Government of Western Australia
Department of Water and Environmental Regulation

Works Approval

Works approval number	W6464/2020/1
Works approval holder	Calidus Resources Limited
ACN	006 640 553
Registered business address	Level 1,11 Ventnor Ave WEST PERTH WA 6005
DWER file number	DER2020/000476
Duration	22 April 2021 to 21 April 2026
Date of issue	21/04/2021
Premises details	Warrawoona Gold Project G45/345, L45/523, M45/547, M45/552, M45/668, M45/669, M45/670, M45/671 MARBLE BAR WA 6760

Prescribed premises category description (Schedule 1, ***Environmental Protection Regulations 1987***)	**Assessed production / design capacity**
Category 5: Processing or beneficiation of metallic or non metallic ore	2.5 million tonnes per annual period
Category 64: Class II or III putrescible landfill site	1,500 tonnes per annual period
Category 85: Sewage facility	50 m^3/day

This amended works approval is granted to the works approval holder, subject to the attached conditions, on 6 April 2022, by:

ALANA KIDD
MANAGER, RESOURCE INDUSTRIES
an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

Works approval history

Date	Reference number	Summary of changes
21/04/2021	W6464/2020/1	Works approval granted.
6/04/2022	W6464/2020/1	Works approval amended: • Table 1, Item 3 Sedimentation Ponds design modifications; • Table 2, monitoring bore in the hyporheic zone creek sediments on the premises boundary modified to TSFMB12 monitoring well in the creek sediments next to TSFMB04; • TSF design modifications; and • Prescribed premises boundary modifications.

Interpretation

In this works approval:

(a) the words 'including', 'includes' and 'include' in conditions mean "including but not limited to", and similar, as appropriate;

(b) where any word or phrase is given a defined meaning, any other part of speech or other grammatical form of that word or phrase has a corresponding meaning;

(c) where tables are used in a condition, each row in a table constitutes a separate condition;

(d) any reference to an Australian or other standard, guideline, or code of practice in this works approval:

(i) if dated, refers to that particular version; and

(ii) if not dated, refers to the latest version and therefore may be subject to change over time;

(e) unless specified otherwise, any reference to a section of an Act refers to that section of the EP Act; and

(f) unless specified otherwise, all definitions are in accordance with the EP Act.

NOTE: This works approval requires specific conditions to be met but does not provide any implied authorisation for other emissions, discharges, or activities not specified in this works approval.

Works approval conditions

The works approval holder must ensure that the following conditions are complied with:

Construction phase

Infrastructure and equipment

1. The works approval holder must:

(a) construct and/or install the infrastructure and/or equipment;

(b) in accordance with the corresponding design and construction / installation requirements; and

(c) at the corresponding infrastructure location; and

(d) within the corresponding timeframe,

as set out in Table 1.

Table 1: Design and construction / installation requirements

	Infrastructure	Design and construction / installation requirements	Infrastructure location	Timeframe
1	Processing Plant	Single stage crusher with SAG mill, conventional CIL circuit and thickener to thicken tailings to >65% solids: • 2.5 Mtpa production capacity. Dust controls: • Fixed sprays to form a mist within the ROM bin and at the stockpile feed conveyor discharge point; • Sprays fitted to tipping area of crusher to ensure ore remains moist during tipping and crushing activities; • Water sprays activated via a solenoid valve when a dump truck or front end loader is detected; • Dust collector, including maintenance access, installed on top of the lime silo to contain dust emissions during the pneumatic loading process; and • Rotary valve to control the discharge rate of the lime to the mill feed conveyor. Noise controls: • All plant equipment maintained to ensure they are operating efficiently; • Air compressors housed in sound attenuating enclosure; • Equipment and machinery designed to comply with Australian Standard noise limits; • Apply best available technology to minimise noise emissions; and • Compliance with the *Environmental Protection (Noise) Regulations 1997.* Stormwater controls: • Stormwater diverted away from the	Schedule 1: Maps, Premises map, Figure 2 and Figure 3	Prior to the submittal of the Environmental Compliance Report required by condition 2

	Infrastructure	Design and construction / installation requirements	Infrastructure location	Timeframe
		Processing Plant by diversion drains and bunding; • Processing activities within bunded areas, which drain to sumps with recovery pumps to feed recovered spills back to the processing circuit; • Diversion and containment bunding to capture surface water runoff from the surrounding area to direct potentially contaminated runoff to the retention basin and can be fed into the process circuit; • Flood protection installed around operational areas; • Process Water Tank to receive process water; and • Tailings thickener tank receives decant water from the TSF. Hydrocarbon / Chemical controls: • Designed and constructed in line with *Australian Standard AS 1940:2017 The Storage and Handling of Flammable and Combustible Liquids* and *Australian Standard AS 1692-2006 Steel Tanks for Flammable and Combustible Liquids*; • Stored in bunded areas with collection sump to recover spillages; • Level indicators to detect leaks, based on drops in level; • Fuel bowsers and fuel delivery inlets located on concrete or HDPE lined pads to contain any spillages; • Vehicles and machinery serviced within designated workshop areas; • Transport of hydrocarbons/chemicals confined to defined roads and tracks with speed restrictions; • Spill kits stocked and in strategic locations; • Designated bins and drums will be provided to dispose of waste hydrocarbons/chemicals to be transported offsite for disposal at licensed facilities; • Hydrocarbon contaminated water will be directed to an Oily Water Separator System and the treated wastewater used in dust suppression if the TPH concentration is less than 15mg/L. If TPH tests higher than 15mg/L then recirculated through treatment system; and • Remediation of contaminated soils at the Bioremediation Facility, located adjacent to the landfill. WAD-CN controls: • In the event of the Caro's acid plant going off-		

	Infrastructure	Design and construction / installation requirements	Infrastructure location	Timeframe
		line, or high free or WAD-CN concentrations in the leach or tailings stream, alarms will be activated and the plant will be shut down in a controlled manner to prevent non-destructed tailings being pumped out to the TSF; and • Process interlocks to prevent discharge of tailings when the processing plant is offline.		
2	Bioremediation Facility	• Constructed on flat or gently sloping land, not subject to flooding or groundwater / surface water features; • Impermeable base layer; • At least 300mm clean fill compacted over the base layer to prevent damage to the base layer; • 2 cells (active and inactive); • Bunding around at least 3 sides to minimise run-on and run-off; • Ramped entrance with incline and 5-degree back slope into cells; • Signage; and • Spill kit and hydrocarbon waste bin.	Not yet determined, however, aligned with long-term mine plan to avoid the need to move / relocate the facility	Prior to the submittal of the Environmental Compliance Report required by condition 2
3	Sedimentation Ponds	Sedimentation Pond 1: • Pond for the storage of stormwater runoff from outside bunded areas in the Crusher and CIL tank areas, located to the northeast of the CIL tanks; • Overflows to Sedimentation Pond 2 at Top Water Level (TWL) = 284.7 mAHD; • Minimum freeboard = 0.3 m; • Designed to store run off from 10% AEP-24 hour rainfall event (130 mm) in conjunction with Sedimentation Pond 2; • Pond dimensions at TWL: ➢ Length = 61.5 m; ➢ Width = varies 29 - 42 m; ➢ Depth = 1.5 m; • Pond capacity at TWL = 2,081 m^3; and • Unlined pond (excavated in rock). Sedimentation Pond 2: • Pond for the storage of stormwater runoff from yards and laydown areas within Mine Services Area and outside bunded areas at the Fuel Farm and Power Station located to the northeast of the Mine Services Area; • Top Water Level (TWL) = 280.0 mAHD; • Minimum freeboard = 1.0 m; • Designed to store runoff from 10% AEP-24 hour rainfall event (130 mm) in conjunction with Sedimentation Pond 1; • Pond dimensions at TWL: ➢ Length = 100 m; ➢ Width = 23-40 m; ➢ Depth 3.0 m;	Schedule 1: Maps, Premises map, Figure 5	Prior to the submittal of the Environmental Compliance Report required by condition 2

	Infrastructure	Design and construction / installation requirements	Infrastructure location	Timeframe
		• Pond capacity at TWL = 8,250 m^3; and • Unlined pond (excavated in rock).		
4	Raw Water Pond	Pond for the storage of raw water and RO brine reject water from the RO Plant at the Processing Plant: • Pond dimensions: ➢ Length 45m; ➢ Width 48m; ➢ Depth 3.6m; • Pond capacity 4,980m^3; • Freeboard 300mm; • Freeboard markers installed; • Lined with an impermeable HDPE membrane and located within an internally draining processing area; • Overflows to Sedimentation Pond 2; • Daily inspection logs of integrity of all water lines, tanks and bunds; • Installed within bunds to ensure all liquids are captured and not released to the environment; and • Scour pits or sumps constructed along pipeline corridors to ensure leaks or spillages containing raw water and/or brine water are contained within bunded areas.	Schedule 1: Maps, Premises map, Figure 5	Prior to the submittal of the Environmental Compliance Report required by condition 2
5	RO Plant at the Processing Plant	• Capacity 150m^3/day; and • Brine directed to the Raw Water Pond.	Within the Proposed Process Plant section of Schedule 1: Maps, Premises map, Figure 2	Prior to the submittal of the Environmental Compliance Report required by condition 2
6	Pipeline and services corridor Processing Plant to TSF Return water from the TSF decant to the Thickener	• Installed within bunds to ensure all liquids are captured; • Installed within an unlined bunded V trench which will be able to contain potential spillages in the case of any leakage or burst in the pipelines (nominally of 12 hours duration); • The trench will be adjacent to and aligned with a light vehicle access road, facilitating access for inspections and maintenance of the TSF; • Scour pits or sumps constructed along pipeline corridors to ensure leaks or spillages containing TSF decant are contained within bunded areas; • Tailings and return water pipelines fitted with flow and leak detection sensors monitored from control room; • Equipped with telemetry systems and pressure sensors to allow detection ruptures; • Equipped with automated cut offs in the event of ruptures; • Provided with secondary containment to contain any spills for a period equal to the time between routine inspections; and • Spill catch pits will be excavated at	Schedule 1: Maps, Premises map, Figure 2 and Figure 3	Prior to the submittal of the Environmental Compliance Report required by condition 2

	Infrastructure	Design and construction / installation requirements	Infrastructure location	Timeframe
		topographic lows in the corridor to provide design storage capacity where required.		
7	TSF general details	Down valley thickened tailings distribution TSF: • Tailings thickened to >65% w/w solids; • 17 Mt storage capacity; • Single cross-valley earthfill embankment will provide containment at the north western end of the tailings storage area; • Containment around the remaining perimeter will be provided by the natural topography with two small containment bunds; • Stage 1 Crest RL264.0m; • Stage 2 Crest RL267.3m; and • Each stage will include an emergency spillway (in an area where the natural topography provides a suitable spillway location) constructed in competent natural ground.	Schedule 1: Maps, Premises map, Figure 2 and Figure 3	Prior to the submittal of the Environmental Compliance Report required by condition 2
8	TSF permeability demonstrated with testing performed across the areas	• Low permeability (between 0.8x 10^{-8} m/s and 2.6 x 10^{-8} m/s) foundation prepared by moisture conditioning and compacting Zone 1 filled cut off trench and upstream low permeability zone; • Compacted Zone 1 material to be placed against the abutments for a distance of approximately 100m from the ends of the embankment to reduce the potential for lateral seepage; • Upstream blanket of compacted low permeability material of minimum 300mm thickness to be provided on the impoundment floor to approximately 65m from the upstream toe of the embankment; and • Zone permeabilities: ➢ Zone 1: Clayey sand/Sandy clay (local borrow from superficial deposits) – 4.5m wide, 5 x 10^{-8} m/s; ➢ Zone 2: Well-graded sand filter site manufactured) – 1.5m wide, 1 x 10^{-5} m/s; and ➢ Zone 3: General fill (local borrow from weathered rock) – 4m wide, 1 x 10^{-6} m/s.	Schedule 1: Maps, Premises map, Figure 2 and Figure 3	Prior to the submittal of the Environmental Compliance Report required by condition 2
9	TSF spigots	• Initially two spigots for the discharge of tailings, transitioning to one, location to be varied as level of tailings beach increases.	Schedule 1: Maps, Premises map, Figure 2 and Figure 3	Prior to the submittal of the Environmental Compliance Report required by condition 2
10	TSF freeboard	• Emergency spillway (in an area where the natural topography provides a suitable spillway location) for each stage will be present throughout operation and post closure of the TSF to prevent the embankment from overtopping in the event of extreme rainfall events occurring when the design stages are at full tailings storage capacity;	Schedule 1: Maps, Premises map, Figure 2 and Figure 3	Prior to the submittal of the Environmental Compliance Report required by condition 2

	Infrastructure	Design and construction / installation requirements	Infrastructure location	Timeframe
		• Freeboard of 500mm maintained; and • Designed for storage of excess run-off from a 1:10 average exceedance probability (AEP) notional wet season, an extreme storage allowance for a 1:100 AEP, 72-hour duration storm event run-off.		
11	TSF decant structures	• Mobile decant pump on the upstream side of the embankment to collect supernatant water released from the discharged tailings slurry into the TSF, incidental rainfall runoff and transferred seepage recovered from the seepage collection trench; • Decant pond size minimized via recirculation of decant water back to the Processing Plant Thickener; and • Cyanide levels kept at <30mg/L using Caro's acid.	Schedule 1: Maps, Premises map, Figure 2 and Figure 3	Prior to the submittal of the Environmental Compliance Report required by condition 2
12	TSF underdrainage	• Seepage interception trench to be constructed immediately downstream of the main embankment to allow for collection and return of any near surface seepage. The trench will run parallel to the main embankment downstream toes. If seepage is intercepted by the trench, a submersible pump will be installed in a seepage recovery sump to pump water back into the TSF impoundment to be collected by the decant recovery system.	Schedule 1: Maps, Premises map, Figure 2 and Figure 3	Prior to the submittal of the Environmental Compliance Report required by condition 2
13	TSF tailings and decant return	• Cyanide levels kept at <30mg/L using Caro's acid.	Schedule 1: Maps, Premises map, Figure 2 and Figure 3	Prior to the submittal of the Environmental Compliance Report required by condition 2
14	Landfill	Klondyke Waste Rock Dump site: • 750 tonnes Putrescible wastes; • 750 tonnes Inert wastes; • Located more than 100m from surface water features; • Separated by at least 3m from the highest level of the groundwater table; • Active tipping face maximum length of 30m and maximum height of 2m; • Stormwater diverted away from the landfill by diversion drains and bunding; and • Mobile fencing installed to prevent access by livestock and other fauna. Tyres: • Disposed of in batches not exceeding 1,000 used tyres; • Covered at regular intervals so that no more than 1,000 used tyres are left exposed; • Each batch separated by at least 100mm of soil or another dense inert and incombustible materials, with a final over not less than	Schedule 1: Maps, Premises map, Figure 1	Prior to the submittal of the Environmental Compliance Report required by condition 2

	Infrastructure	Design and construction / installation requirements	Infrastructure location	Timeframe
		500mm; and • Fire breaks maintained.		
15	WWTP and irrigation area	Iconic Water Solutions WWTP: • Capacity 50m^3/day; • Pump well; • Balance tank; • Anaerobic tank; • Anoxic tank; • Two aeration tanks; • Clarifier tank; • Settling tank; • Waste activated sludge tank; • Chlorine contact tank; • Fitted with high level alarms on the balance tank and irrigation tank; • Treated wastewater irrigation storage tanks (with a minimum capacity of two days) for storage prior to discharge; and • Design effluent quality criteria: ➢ pH 6.8 – 8.5 pH units; ➢ Biochemical Oxygen Demand <20mg/L; ➢ Total Suspended Solids <30mg/L; ➢ Total Nitrogen <30mg/L; ➢ Total Phosphorus <8mg/L; ➢ *E.coli* <1,000 mg/L; and ➢ Free Chlorine 0.2 – 2.0 mg/L. Irrigation area: • 1.5 hectares; • Fully fenced and signposted; • Stormwater diverted away from the WWTP and irrigation area by diversion drains and bunding; and • Design Total Nitrogen and Total Phosphorus loading rates: ➢ Total Nitrogen 365 kg/ha/yr; and ➢ Total Phosphorus 98 kg/ha/yr. Pipelines: • Installed within bunds to ensure all liquids are captured and not released to the environment; and • Scour pits or sumps constructed along pipeline corridors to ensure leaks or spillages are contained within bunded areas.	Schedule 1: Maps, Premises map, Figure 1	Prior to the submittal of the Environmental Compliance Report required by condition 2
16	RO Plant at the WWTP	• Capacity 25m^3/day; • Brine directed to the WWTP final Irrigation tank; and • Brine must be mixed with WWTP effluent prior to discharge to the irrigation area.	Schedule 1: Maps, Premises map, Figure 1	Prior to the submittal of the Environmental Compliance Report required by condition 2

Compliance reporting

2. The works approval holder must within 60 calendar days of an item of infrastructure or

equipment required by condition 1 being constructed and/or installed:

(a) undertake an audit of their compliance with the requirements of condition 1; and

(b) prepare and submit to the CEO an Environmental Compliance Report on that compliance.

3. The Environmental Compliance Report required by condition 2, must include as a minimum the following:

(a) certification by a suitably qualified professional engineer or builder that the items of infrastructure or component(s) thereof, as specified in condition 1, have been constructed in accordance with the relevant requirements specified in condition 1;

(b) as constructed plans and a detailed site plan for each item of infrastructure or component of infrastructure specified in condition 1;

(c) Photographic evidence of the installation of the infrastructure;

(d) be signed by a person authorised to represent the works approval holder and contains the printed name and position of that person.

(e) Monitoring data indicating the baseline ambient environmental conditions at the premises prior to and immediately following construction of the item(s) of infrastructure; and

(f) A Quality Control / Quality Assurance Certificate from an independent third party which demonstrates that the permeability of the TSF meets the requirements specified in Table 1.

Construction of groundwater monitoring wells

4. The works approval holder must design, construct, and install groundwater monitoring wells in accordance with the requirements specified in Table 2.

Table 2: Infrastructure requirements – groundwater monitoring wells

Infrastructure	Design, construction, and installation requirements	Monitoring well locations	Timeframe
Groundwater monitoring network for: TSF including at least (TSFMB01, TSFMB02, TSFMB03, TSFMB04) TSFMB12[2] Village Camp Processing Plant Vibrating Wire	<u>Well design and construction:</u> Designed and constructed in accordance with ASTM D5092/D5092M-16: Standard practice for design and installation of groundwater monitoring bores. Well screens must target the part, or parts, of the aquifer most likely to be affected by contamination[1]. Where temporary/seasonal perched features are present, wells must be nested, and the perched features individually screened. <u>Logging of borehole:</u> Soil samples must be collected and logged during the installation of the monitoring wells. A record of the geology encountered during drilling must be described and classified in accordance with the Australian Standard Geotechnical Site Investigations AS1726. Any observations of staining / odours or other	Schedule 1: Maps, Premises map, Figure 4	Must be constructed, developed (purged), and determined to be operational in order to meet the frequency of baseline monitoring as required by Table 10 and prior to the commencement of environmental commissioning activities under condition 7

Infrastructure	Design, construction, and installation requirements	Monitoring well locations	Timeframe
Piezometers (WP01, VWP02, VWP03, VWP04, VWP05, VWP06)	indications of contamination must be included in the bore logs.		
	Well construction log: Well construction details must be documented within a well construction log to demonstrate compliance with ASTM D5092/D5092M-16. The construction logs shall include elevations of the top of casing position to be used as the reference point for water-level measurement, and the revelations of the ground surface protective installations.		
	Well development: All installed monitoring wells must be developed after drilling to remove fine sand, silt, clay and any drilling mud residues from around the well screen to ensure the hydraulic functioning of the well. A detailed record should be kept of well development activities and included in the well construction log.		
	Installation survey: The vertical (top of casing) and horizontal position of each monitoring well must be surveyed and subsequently mapped by a suitably qualified surveyor.		
	Well network map: A well location map (using aerial image overlay) must be prepared and include the location of all monitoring wells in the monitoring network and their respective identification numbers.		

Note 1: Refer to Section 8 of Schedule B2 of the Assessment of Site Contamination NEPM for guidance on well screen depth and length.

Note 2: A monitoring well (or observation well is slotted from the bottom of the bore and is not sealed above the slotted section except for a collar at the surface to prevent water flowing into the drilled hole.

5. The works approval holder must, within 60 calendar days of the monitoring wells being constructed, submit to the CEO a well construction report evidencing compliance with the requirements of condition 4.

6. The monitoring of the baseline ambient environmental conditions required under Table 10 in Schedule 2: Monitoring must be undertaken in accordance with Table 10 in Schedule 2: Monitoring and record the results of all monitoring activity required by Table 10 in Schedule 2: Monitoring, with a comparison to the ANZEG 2018 water quality guidelines Australian and New Zealand Guidelines for Fresh and Marine Water Quality 95% level of species protection for freshwater.

Environmental commissioning phase

Environmental commissioning requirements and emission limits

7. The works approval holder may only commence environmental commissioning of an item

of infrastructure identified in condition 8 once the Environmental Compliance Report has been submitted for that item of infrastructure in accordance with condition 2 of this works approval.

8. Any environmental commissioning activities undertaken for an item of infrastructure specified in Table 3 may only be carried out:

(a) In accordance with the corresponding commissioning requirements; and

(b) For the corresponding authorized commissioning duration.

Table 3: Environmental commissioning requirements

	Infrastructure	**Commissioning requirements**	**Authorised commissioning duration**
1	Processing Plant	Daily inspections logs of the following: • Integrity of all reagent, process solution and process water lines, tanks and bunds; • Process solution, reagent, process water, product spills to ground and clean-up; • Reagent storage, pond freeboard levels, bund integrity; • Ore, water and reagent input volumes; and • Discharge tailings volume and density.	Six months
2	Pipeline and services corridor (Processing Plant to TSF)	Twice daily inspections of pipelines.	Six months
3	TSF	General: • Freeboard of 500mm maintained; • Tailings discharge of up to 625,000 tonnes (1,250,000 tonnes per annum); • Tailings thickened to >65% w/w solids; and • Decant pond to be maintained at the minimum size necessary. Daily inspections logs of the following: • Routine inspections for all components of the TSF including: ➢ Pumps, valves; ➢ Discharge locations and beaching performance; ➢ Location and size of decant pond; ➢ General integrity of embankment; ➢ Seepage downstream of main embankment including the embankment toe and seepage trench; and ➢ Fauna entrapment. • Compaction control testing on zone 1 and zone 2 material: ➢ Nuclear density moisture (NDM) gauge tests (AS1289.5.8.1); and ➢ Laboratory compaction testing using the Hilf method (AS1289.5.7.1). Monthly records of the following: • Groundwater monitoring. Fauna Management and Monitoring: • Beach management via spigots placement to avoid ponding of supernatant water in areas other than the	Six months

	Infrastructure	Commissioning requirements	Authorised commissioning duration
		decant; and • Twice daily observations and recordings (after dawn and late afternoon) of fauna usage.	
4	WWTP and irrigation area	Daily inspections logs of the following: • Integrity of all water lines, tanks and bunds; and • All piping and fittings to the irrigation spray field are free of damages and leaks. Monthly inspections logs of the following: • Observe the sprinklers in the irrigation field have even coverage and are operating as designed; and • Effluent discharge managed to ensure no ponding or runoff. General: • During the commissioning period treated effluent will be stored in the treated effluent/irrigation tanks until sample results are returned (Two compliant samples required to verify treated wastewater is compliant). Where sample results demonstrate compliance, effluent will be irrigated to the spray field. Where samples are not compliant with proposed effluent concentrations, the effluent will be recirculated through the WWTP until it demonstrates compliance or it will be disposed of offsite at a licensed facility. Design effluent quality criteria targeted at: • pH 6.8 – 8.5 pH units; • Biochemical Oxygen Demand <20mg/L; • Total Suspended Solids <30mg/L; • Total Nitrogen <30mg/L; • Total Phosphorus <8mg/L; • E.coli <1,000 mg/L; and • Free Chlorine 0.2 – 2.0 mg/L. Loading rates targeted at: • Total Nitrogen 365 kg/ha/yr; and • Total Phosphorus 98 kg/ha/yr.	Three months

9. During environmental commissioning, the works approval holder must ensure that the emissions from the discharge points listed in Table 4 do not exceed the corresponding limits when monitored in accordance with condition 10.

Table 4: Emission and discharge limits during environmental commissioning

	Discharge point	Parameter	Limit
1	TSF decant return pump	pH	6-9 pH units
		WAD-CN	<30 mg/L

Monitoring during environmental commissioning

10. The works approval holder must monitor emissions and discharges during environmental commissioning in accordance with Table 9 in Schedule 2: Monitoring and record the results of all monitoring activity required by Table 9 in Schedule 2: Monitoring.

11. The works approval holder must monitor the groundwater during commissioning in accordance with Table 10 in Schedule 2: Monitoring and record the results of all monitoring activity required by Table 10 in Schedule 2: Monitoring.

12. The works approval holder must submit to the CEO an Environmental Commissioning Report within 60 calendar days of the completion date of environmental commissioning for each item of infrastructure specified in Table 1.

13. The works approval holder must ensure the Environmental Commissioning Report required by condition 12 of this works approval includes the following:

(a) A summary of the environmental commissioning activities undertaken, including timeframes and amount of gold bearing ore processed, product produced and tailings deposited;

(b) The emissions and discharges monitoring results obtained during environmental commissioning under Table 9 in Schedule 2: Monitoring with a comparison of the WWTP results against the design effluent quality criteria and loading rates stipulated under condition 8;

(c) The WAD-CN monitoring results obtained during environmental commissioning under condition 10 with a summary;

(d) The ambient groundwater monitoring results obtained during environmental commissioning under Table 10 in Schedule 2: Monitoring with a comparison to the ANZEG 2018 water quality guidelines Australian and New Zealand Guidelines for Fresh and Marine Water Quality 95% level of species protection for freshwater;

(e) A summary of the environmental performance of each item of infrastructure or equipment as constructed or installed (as applicable), which at minimum includes records detailing the:

(i) Commissioning of the infrastructure; and

(ii) Testing of the infrastructure;

(f) A review of the works approval holder's performance and compliance against the conditions of this works approval; and

(g) Where they have not been met, measures proposed to meet the manufacturer's design specifications and the conditions of this works approval, together with timeframes for implementing the proposed measures.

Time limited operations phase

Commencement and duration

14. The works approval holder may only commence time limited operations for an item of infrastructure identified in condition 1:

(a) Where the item of infrastructure is not authorized to undertake environmental commissioning, the Environmental Compliance Report as required by condition 2 has been submitted by the works approval holder for that item of infrastructure; and

(b) Where the item of infrastructure is authorized to undertake environmental commissioning under condition 8, the Environmental Commissioning Report for that item of infrastructure as required by condition 12 has been submitted by the works

approval holder.

15. Upon the granting of a licence or registration under Part V of the *Environmental Protection Act 1986*, authorizing the operation of the infrastructure identified in condition 1, the works approval holder may no longer conduct time limited operations in respect of the infrastructure under the terms of this works approval.

16. During time limited operations, the works approval holder must ensure that the premises infrastructure and equipment listed in Table 5 and located at the corresponding infrastructure location is maintained and operated in accordance with the corresponding operational requirements set out in Table 5.

Table 5: Infrastructure and equipment requirements during time limited operations

	Site infrastructure and equipment	**Operational requirements**	**Infrastructure location**
1	Processing Plant	Daily inspections logs of the following: • Integrity of all reagent, process solution and process water lines, tanks and bunds; • Process solution, reagent, process water, product spills to ground and clean-up; • Reagent storage, pond freeboard levels, bund integrity; • Ore, water and reagent input volumes; and • Discharge tailings volume and density.	Schedule 1: Maps, Premises map, Figure 2 and Figure 3
2	Pipeline and services corridor (Processing Plant to TSF)	Twice daily inspections of pipelines.	Schedule 1: Maps, Premises map, Figure 2 and Figure 3
3	TSF	General: • Freeboard of 500mm maintained; • Tailings discharge of up to 625,000 tonnes (1,250,000 tonnes per annum); • Tailings thickened to >65% w/w solids; and • Decant pond to be maintained at the minimum size. Daily inspections logs of the following: • Routine inspections for all components of the TSF including: ➢ Pumps, valves; ➢ Discharge locations and beaching performance; ➢ Location and size of decant pond; ➢ General integrity of embankment; ➢ Seepage downstream of main embankment including the embankment toe and seepage trench; and ➢ Fauna entrapment. Quarterly records of the following: • Groundwater monitoring. Fauna Management and Monitoring: • Beach management via spigots	Schedule 1: Maps, Premises map, Figure 2 and Figure 3

	Site infrastructure and equipment	Operational requirements	Infrastructure location
		placement to avoid ponding of supernatant water in areas other than the decant; and • Twice daily observations and recordings (after dawn and late afternoon) of fauna usage.	
4	Landfill	Klondyke Waste Rock Dump site: • Inert Waste Type 1, Inert Waste Type 2, Putrescible Waste, Clean Fill and Uncontaminated Fill; • 750 tonnes Putrescible wastes; • 750 tonnes Inert wastes; • Located more than 100m from surface water features; • Separated by at least 3m from the highest level of the groundwater table. Groundwater monitoring bores KWEO1, KWE06, KWE07 and KWE10 are located within proximity to the landfill; • Active tipping face maximum length of 30m and maximum height of 2m; • Stormwater diverted away from the landfill by diversion drains and bunding; • Mobile fencing installed to prevent access by livestock and other fauna; and • Landfill inspected regularly and windblown waste collected monthly. Tyres: • Disposed of in batches not exceeding 1,000 used tyres; • Covered at regular intervals so that no more than 1,000 used tyres are left exposed; • Each batch separated by at least 100mm of soil or another dense inert and incombustible materials, with a final over not less than 500mm; and • Fire breaks maintained.	Schedule 1: Maps, Premises map, Figure 1
5	WWTP and irrigation area	Daily inspections logs of the following: • Integrity of all water lines, tanks and bunds; and • All piping and fittings to the irrigation spray field are free of damages and leaks. Monthly inspections logs of the following: • Observe the sprinklers in the irrigation field have even coverage and are operating as designed; and • Effluent discharge managed to ensure no ponding or runoff.	Schedule 1: Maps, Premises map, Figure 1

	Site infrastructure and equipment	Operational requirements	Infrastructure location
		General: • During the commissioning period treated effluent will be stored in the treated effluent/irrigation tanks until sample results are returned (Two compliant samples required to verify treated wastewater is compliant). Where sample results demonstrate compliance, effluent will be irrigated to the spray field. Where samples are not compliant with proposed effluent concentrations, the effluent will be recirculated through the WWTP until it demonstrates compliance or it will be disposed of offsite at a licensed facility. RO brine must be mixed/diluted into the WWTP final effluent tank prior to discharge to the irrigation area. Design effluent quality criteria targeted at: • pH 6.8 – 8.5 pH units; • Biochemical Oxygen Demand <20mg/L; • Total Suspended Solids <30mg/L; • Total Nitrogen <30mg/L; • Total Phosphorus <8mg/L; • E.coli <1,000 mg/L; and • Free Chlorine 0.2 – 2.0 mg/L. Loading rates targeted at: • Total Nitrogen 365 kg/ha/yr; and • Total Phosphorus 98 kg/ha/yr.	

Time limited operations requirements and emission limits

17. During time limited operations, the works approval holder must ensure that the emissions from the discharge points listed in Table 6 do not exceed the corresponding limits when monitored in accordance with condition 18.

Table 6: Emission and discharge limits during time limited operations

	Discharge point	Parameter	Limit
1	TSF decant return pump	pH	6-9 pH units
		WAD-CN	<30 mg/L

Monitoring during time limited operations

18. The works approval holder must monitor emissions and discharges during the time limited operations in accordance with Table 9 in Schedule 2: Monitoring and record the results of all monitoring activity.

19. The works approval holder must monitor the groundwater during time limited operations in accordance with Table 10 in Schedule 2: Monitoring and record the results of all monitoring activity.

Specified actions

20. During the first 30 days of time limited operations, the works approval holder must collect at least 10 individual representative tailings samples, including pore water, to determine the likely behavior of elements under a range of leaching conditions, which may include, but not be limited to:

(a) Testing using the LEAF Test Method 1313 pH-dependent leaching test (United States Environmental Protection Agency, 2017);

(b) Geotechnical characterisation of tailings including: particle size distribution, volume of solids, settling test (drained and undrained), air drying test and hydraulic conductivity of the same tailings tested in (a); and

(c) Testing for the contaminants listed in Table 7.

All test results shall be collated and provided in a report to the CEO no later than 60 days after the sample results become available.

Table 7: Tailings characterisation parameters

	Stream	**Contaminants**		
1	Tailings leachate and pore water (mg/L)	Ag - Silver	Cu – Copper	Se – Selenium
		Al – Aluminium	Total CN	Si - Silicon
		As – Arsenic	WAD-CN	Sn - Tin
		Ba – Barium	Fe – Iron	Sr - Strontium
		Beryllium, Be	Hg – Mercury	Uranium, U
		B - Boron	K – Potassium	Vanadium, V
		C total – Carbon total	Mg – Magnesium	Zn – Zinc
		C carbonate – Carbon carbonate	Mn - Manganese	TDS (total dissolved solids)
		Ca – Calcium	Mo – Molybdenum	Total Nitrogen
		Cd – Cadmium	Na – Sodium	Sulfur total
		Co - Cobalt	Ni – Nickel	SO_4^{-2} – Sulphate
		Copper, Cu	P – Phosphorus	Acrylamide
		Chloride, Cl	Pb – Lead	
		Cr – Chromium	Sb – Antimony	
2	Tailings leachate and pore water (pH units)	pH		

Compliance reporting

21. The works approval holder must submit to the CEO a report on the time limited operations within 60 calendar days of the completion date of time limited operations or 60 calendar days before the expiration date of the works approval, whichever is the sooner.

22. The works approval holder must ensure the report required by condition 21 includes the following:

(a) A summary of the time limited operations, including timeframes and amount of gold bearing ore processed, product produced and tailings deposited;

(b) The results of the long-duration kinetic testing carried out on tailings and other waste-rock materials during the time limited operations under condition 20 with a summary.

(c) The emissions and discharges monitoring results obtained during time limited operations under Table 9 in Schedule 2: Monitoring with a comparison of the WWTP results against the design effluent quality criteria and loading rates stipulated under condition 16;

(d) The WAD-CN monitoring results obtained during time limited operations under condition 18 with a summary;

(e) The ambient ground monitoring results obtained during time limited operations under Table 10 with a comparison to the ANZEG 2018 water quality guidelines Australian and New Zealand Guidelines for Fresh and Marine Water Quality 95% level of species protection for freshwater;

(f) A summary of the environmental performance of all infrastructure as constructed or installed (as applicable), which includes records detailing the:

(i) Gold bearing ore processed;

(ii) Product produced;

(iii) Tailings deposited;

(iv) Tailings density (solid vs water content);

(v) TSF and Process Water Dam water balance where the rate of evaporation is not assumed to be the same as the pan evaporation rate; and

(vi) Volumes of waste types disposed of to the landfill;

(g) A review of operational performance and compliance against the conditions of the works approval and the environmental Commissioning Report; and

(h) Where the manufacturer's design specifications and the conditions of this works approval have not been met, what measures will the works approval holder take to meet them, and what timeframes will be required to implement those measures.

Records and reporting (general)

23. The works approval holder must record the following information in relation to complaints received by the works approval holder (whether received directly from a complainant or forwarded to them by the Department or another party) about any alleged emissions from the premises:

(a) the name and contact details of the complainant, (if provided);

(b) the time and date of the complaint;

(c) the complete details of the complaint and any other concerns or other issues raised; and

(d) the complete details and dates of any action taken by the works approval holder to investigate or respond to any complaint.

24. The works approval holder must, within 7 days of becoming aware of any limits breached with conditions 9 and 17 of this licence, notify the CEO in writing of that non-compliance.

25. The works approval holder must maintain accurate and auditable books including the following records, information, reports, and data required by this works approval:

(a) the works conducted in accordance with condition 1;

(b) any maintenance of infrastructure that is performed in the course of complying with condition 1;

(c) monitoring programmes undertaken in accordance with conditions 6, 9, 10, 17 and 18;

(d) complaints received under condition 23; and

(e) limits breached under condition 24.

26. The books specified under condition 25 must:

(a) be legible;

(b) if amended, be amended in such a way that the original version(s) and any subsequent amendments remain legible and are capable of retrieval;

(c) be retained by the works approval holder for the duration of the works approval; and

(d) be available to be produced to an inspector or the CEO as required.

Definitions

In this works approval, the terms in Table 8 have the meanings defined.

Table 8: Definitions

Term	Definition
AEP	Annual Exceedance Probability
AS/NZS 5667.1	means the Australian Standard AS/NZS 5667.1 *Water Quality – Sampling – Guidance of the Design of sampling programs, sampling techniques and the preservation and handling of samples.*
AS/NZS 5667.11	means the Australian Standard AS/NZS 5667.11 *Water Quality – Sampling – Guidance on sampling of groundwaters.*
ANZEG 2018	Australian and New Zealand guidelines for fresh and marine water quality https://www.waterquality.gov.au/guidelines/anz-fresh-marine
Books	has the same meaning given to that term under the EP Act.
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department administering the *Environmental Protection Act 1986* Locked Bag 10 Joondalup DC WA 6919 info@dwer.wa.gov.au
CIL	carbon-in-leach.
Clean Fill	has the meaning defined in the Landfill Definitions.
CN	Cyanide.
Department	means the department established under section 35 of the *Public Sector Management Act 1994* and designated as responsible for the administration of Part V Division 3 of the EP Act.
Discharge	has the same meaning given to that term under the EP Act.
Emission	has the same meaning given to that term under the EP Act.
Environmental commissioning	means the sequence of activities to be undertaken to test equipment integrity and operation, or to determine the environmental performance, of equipment and infrastructure to establish or test a steady state operation and confirm design specifications.
Environmental Commissioning Report	means a report on any commissioning activities that have taken place and a demonstration that they have concluded, with focus on emissions and discharges, waste containment, and other environmental factors.

Term	Definition
Environmental Compliance Report	means a report to satisfy the CEO that the conditioned infrastructure and/or equipment has been constructed and/or installed in accordance with the works approval.
EP Act	*Environmental Protection Act 1986* (WA).
EP Regulations	*Environmental Protection Regulations 1987* (WA).
Freeboard	means the distance between the maximum water surface elevations and the top of retaining banks or structures at their lowest point.
Inert Waste Type 1	has the meaning defined in the Landfill Definitions.
Inert Waste Type 2	has the meaning defined in the Landfill Definitions.
Landfill Definitions	means the document titled "Landfill Waste Classification and Waste Definitions 1996 (as amended 2018)" published by the Chief Executive Officer of the Department of Water and Environmental Regulation as amended from time to time.
NEPM	National Environment Protection Measure
Premises	the premises to which this licence applies, as specified at the front of this licence and as shown on the premises map (Figure 1) in Schedule 1 to this works approval.
Prescribed premises	has the same meaning given to that term under the EP Act.
Putrescible Waste	has the meaning defined in the Landfill Definitions.
RO	Reverse osmosis.
ROM	run of mine.
SAG	semi-autogenous-grinding.
Time limited operations	refers to the operation of the infrastructure and equipment identified under this works approval that is authorized for that purpose, subject to the relevant conditions.
TSF	Tailings Storage Facility.
Uncontaminated Fill	has the meaning defined in the Landfill Definitions.
WAD-CN	Weak Acid Dissociable Cyanide.
Waste	has the same meaning given to that term under the EP Act.
Works approval	refers to this document, which evidences the grant of the works approval by the CEO under section 54 of the EP Act, subject to the conditions.
Works approval	refers to the occupier of the premises being the person to whom this

Term	Definition
holder	works approval has been granted, as specified at the front of this works approval.
WWTP	wastewater treatment plant.

END OF CONDITIONS

Schedule 1: Maps

Premises map

The boundary of the prescribed premises is shown in the map below (Figure 1)

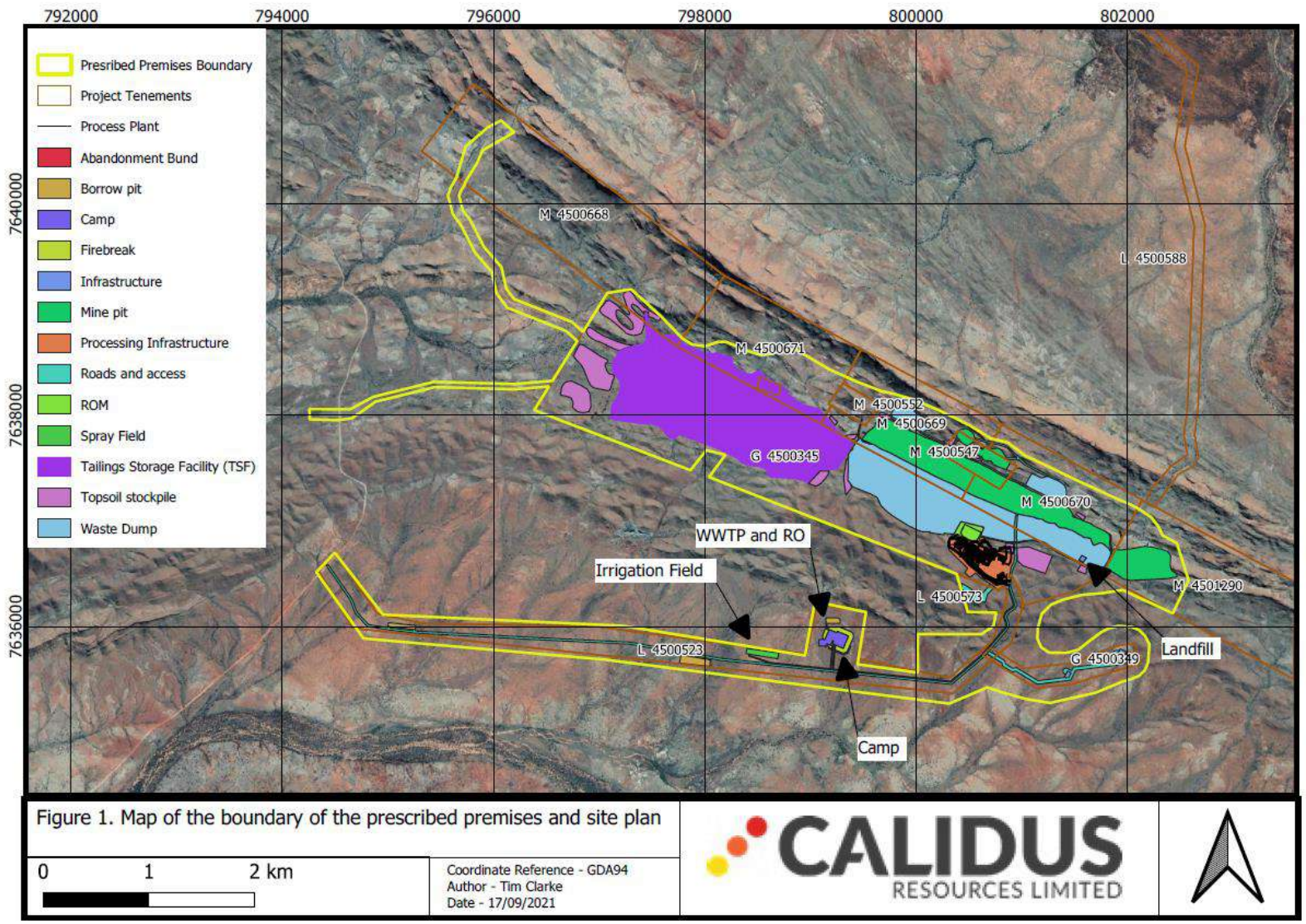

Figure 1: Map of the boundary of the prescribed premises and site plan

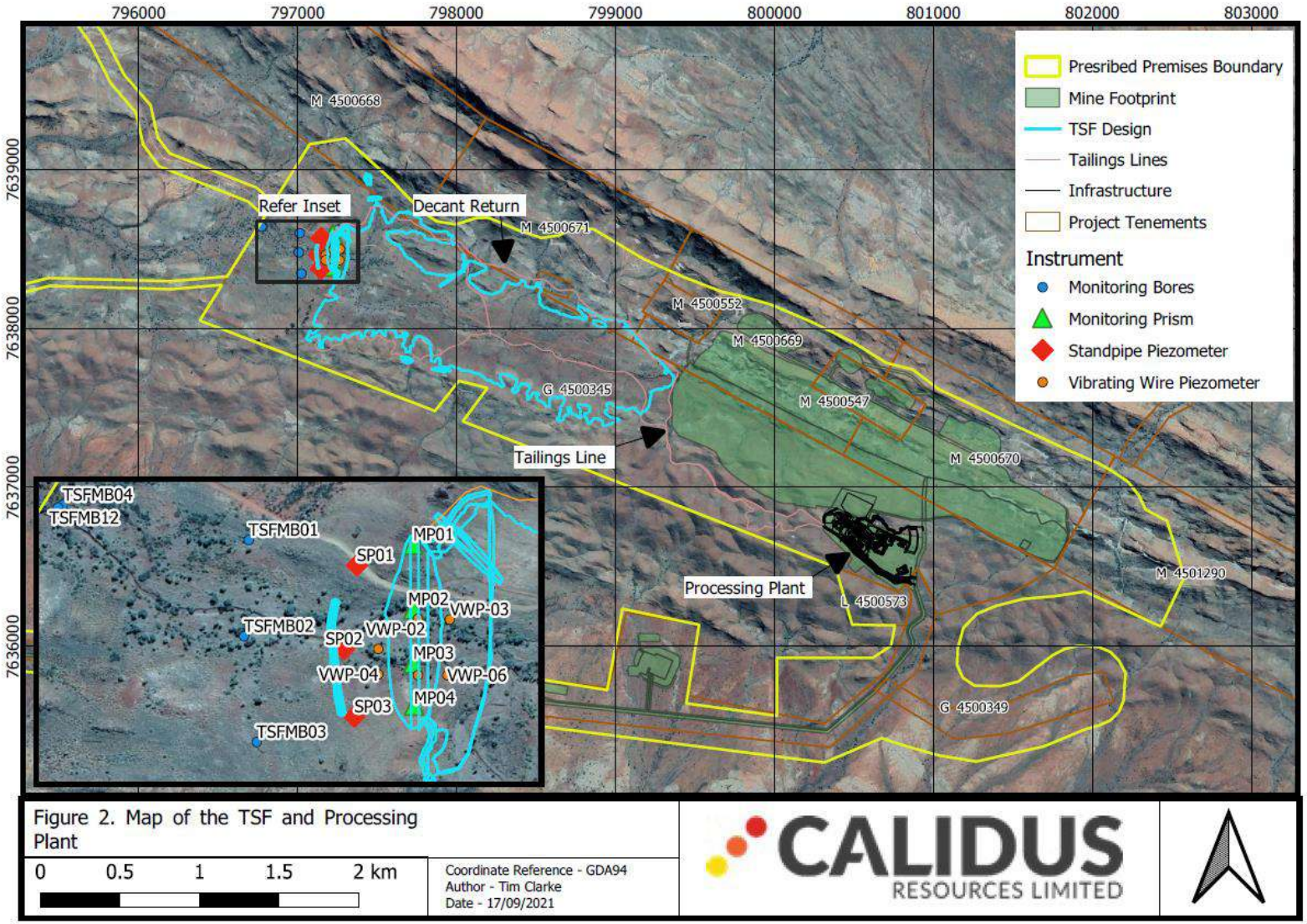

Figure 2: Map of the TSF and Processing Plant

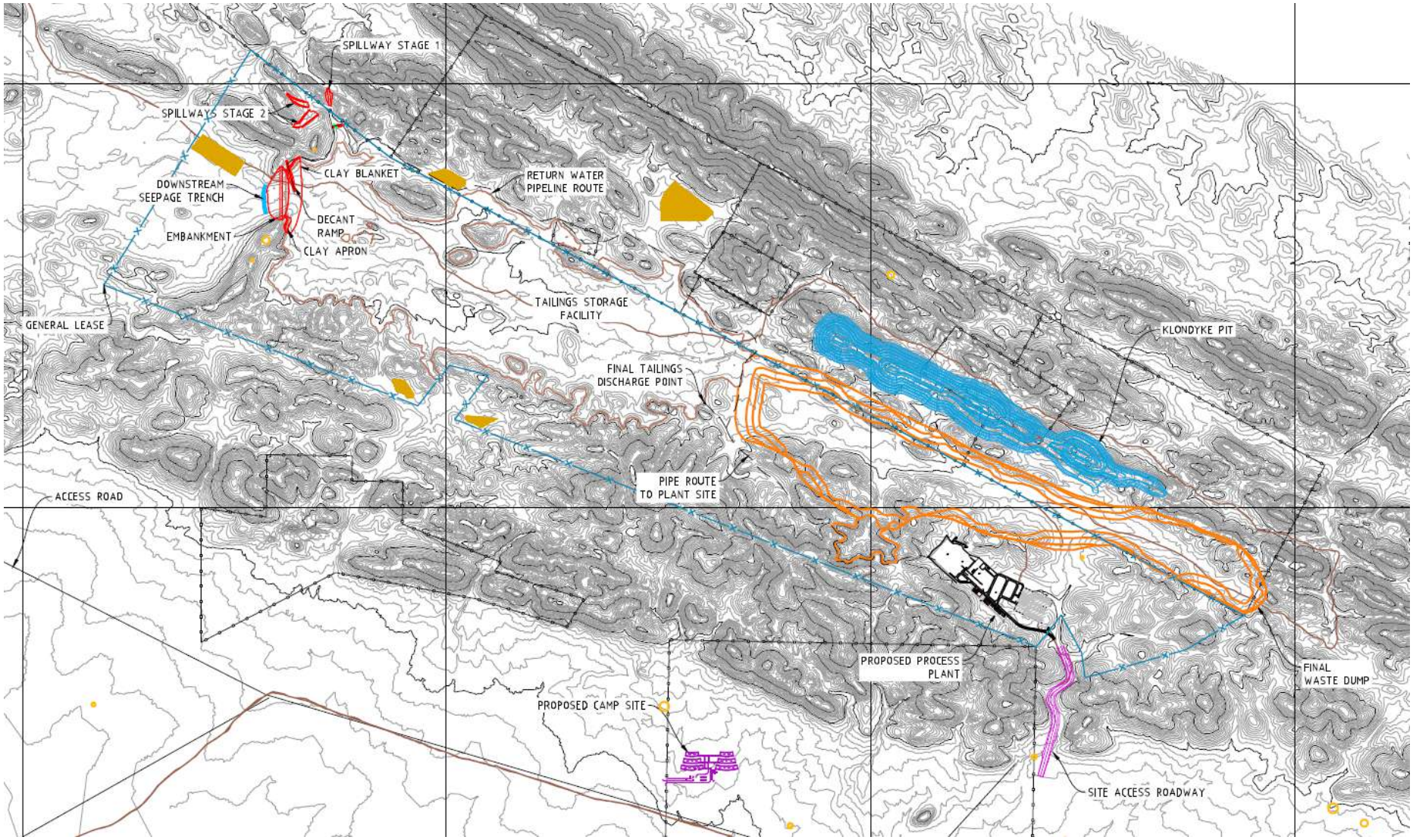

Figure 3: TSF overall site general arrangement

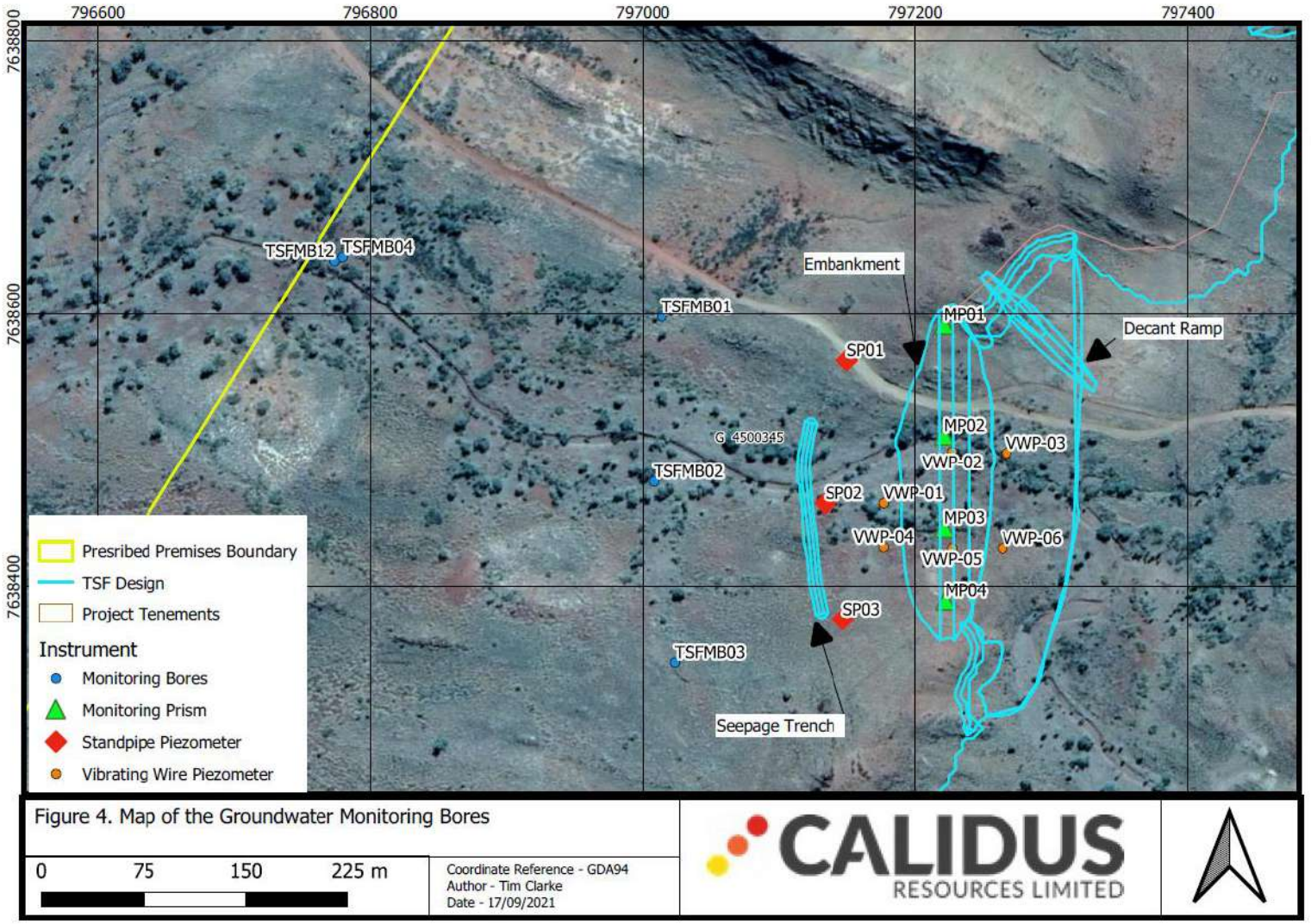

Figure 4: Map of the Groundwater Monitoring Bores

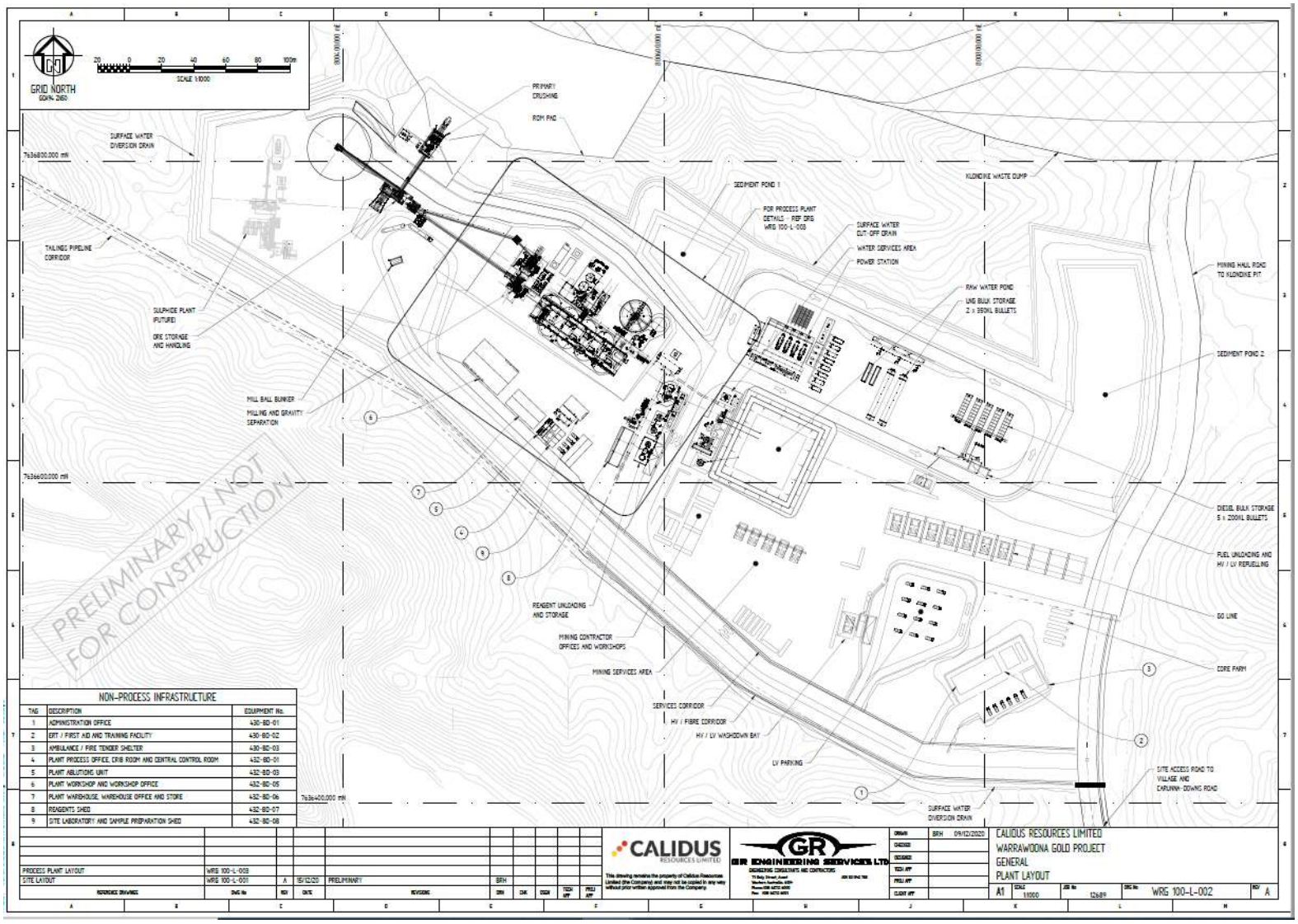

Figure 5: Site infrastructure

Schedule 2: Monitoring

Table 9: Emissions and discharges monitoring

	Discharge point	Parameter	Frequency	Averaging Period	Unit	Method Sampling & Analysis
1	Tailings hopper	pH	Daily	Spot sample	pH units	AS5667.1-1998 AS5667.10-1998
		WAD-CN	Daily	Spot sample	mg/L	AS5667.1-1998 AS5667.10-1998
2	TSF decant return pump	pH	Daily	Spot sample	pH units	AS5667.1-1998 AS5667.10-1998
		WAD-CN	Daily	Spot sample	mg/L	AS5667.1-1998 AS5667.10-1998
		Acrylamide	Daily	Spot sample	mg/L	AS5667.1-1998 AS5667.10-1998
3	WWTP Irrigation Tank	Volume of reject brine discharged from the RO Plant at the WWTP to the Final Irrigation Tank should be recorded.	Weekly during commissioning Quarterly during time limited operations	Cumulative weekly	m^3	AS5667.1-1998 AS5667.10-1998
		pH		Spot sample	pH units	
		Biochemical Oxygen Demand			mg/L	
		Total Dissolved Solids				
		Total Suspended Solids				
		Total Nitrogen				
		Total Phosphorus				
		E.coli				
		Free Chlorine				
4	Oily Water Separator	Total Petroleum Hydrocarbons	Prior to discharge in	Spot sample	Mg/L	AS5667.1-1998

	Discharge point	Parameter	Frequency	Averaging Period	Unit	Method Sampling & Analysis
	System dust suppression		dust suppression			AS5667.10-1998

Table 10: Ambient groundwater monitoring

	Parameter	Monitoring location	Unit	Frequency	Averaging period	Method Sampling & Analysis
1	SWL	Refer to condition 4	mbgl	At least twice, 3 months prior to the commencement of commissioning for baseline monitoring Monthly during commissioning Quarterly during Time Limited Operations	Spot sample	AS5667.1-1998 AS5667.10-1998
2	pH		pH units			
3	Electrical Conductivity, EC		µS/cm			
4	Total Dissolved Solids, TDS		mg/L			
5	Sulfate, SO_4					
6	Ammonia, NH_3					
7	Nitrite, NO_2					
8	Nitrite + Nitrate, NO_3					
9	Total Kjeldahl Nitrogen, N					
10	Total Nitrogen, TN					
11	Total Phosphorus, TP					
12	Reactive Phosphorus, P					
13	Total CN					
14	WAD-CN					
15	Aluminium, Al					
16	Arsenic, As					
17	Boron, B					
18	Barium, Ba					
19	Beryllium, Be					
20	Cadmium, Cd					

	Parameter	Monitoring location	Unit	Frequency	Averaging period	Method Sampling & Analysis
21	Calcium, Ca					
22	Chloride, Cl					
23	Chromium, Cr					
24	Cobalt, Co					
25	Copper, Cu					
26	Fluoride, F					
27	Iron, Fe					
28	Lead, Pb					
29	Magnesium, Mg					
30	Manganese, Mn					
31	Mercury, Hg					
32	Molybdenum, Mo					
33	Nickel, Ni					
34	Selenium, Se					
35	Strontium, Sr					
36	Uranium, U					
37	Vanadium, V					
38	Zinc, Zn					