hence will assist in optimising water recovery and tailings density. All operations undertaken in accordance with the Tailings Operating Manual. Daily inspections (at least oncer per shift) of the facility during operations. Annual Geotechnical assessment of the IPTSF. Hidden Secret IPTSF is surrounded by an abandonment bund which would largely contain any overtopping (in the unlikely event it did occur).	Unlikely	Moderate	Medium

Activity	Potential Emission Type and Source	Potential Receptors	Potential Pathway	Potential adverse Impacts	Impact Assessment/ Proposed Controls	Residual Risk		
						LIKELIHOOD	CONSEQUQ	PRIORITY
	Seepage of tailings leachate from the base of the TSF (floor of the open pit) with infiltration to groundwater or surrounding soils.	Groundwater of beneficial use – none (hypersaline), no local bores or users Soil and vegetation surrounding the IPTSF – IPTSF is largely surrounded by cleared mine infrastructure areas. Lake Cowan located >1.8km from IPTSF.	Seepage to ground adjacent to the IPTSF and seepage from the base of the TSF with infiltration to groundwater	Groundwater mounding resulting in reduced vegetation health. Contamination of groundwater with impacts on beneficial users. Soil contamination inhibiting vegetation growth and survival, and health impacts to fauna.	IPTSF will operate for a short period. Seepage assessment has indicated that a steep-sided groundwater mound, with a maximum radius of about 300 m, will be produced when Hidden Secret Pit is filled with tailings. This is not expected to result in any detrimental impacts to the fractured bedrock aquifer or the surrounding vegetation. The bedrock at Hidden Secret is fairly massive and impermeable, and appears to lack structures, such as faults or shears, that could form major sources of groundwater inflow. TSF operation in accordance with TSF Operations Manual. Daily inspections (at least oncer per shift) of the facility during operations. A TSF inspection log will be completed for each inspection. Completion of monthly water balance. Maintenance of decant pond as far as practically possible away from the pit walls. Regulating the size of surface water pond will reduce seepage and evaporation from the TSF and hence will assist in optimising water recovery and tailings density. Water from the TSF will be removed via an independent pontoon mounted decant pump and piped back to the process plant for re-use. The size of the decant water pond will be minimised by maximising the volume of water returned to the plant. Process monitoring will be undertaken consistent with Table 13 (Condition 21) of DWER Licence L9155/2018/1 and include monthly records of the volumes of tailings deposited and water recovered from the TSF. Water samples will be collected at least once each month and analysed for the parameters recorded in Table 14 of DWER Licence L9155/2018/1. Ongoing monitoring of groundwater bores surrounding the IPTSF in accordance with DWER Licence L9155/2018/1 (Condition 13 and Condition 14) including monthly SWL and quarterly groundwater quality analyses. A limit of 4 mbgl currently applies to groundwater levels in the monitoring bores around all the HGO TSF's. If this is triggered monitoring will increase in frequency till the cause is identified. Recovery bores will be installed if required. Annual Geotechnical assessment of the IPTSF. Capping of the TSF surface at closure.	Unlikely	Moderate	Medium
	Dust from TSF surface containing tailings contaminants (soluble form of metals).	Soil and vegetation surrounding the IPTSF – IPTSF is largely surrounded by cleared mine infrastructure areas. Lake Cowan located >1.8km from IPTSF.	Air / wind dispersion	Soil contamination inhibiting vegetation growth and survival, and health impacts to terrestrial fauna.	Wet tailings pose little risk of dust during operations – expect tailings will be kept at a slurry density of ~55% solids. In the initial months, it is expected that the majority of the tailings will stored beneath the decant water pond and dust will not be produced. Annual Geotechnical assessment of the IPTSF. On completion of discharge, exposed tailings will ultimately be covered with waste rock when the materials become trafficable with tailings consolidation.	Unlikely	Slight	Low

Table 8: Risk Criteria

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost Certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

Likelihood	
The following criteria has been used to determine the likelihood of the risk / opportunity occurring.	
Almost Certain	The risk event is expected to occur in most circumstances
Likely	The risk event will probably occur in most circumstances
Possible	The risk event could occur at some time
Unlikely	The risk event will probably not occur in most circumstances
Rare	The risk event may only occur in exceptional circumstances

Consequence		
The following criteria has been used to determine the consequences of a risk occurring:		
	Environment	Public Health* and Amenity (such as air and water quality, noise, and odor)
Severe	• on-site impacts: catastrophic • off-site impacts local scale: high level or above • off-site impacts wider scale: mid-level or above • Mid to long term or permanent impact to an area of high conservation value or special significance^ • Specific Consequence Criteria (for environment) are significantly exceeded	• Loss of life • Adverse health effects: high level or ongoing medical treatment • Specific Consequence Criteria (for public health) are significantly exceeded • Local scale impacts: permanent loss of amenity
Major	• on-site impacts: high level • off-site impacts local scale: mid-level • off-site impacts wider scale: low level • Short term impact to an area of high conservation value or special significance^ • Specific Consequence Criteria (for environment) are exceeded	• Adverse health effects: mid-level or frequent medical treatment • Specific Consequence Criteria (for public health) are exceeded • Local scale impacts: high level impact to amenity
Moderate	• on-site impacts: mid-level • off-site impacts local scale: low level • off-site impacts wider scale: minimal • Specific Consequence Criteria (for environment) are at risk of not being met	• Adverse health effects: low level or occasional medical treatment • Specific Consequence Criteria (for public health) are at risk of not being met • Local scale impacts: mid-level impact to amenity
Minor	• on-site impacts: low level • off-site impacts local scale: minimal • off-site impacts wider scale: not detectable • Specific Consequence Criteria (for environment) likely to be met	• Specific Consequence Criteria (for public health) are likely to be met • Local scale impacts: low level impact to amenity
Slight	• on-site impact: minimal • Specific Consequence Criteria (for environment) met	• Local scale: minimal to amenity • Specific Consequence Criteria (for public health) met

9 ATTACHMENT 7 – SITING AND EXISTING ENVIRONMENT

9.1 OVERVIEW

The proposed Hidden Secret IPTSF is located within the existing prescribed premises. A summary of the siting and relevant existing environment aspects is provided in the sections below.

9.2 RECEPTORS

There are no sensitive land users or residences within 40 km of the IPTSF. The closest residence is Widgiemooltha located >40km from the Hidden Secret IPTSF.

9.3 SPECIFIED ECOSYSTEMS

DWER's Guidance Statement: Environmental Siting (DWER, 2016) lists Specified Ecosystems and Designated Areas and relevant databases which are considered in risk assessments undertaken by DWER. The distances to specified ecosystems are summarised in Table 9.

Table 9: Specified Ecosystems and Designated Areas

Specified ecosystems	Distance from the Premises
Ramsar Sites	None identified within 500 km.
DBCA Managed Lands and Water	Binaronca Nature Reserve located >14 km NE of Hidden Secret IPTSF and >3.5km NE of HGO Plant.
Ecological communities (TECs and PECs)	The Project area intersect the buffer zone of the Fraser Range Vegetation complex (a P1 PEC) but is not representative of this community
Biological Component	**Distance from Premises**
Threatened/ Priority Flora	No Threatened flora recorded at the Project. Priority flora recorded at HGO include: *Calandrinia lefroyensis* (P1) and *Allocasuarina eriochlamys subsp. grossa* (P3). These species are known not to occur in the tailings pipeline corridor.
Threatened /Priority Fauna	No Threatened fauna recorded at the Project.
Hydrography WA 250K – Surface Water Polygons	No drainage lines that could cause flooding of the area. Hidden Secret pit is located ~2 km from the shoreline of Lake Cowan.
Contaminated Sites	None recorded in DWER's Contaminated Sites database.
Groundwater and water sources	**Distance from the Premises**
Public Drinking Water Source Areas	None within 100 km.
RIWI Act	Premises is located within the Goldfields Groundwater Management Area. Premise is not located within a Proclaimed Surface Water Management Area.

9.4 CLIMATE

The Hidden Secret Project is located in the Coolgardie Region of Western Australia, which has a semi-arid (dry) warm Mediterranean climate. The region's climate has been described in more detail by the Bureau of Meteorology (BoM) using three different methods. The methods, time scales and climate descriptions are detailed below:

- Hot dry summer, cold winter based on temperature and humidity data (1961 to 1990);
- Grassland - warm (persistently dry) based on the Köppen classification system of native vegetation distribution, with seasonal temperature and precipitation data (1961 to 1990); and

- Winter - wet winter and low summer rainfall based on the difference between summer and winter rainfall using the median annual rainfall over a 100 year period (1900 to 1999) and seasonal incidence.

The nearest weather recording station is the Norseman Aero WA (site 012009), which is located approximately 51.6 km south of the Project area. Climate data has been recorded at Norseman since 1897, from monitoring site number 012065 (Norseman) until September 2012 and at monitoring site number 012009 (Norseman Aero) since 1999. The Norseman Aero site is located 3 km from the original site. Climate data (obtained via the BoM website) for temperature, rainfall and wind from these monitoring sites is provided in Figure 6 (BOM 2024).

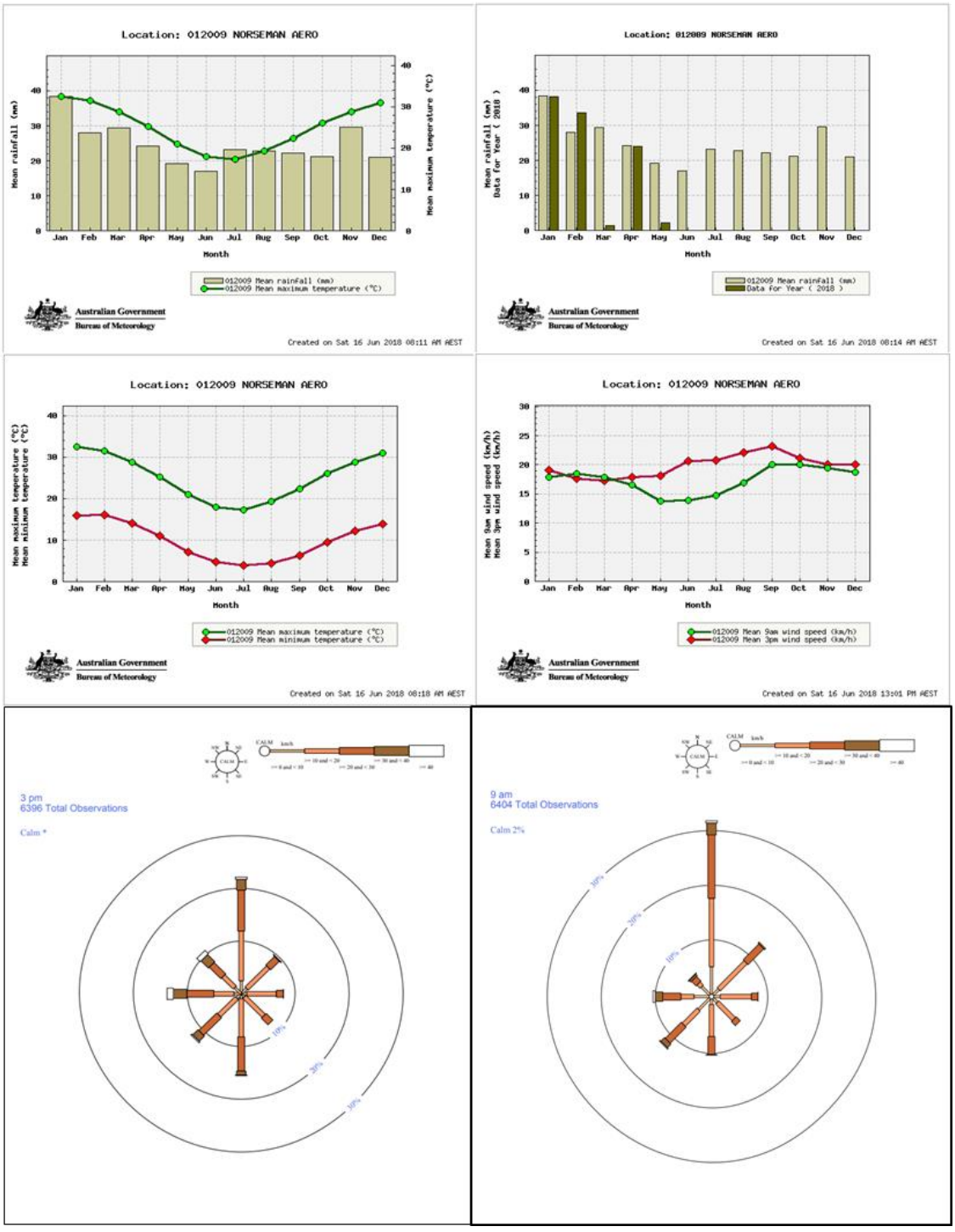

Figure 6: Climate Data

9.5 GEOLOGY

Higginsville lies to the west of the Zulieka Shear, at the southern end of the Norseman to Wiluna Greenstone Belt. The regional bedrock comprises a north-northwest-trending sequence of fault-bounded and thrust-repeated basalt, komatiite and interflow clastic sediment, which has been metamorphosed to upper greenschist facies and intruded by dolerite dykes.

Eundynie (comprising Hidden Secret and Mousehollow) occurs within the western limb of a southerly-plunging syncline and comprises basalt, gabbro and komatiite, with minor granodiorite and other felsic intrusives. Gold mineralisation at Hidden Secret is associated with quartz veins that transgress the rock units and dip to the east at about 30-60^{o} (Rockwater, 2019b).

Plan and section views of the Hidden Secret pit showing the geology are provided as Figure 7 and Figure 8 respectively.

9.6 LANDFORM & SOILS

The Hidden Secret project area (Eundynie) is located within the Eastern Goldfields subregion of the Coolgardie Bioregion according to the Interim Biogeographic Regionalisation for Australia (IBRA) classification system.

The Coolgardie bioregion covers an area of 129,117 km^2 and correlates largely to the Coolgardie Botanical District defined by Beard (1990) and is described broadly as lying within the interzone between mulga/spinifex country and eucalypt environments (ANRA 2008). The Eastern Goldfields sub-region is summarised as supporting diverse Eucalypt woodlands on low greenstone hills, valley floors, broad plains and salt lake surrounds; samphire shrublands on saline valley floors and Mallees, Acacia thickets and shrub-heaths on sandplains, playas, laterite areas and granite outcrops (Thackway and Cresswell 1995).

The Hidden Secret project area is situated adjacent to the Lake Cowan salt flat and >2km from the shoreline. Lake Cowan is one of the larger lakes in the Goldfields bioregion, with an area of approximately 1,145 km^2. Lake Cowan is not recognised regionally, nationally or internationally as a wetland of conservation significance.

The project lies within the Kambalda Soil-Landscape System which comprises flat to undulating plains, hills and ranges on greenstone and granite rocks of the Yilgarn Craton, with intervening salt lake chains. Soils of this land system are principally brown calcareous earths and are poorly developed over the gold bearing greenstone belts (Beard 1990). Saline and sub-saline soils are common adjacent to drainage channels and salt lakes.

Soils in the Goldfields region are typically alkaline with a pH range of 7.0 to 9.0, with low soil fertility and electrical conductivity of 14 mS/cm, indicating moderate soil salinity.

Soils in the Eundynie area characterised by red loamy earths and calcareous loamy earths on the plains, calcareous shallow loams and stony soils on low hills and rises and saline soils on and near playa lakes. Soil fertility is generally low and soil salinity is locally higher.

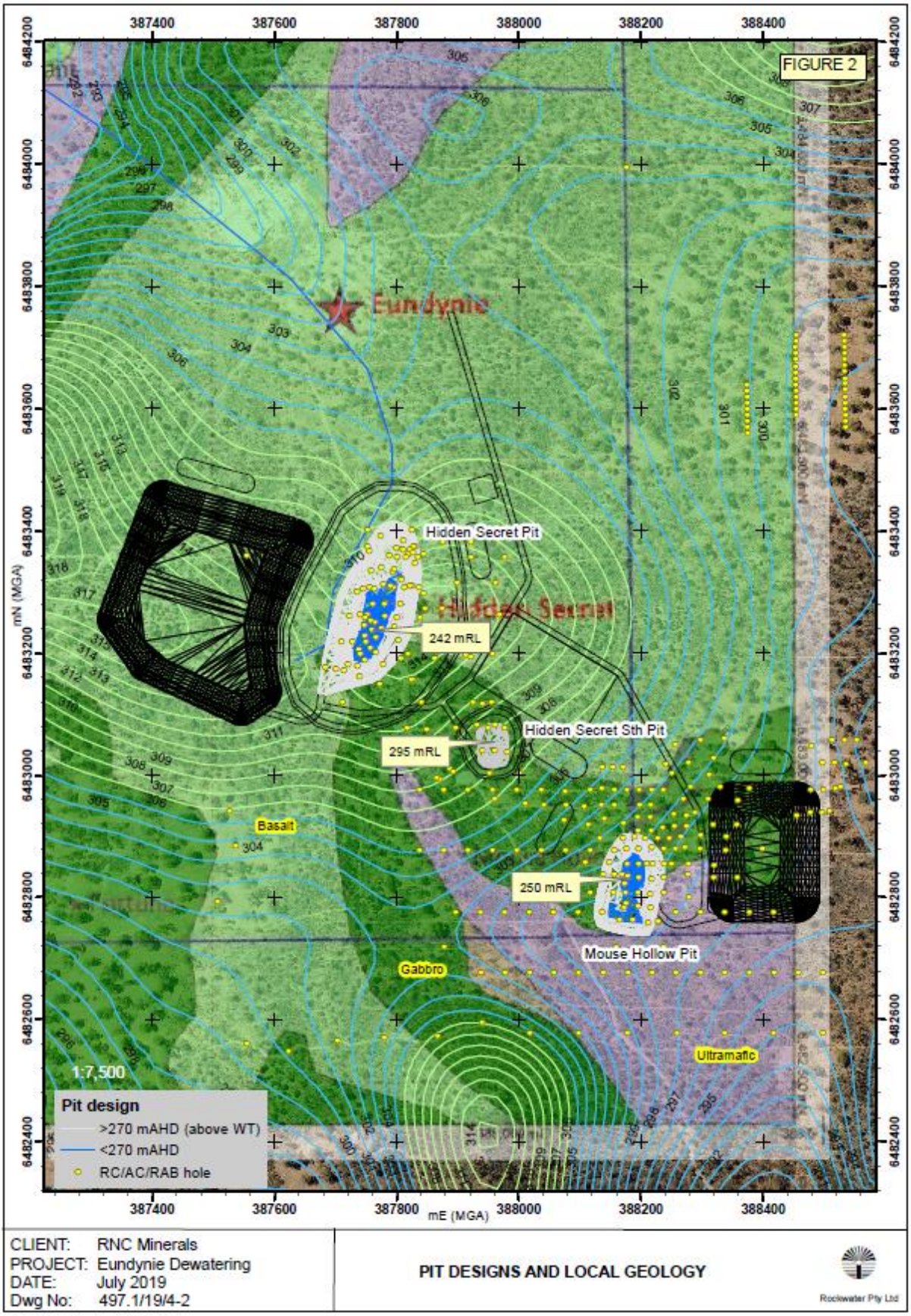

Figure 7: Geology in proximity to Hidden Secret pit (from Rockwater 2019a)

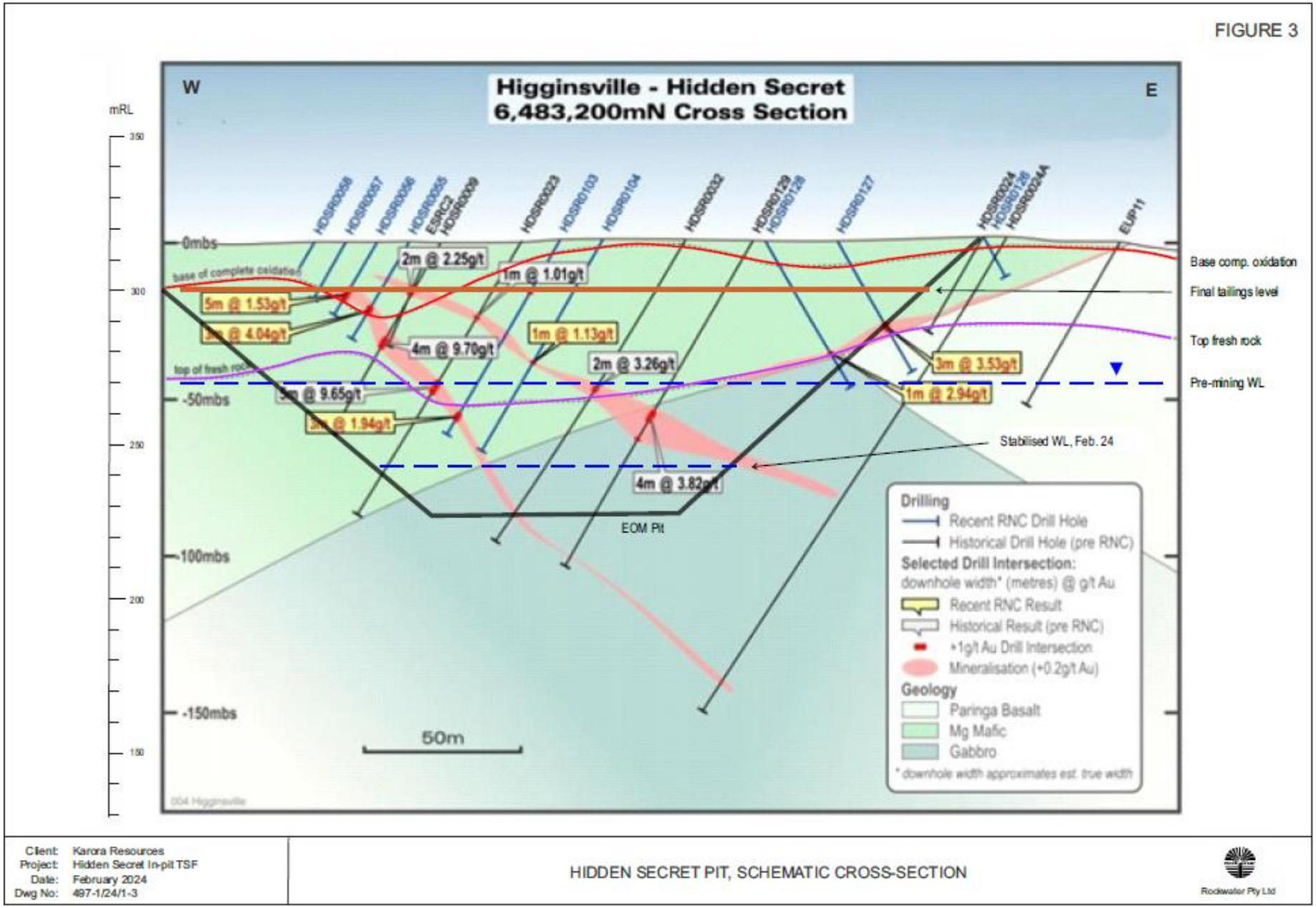

Figure 8: Hidden Secret Pit geology schematic cross section

9.7 VEGETATION AND FLORA

Native Vegetation Solutions (NVS) completed a Level 1 Flora and Vegetation survey over the Baloo/Eundynie Project area and access corridor in 2019 which included the Hidden Secret IPTSF and the majority of the tailings pipeline corridor. The NVS (2019) survey report is attached as Appendix 2.

A total of 20 families, 37 genera and 80 species, comprising four major vegetation groups were identified. All vegetation groups were in a 'Very Good' to 'Good' condition (using the Keighery 1994 condition scale), however there was evidence of grazing and previous mining and exploration disturbance (NVS, 2019).

No Threatened or Priority flora was recorded.

No Environmentally Sensitive Areas (ESA's) unique vegetation communities are known from the local area, and none were recorded during the survey of the Project area. All vegetation types are common, widespread and well represented in the Eastern Goldfields subregion (NVS, 2019).

All clearing will be undertaken in accordance with CPS 8152/4.

9.8 FAUNA

9.8.1 Terrestrial Fauna

A Level 1 Vertebrate Fauna survey of the Project area was completed by Terrestrial Ecosystems in 2019. The area was also covered by the GHD biological assessment of the Higginsville area (see Appendix 3) and no species of conservation significance were identified as being at risk from mining activities in the area. A Level 1 survey was considered adequate given the extensive amount of available survey data and abundance of similar habitat in adjacent areas.

The fauna survey area mirrored that of the NVS flora survey area. During a reconnaissance survey of the Project area, a habitat assessment was completed which identified the presence of three broad habitat types:

- Salmon Gum woodland over sparse chenopods;
- Eucalypt woodland over mulga shrubland and chenopod over scattered grasses; and
- mixed sclerophyll shrubland.

The condition of the abovementioned habitats vary, however, the majority of these habitats are considered to be in good condition. Some of the project area has been disturbed due to historical development activity (i.e. tracks, exploration and fences). There is also extensive evidence of disturbance by cattle and the presence of rabbits and cats. All habitat types identified in the Project area are abundant and in very good condition in adjacent areas.

The Eundynie area has the potential to support a wide range of vertebrate species including up to 9 amphibian, 93 reptile, 127 bird and 37 mammal species. Of these, there are 21 species of conservation significant fauna that could potentially occur within the Project area, however, no species of conservation significance are considered likely to be significantly impacted by mining activities.

Avian species of conservation significance identified as having the potential to occur in the project area include the Major Mitchell's Cockatoo, Western Rosella, Peregrine Falcon, Crested Bellbird, Shy Heathwren, Bush Stone-curlew, Hooded Plover, Australian Bustard and Malleefowl. The Hooded Plover may potentially inhabit the shore of Lake Cowan during flood events. All other avian species potentially found in the project area are mobile and will readily move to adjacent areas if disturbed.

There is a very low possibility that the area supports Carpet Pythons and Southern Death Adders. Carpet Pythons are scarce in the 'Great Western Woodlands' with some documented and isolated populations further to the south around the Lake Johnstone project area, east of Widgiemooltha and north and east of Kalgoorlie. The Southern Death Adder is a very cryptic species and seldom recorded during surveys

when they are present. Given their current known distribution and the low probability of them being present in the project area, any potential impacts are likely to be very low.

There are no known mammals of conservation significance likely to be found within the Project area.

The vegetation to be impacted by clearing and mining activities does not currently provide any important linkages or corridors essential for the movement of local fauna species throughout the local area or region, therefore, the removal/disturbance of native vegetation within the disturbance envelope is unlikely to prohibit the future movement (mobility) of fauna.

9.8.2 Short Range Endemic and Subterranean Fauna

SRE species are known to favour habitat isolates such as granite outcrops and banded ironstones in the Goldfields (EPA, 2016a) due to their unique geology, soil and relative isolation. Vegetation communities can also be used to determine the likely presence of SRE species, as many invertebrate species have ranges determined by specific plant species or communities. Contiguous, widespread areas of habitat are less prospective.

No habitats have been identified during flora and fauna surveys that warrant further investigation into the presence of SRE species. Based on vegetation study results, there are no restricted vegetation units that are especially different from adjoining units that would increase the likelihood of SRE species being present.

Groundwater parameters beneath Lake Cowan and the Project area were measured by AQ2 in 2016. Groundwater is hypersaline with salinity ranging from 310,000 to 330,000 mg/L TDS and Electrical Conductivity (EC) ranging from 18,400 – 23,400 mS/m. Consequently, groundwater within the excavated pit and likely drawdown impact areas does not offer prospective or suitable habitat for stygofauna species, as groundwater salinities are not within known tolerable ranges for stygofauna. Field studies of stygofauna distribution suggest that the salinity tolerance of most stygofauna is limited to salinity level less than 5000 µS/cm (or 500 mS/m) (Hose *et al.* 2015).

Troglofauna are known from karst, channel iron deposits, banded iron formations, alluvium/colluviums in valley-fill areas, and weathered or fractured sandstone (EPA, 2016b). The underlying geology of the Hidden Secret deposit lacks suitable void space and is not considered to be prospective habitat for troglofauna species.

9.9 GROUNDWATER

9.9.1 Regional Groundwater

The main aquifer systems in the region are encountered within weathered and/or fractured bedrock, palaeochannel sands, eolian and lacustrine deposits. Within the bedrock, groundwater occurs in transitional rocks near the base of weathering, mineralised shear zones, and fracture systems associated with local and regional structures. This aquifer varies in extent and hydraulic properties, depending on structural integrity, degree of weathering, bedrock depth and lithology. Fractured bedrock aquifers occur more commonly in mafic, ultramafic and granitoid rocks, than in sedimentary or felsic volcanic and volcanic-clastic rocks (AQ2, 2016).

Groundwater recharge is very low in the region, as most of the rainfall either evaporates or is used by vegetation. Only a small proportion of rainfall (<1% of annual precipitation totals) runs off into claypans and salt lakes. Direct recharge takes place principally in bedrock outcrops and in sandplains areas. Groundwater flows towards the salt lakes under low hydraulic gradients, from where it discharges mainly by evaporation. Water levels range from less than 1 m bgl in playa lakes, to more than 50 mbgl in the bedrock aquifers in the upper reaches of catchments (AQ2, 2016).

9.9.2 Eundynie Groundwater

The bedrock at Hidden Secret is fairly massive and impermeable, and appears to lack structures, such as faults or shears, that could form major sources of groundwater inflow. However, some enhanced permeability is likely to result from brittle-fracturing of the mineralised quartz veins, and possibly also from the felsic intrusions (Rockwater 2019a). The Rockwater (2019a) report is included as Appendix 4.

The pre-mining water table elevation at Hidden Secret was 270 m AHD and approximately 20 m below ground level. Since late 2023, the water level in the Hidden Secret Pit has more or less stabilised at 245 mAHD indicating steady- state conditions have been reached between net effective evaporation and pit inflow (Rockwater 2024). Based on the surface area of the pit and estimate of the average net effective evaporation from the pit lake, Rockwater (2024) calculated that the steady-state inflow rate to the pit is approximately 0.85 L/s.

Rockwater (2024) reported that the pit inflow rates for the early, middle and late stages of pit lake formation at Hidden Secret indicate that the permeability of the bedrock below the water table (270 mAHD) is very low, with the major source of groundwater inflow to the pit likely to have been the flowing RC hole on the ramp, with contributions from the pit-wall seepage zones being negligible. In their assessment of the mine dewatering requirements pre-mining, Rockwater (2019a) estimated the average permeability of the bedrock at Eundynie to be very low (0.008 m/day). Higher permeability was associated with the gold bearing quartz veins, which have now been mined.

Groundwater from the Baloo deposit and surrounding area is hypersaline, with salinity ranging from 310,000 to 330, 000 mg/L TDS. The groundwater quality has not been sampled directly from Hidden Secret however, by analogy to the existing pits at Higginsville (excluding Baloo), is certainly hypersaline (60,000 mg/L to 200,000 mg/L).

9.9.3 Other Groundwater Users

There are no other groundwater users in the local area that could be impacted (Rockwater 2019b).

9.10 SURFACE WATER HYDROLOGY

Rockwater (2019b) completed a surface water assessment of the Eundynie Project area. The report is attached as Appendix 5.

The Hidden Secret open pit occurs in hilly, rocky terrain in the central part of a peninsula jutting into Lake Cowan. The land surface elevation is at approximately 315 mAHD, about 50 m higher than the western shore of the Lake. The surrounding landforms slope away from the open pit site and there are no nearby drainage lines that could cause flooding of the open pit.

The Rockwater (2019b) assessment included a hydrological analyses of the catchment areas including an estimation of peak flows at incremental ARI events up to a Probable Maximum Flood (1:2000 year event). The proposed Eundynie pits lie on a small peninsula, about 65 m above Lake Cowan within two small catchments, Catchment A and Catchment B (Figure 9). The Hidden Secret pit is located within an estimated catchment area of 0.44 km^2.

Based on the results of their assessment, Rockwater (2019b) concluded a hydraulic analysis for surface water protection was not required for the Hidden Secret Pit as it is located on high ground at the top of Catchment A and will not be impacted by surface water runoff (Figure 9).

Therefore, flood protection is not required for the Hidden Secret IPTSF.

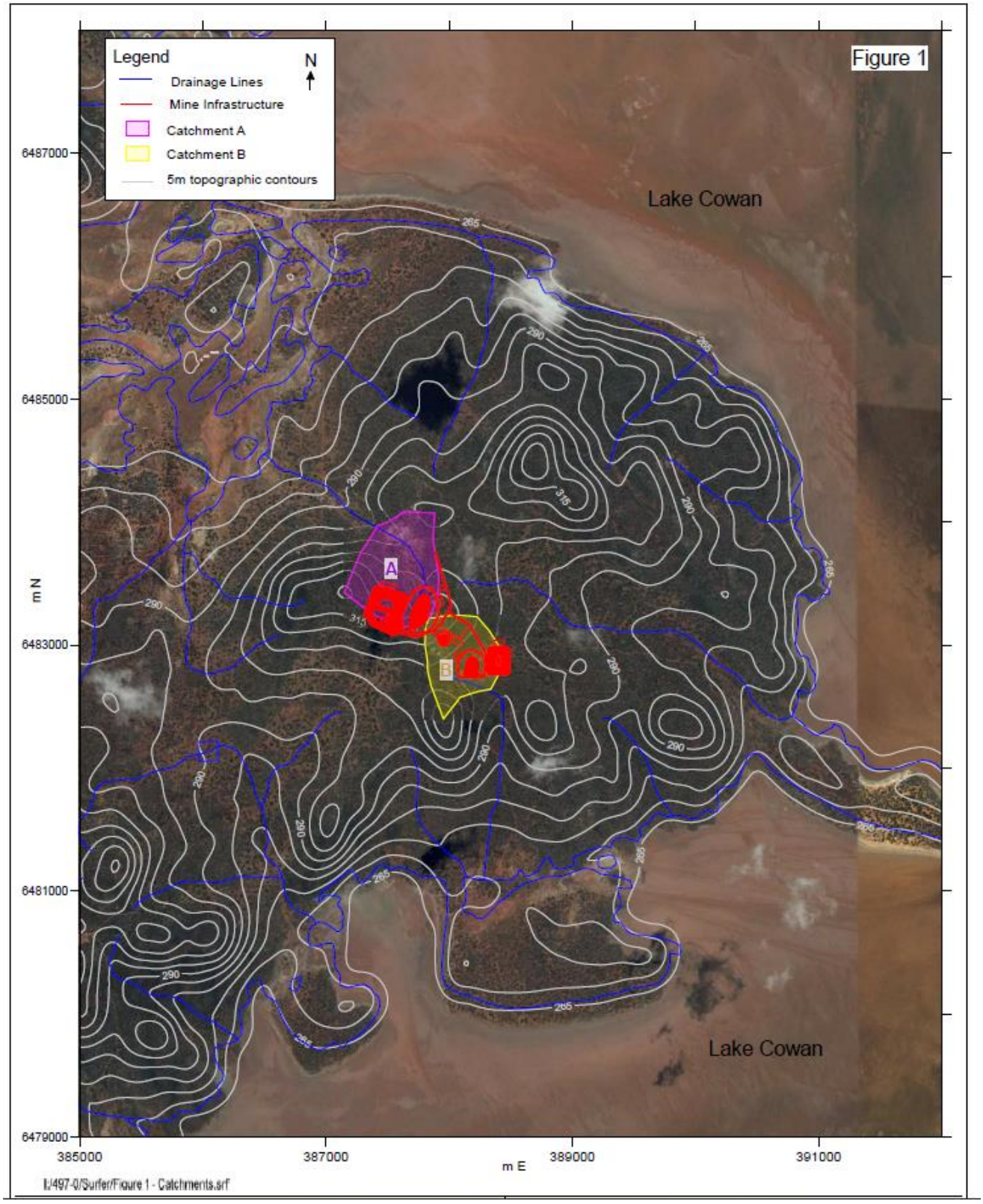

Figure 9: Hidden Secret Surface Water Catchments

9.11 REHABILITATION

Upon completion of consolidation and drying of the tailings surface, the surface will be rehabilitated which will involve capping of the surface with:

- Suitable benign mine waste layer (nominally 1.5 m thick);

- Laterite-clay (or similar) layer (nominally 0.3 m thick); and
- Topsoil layer / growth medium for revegetation (nominally 0.1 m thick)

Karora has an approved Mine Closure Plan (MCP) which is currently being updated to include the Hidden Secret IPTSF and associated infrastructure.

11 BIBLIOGRAPHY

AQ2 (2016). *Water Management: Baloo Gold Deposit.* Report prepared for S2 Resources by AQ2 Pty Ltd. July 2016.

Australian Natural Resources Atlas – ANRA (2008). https://data.gov.au/data/dataset/ff9737ba-55a4-4d6a-8b1c-e399cc4195e1

Beard, J. S. (1990). *Plant life of Western Australia*. Kangaroo Press, Kenthurst, New South Wales.

Bureau of Meteorology (BoM) (2024). http://www.bom.gov.au

Coffey Services Australia Pty Ltd (2018). *TSF Design Report and Mining Proposal Supporting Information, Fairplay East In-Pit Tailings Storage Facility, Higginsville Gold Operations*. Document ref. 754-PERGE219368 Rev 0.

Department of Mines, Industry Regulation and Safety (2013*). Code of practice: Tailings storage facilities in Western Australia*.

Department of Mines and Petroleum (2015). *Guide to Departmental requirements for the management and closure of tailings storage facilities (TSFs).*

Department of Water and Environmental Regulation (2016). Guideline - *Environmental Siting*. November 2016.

Entech Pty Ltd (2024). *Hidden Secret Geotechnical Review*. Ref. Report No. ENT_1116. Unpublished report prepared for Karora, February 2024.

Environmental Protection Authority- EPA (2009). *Guidance Statement No. 20 – Sampling of short range endemic invertebrate fauna for environmental impact assessment in Western Australia*. Environmental Protection Authority, Government of Western Australia, Perth. May 2009.

EPA (2016). *Technical Guidance: Sampling of short range endemic fauna*. Environmental Protection Authority, Government of Western Australia, Perth. December 2016.

EPA (2021). *Technical Guidance – Subterranean fauna surveys for environmental impact assessment*. Environmental Protection Authority, Government of Western Australia, Perth. December 2021.

Graeme Campbell & Associates (2024). *Higginsville Gold Mine: Geochemical Characterisation of Ex-Mill Tailings Slurry Sample, Implications for Tailings Management*. Unpublished Report prepared for Karora.

Hose G C, Sreekanth J, Barron O & Pollino C (2015). *Stygofauna in Australian Groundwater Systems: Extent of knowledge*. CSIRO, Australia.

Institution of Engineers, Australia (1998). *Australian Rainfall & Runoff (1998). A Guide to Flood Estimation*.

Keighery, B.J. (1994). *Bushland plant survey, a guide to plant community survey for the community.* Wildflower Society of WA (Inc.), Nedlands, Western Australia.

Luke, G J, Burke, K L and O'Brien, T M (2003). *Evaporation Data for Western Australia.* Resource Management Technical Report No 65, Dept Agriculture WA, 2003.

Native Vegetation Solutions (2019). *Reconnaissance Flora and Vegetation Survey of the Eundynie Gold Project, Higginsville*. NVS, Kalgoorlie Western Australia. July 2019.

Rockwater (2019a). *Results of Permeability Tests and Groundwater Modelling: Eundynie Gold Deposit*. Report for RNC Minerals. Jolimont Western Australia. July 2019.

Rockwater (2019b). *Surface Water Assessment: Eundynie Gold Deposit*. Report for RNC Minerals. Jolimont Western Australia. July 2019.

Rockwater (2024). *Hidden Secret IPTSF- Seepage Assessment*. Document ref. Report No. 497.1/24/04 in February 2024.

Terrestrial Ecosystems (2015). *Level 1 Vertebrate Fauna Risk Assessment for the Baloo Project Area*. Terrestrial Ecosystems, Balcatta, Western Australia. June 2015.

Terrestrial Ecosystems (2019). *Level 1 Vertebrate Fauna Risk Assessment for the Eundynie Project.* Terrestrial Ecosystems, Mt Claremont, Western Australia. July 2019

Tetra Tech Coffey Pty Ltd (2023a). *Tailings Storage Facilities 2, 3 and 4 Super Cell Stage 5 Raise Design, Avoca Mining Pty Ltd, Higginsville Gold Operations, Geotechnical Investigation*. Document ref. 754-PERGE326330_R01 Rev A.

Tetra Tech Coffey Pty Ltd (2023b). *Higginsville TSF Audit 2023, Higginsville Gold Operations*. Document ref. 754-PERGE327769 Rev 0.

Tetra Tech Coffey (2024). *Higginsville Gold Operations, Hidden Secret IPTSF Design*. Unpublished report prepared for Karora (Higginsville) Pty Ltd, May 2024.

Thackway, R. and Cresswell, I.D. (1995). *An Interim Biogeographic Regionalisation for Australia.* Australian Nature Conservation Agency, Canberra.

APPENDIX 1: TSF DESIGN REPORT (TTC 2024)

APPENDIX 2: RECONNAISSANCE FLORA AND VEGETATION SURVEY OF THE EUNDYNIE GOLD PROJECT, HIGGINSVILLE (NVS 2019)

APPENDIX 3: LEVEL 1 VERTEBRATE FAUNA RISK ASSESSMENT FOR THE EUNDYNIE PROJECT (TERRESTRIAL ECOSYSTEMS 2019)

APPENDIX 4: SURFACE WATER ASSESSMENT: EUNDYNIE GOLD DEPOSIT (ROCKWATER 2019a)

APPENDIX 5: RESULTS OF PERMEABILITY TESTS AND GROUNDWATER MODELLING: EUNDYNIE GOLD DEPOSIT (ROCKWATER 2019b)