Application for Works Approval

Part V Division 3 of the *Environmental Protection Act 1986*

Works Approval Number	W6640/2022/1
Applicant	Aurenne MIT Pty Ltd
ACN	611 002 709
File number	DER2021/000714
Premises	Mt Ida Gold Project; Bottle Creek Premises Mt Ida Road Legal description M 29/150, M 29/151, G 29/29, G 29/30, L 29/145, L 29/153, L 29/154, L 29/137, E 29/1007 & E 29/1014 As defined within Schedule 1 of the works approval
Date of report	21 June 2022
Decision	Works Approval Granted

Michael Greenslade

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

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1. Decision summary

This decision report documents the assessment of potential risks to the environment and public health from emissions and discharges during the construction and operation of the premises. As a result of this assessment, works approval W6640/2022/1 has been granted.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this decision report, the Department of Water and Environmental Regulation (the department; DWER) has considered and given due regard to its regulatory framework and relevant policy documents which are available at https://dwer.wa.gov.au/regulatory-documents.

2.2 Application summary and overview of premises

On 8 December 2021, Aurenne MIT Pty Ltd (the applicant) submitted an application for a works approval at the Mt Ida Gold Bottle Creek premises to the department under section 54 of the *Environmental Protection Act 1986* (EP Act).

The application is for:

- Construction, commissioning and time limited operations of:
    - a gold processing facility (carbon in-leach) and associated pipework
- Construction and time limited operations of:
    - an Integrated waste landform tailings storage facility (IWL TSF), for which the starter embankment is proposed to have a total tailings capacity of 1.68Mt for a minimum storage life of 1 year and 5 months;
    - a raw water pond designed to hold 5,000m^3 of pit lake dewater, mine dewater and bore water;
    - a process water pond designed to hold 5,000m^3 of decant return water from the IWL TSF, overflow from the raw water pond and supernatant water from the pre-leach thickener overflow;
- Dewatering of existing VB and Boags pit lakes (Figure 4, Appendix 2), to use for dust suppression. Approximately 3,000 tonnes of pit lake water is intended for dust suppression. The pit lakes will be used as a water source until a borefield under groundwater licence GWL204119(1) is developed.
- Hypersaline brine (up to 523kL/day) from the reverse osmosis (RO) plant is intended for discharge into Boags pit lake. The brine will be added to the pit lake and water extracted for dust suppression.
- Construction and time limited operations for a category 64 class II putrescible landfill – (excavation trench) with a throughput 360m^3/year. The landfill will be a moving trench which incorporates a maximum open excavation of 50-100 m long by 4 m wide and up to a maximum 2 m deep.

The premises relates to the categories and assessed design capacity under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) which are defined in works approval W6640/2022/1. The infrastructure and equipment relating to the premises category and any associated activities which the department has considered in line with *Guideline: Risk Assessments* (DWER 2020) are outlined in works approval W6640/2022/1.

A mining proposal has been submitted to the Department of Mines, Industry Regulation and Safety (DMIRS) and was approved on 21 April 2022. A clearing permit (NVCP CPS 9383/2) to clear up to 1,000 hectares of native vegetation was granted on 4 February 2022 and amended on 14 June 2022.

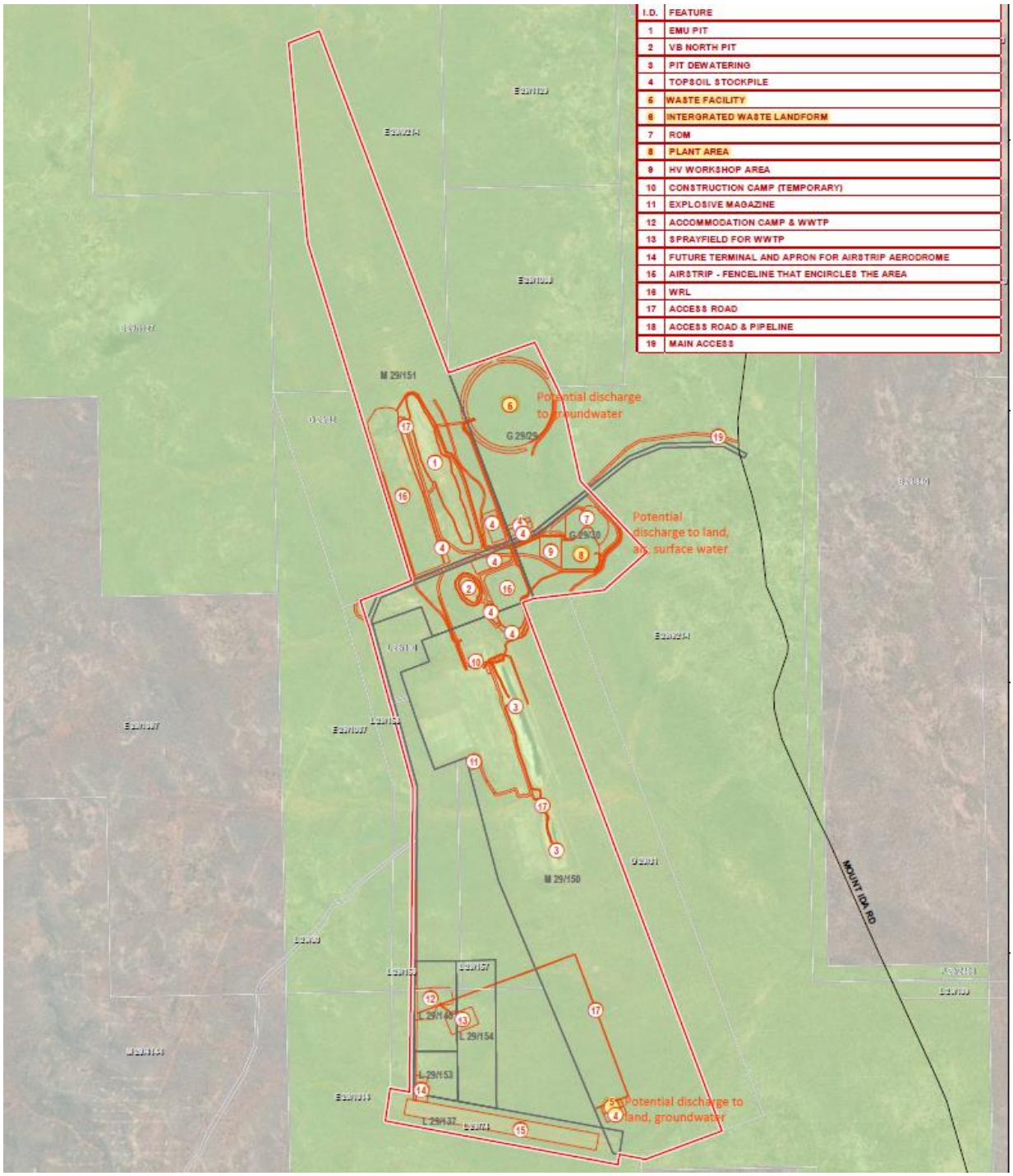

Figure 1: Proposed site layout

2.2.1 Processing Plant

The Bottle Creek processing plant will be located on G29/30 (Figure 1 – location "8") with the ROM pad and primary crusher established on elevated terrain to the north. The plant is designed for 1.2Mtpa throughput with tailings discharged to the IWL/TSF on G29/29. The proposed processing plant will consist of:

- a single stage crushing circuit with surge bin;
- a semi-autogenous grinding (SAG) mill;
- thickening of leach feed before passing through a carbon in pulp (CIP) circuit with seven mechanically agitated CIP tanks. The leaching and adsorption circuit is designed to leach the contained gold and silver metal ions into solution through cyanide dissolution, with the resultant metals adsorbed onto activated carbon for mechanical recovery;
- the CIP area will be a concrete floored and bunded facility with a bund capacity of 110% of the largest CIP tank. The bunded area will have two sumps to be cleared by submersible sump pumps, returning material to adsorption tank 2 or 7. All losses from the CIP circuit will therefore be contained within the CIP area. The CIP bunded area, sumps and pumps will be subject to routine shift inspection for spillage and sump clearance;
- a pressure elution circuit including a carbon regeneration kiln, electrowinning cells, gold room and gold room furnace;
- chemical reagent storage (quicklime, sodium cyanide, hydrochloric acid, sodium hydroxide, carbon). The cyanide storage tank of 140m^3 capacity and the caustic soda tank of 30 m^3 capacity will be contained in a common concrete bund of 168 m^3 capacity. Hydrochloric acid will be stored within a bunded area with 110% containment capacity; and
- tailings pumps and piping to the IWL/TSF.

Chemicals (and hydrocarbons, fuels) transport, storage will be managed under a Dangerous Goods Licence under the *Dangerous Goods Safety Act 2004*.

2.2.2 Integrated Waste Landform Tailings Storage Facility (IWL TSF)

The proposed integrated waste landform tailings storage facility (IWL TSF) will be a single cell circular facility designed to store approximately 6Mt of tailings over a 6 year project life. This is assuming an ore processing rate of 1.2 Mtpa and a minimum tailings in-situ density of 1.5 t/m3 (dry). The IWL TSF will have a footprint of approximately 29 hectares and a planned maximum embankment height of 28m. The starter embankment (approved within this works approval) is proposed to have a total tailings capacity of 1.68Mt for a minimum storage life of 1 year and 5 months (Table 1).For further detail on TSF construction, seepage management, tailings characterisation and DWER regulatory controls see section 3.3.

Table 1: Estimated TSF storage capacity embankment/crest height

Stage	Embankment height	Crest height (m RL)	Est. storage capacity (t)
Starter embankment height	18 m	506	1,680,000

2.2.3 Pit Lake Water

Approximately 3,000 tonnes of pit lake water from existing Boags and VB pits (Figure 4, Appendix 2) are proposed to be used for dust suppression. The pit water will be used until a bore field is developed under groundwater licence GWL204119(1) to take 250,000kL annually for dewatering and dust suppression.

The applicant also intends to discharge hypersaline brine from the reverse osmosis plants to the Boags pit lake. This is further discussed in section 3.4.

These activities, whilst not triggering a requirement for category 6, are ancillary to prescribed activities and will be included as part of this Part V assessment.

2.2.4 Putrescible Landfill Facility

A class II category 64 landfill facility is proposed to be constructed and operated on M29/150 to accept 360 m^3/year of putrescible and inert wastes (Figure 1 – location "5"). No waste from external sources will be accepted. Waste materials from the following waste streams are proposed to be disposed of in the landfill facility:

- Putrescible waste;
- Inert Waste Type 1 (non-hazardous, non-biodegradable wastes, such as building rubble); and
- Inert Waste Type 2 (non-hazardous, non-biodegradable organic materials that shall be managed to prevent fire).

Hazardous wastes will not be accepted at the landfill. The workshop will have a laydown area for temporary storage of hazardous wastes that will be taken offsite for recycling or disposal.

The landfill will be a moving trench which incorporates a maximum open excavation of 50-100 m long by 4 m wide and up to a maximum 2 m deep (Figure 2).

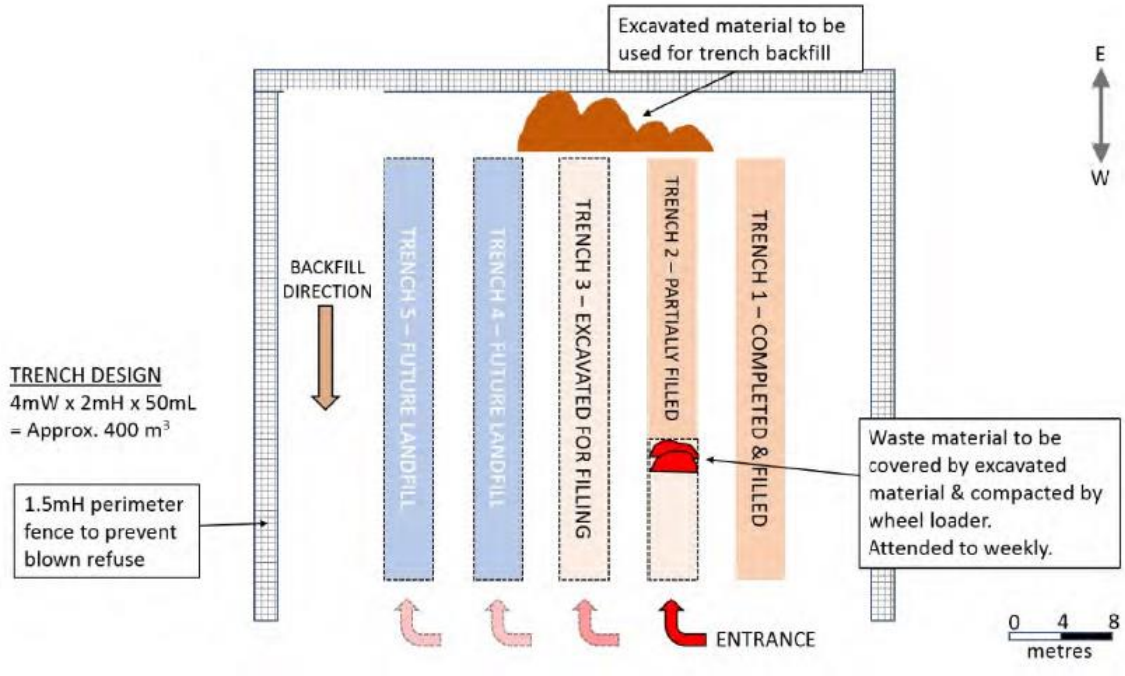

Figure 2: Proposed landfill layout

3. Risk assessment

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the *Guideline: Risk Assessments* (DWER 2020).

To establish a risk event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission.

3.1 Source-pathways and receptors

3.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises construction and operation which have been considered in this decision report are detailed in Table 2.

Table 2 also details the control measures the applicant has proposed to assist in controlling these emissions, where necessary. Noise emissions associated with construction and odour emissions from landfill activities have been discounted from the risk assessment as there are no nearby sensitive human receptors. The applicant has indicated the landfill will be isolated from the site accommodation village.

Table 2: Proposed applicant controls

Emission	Sources	Potential pathways	Proposed controls
Construction			
Dust	Construction of: • Gold processing plant; • IWL TSF • Landfill	Air/windborne pathway causing poor vegetation health/death for threatened flora	• Dust suppression using saline groundwater carried in water carts and infrastructure-mounted water spray nozzles. • During periods of high wind, topsoil handling will be restricted if dust cannot be adequately controlled.
		Air/windborne pathway causing impacts to malleefowl mounds during breeding season (1 September to 31 January)	Will operate under a Malleefowl Management Plan E-PLA- 005 which includes the following: • Gather baseline information, including spatial data regarding malleefowl within the project area • Record location of malleefowl sightings and active malleefowl mounds and any mortalities of protected or listed fauna • Liaise with DBCA • Undertake training and awareness of fauna management Clearing permit CPS9383/2 also contains conditions for protection of Malleefowl during clearing of native vegetation.

Emission	Sources	Potential pathways	Proposed controls
Commissioning			
Spills/leaks of process water contaminated with environmentally hazardous materials (metalloids, cyanide, processing plant reagents)	Commissioning of ore processing plant and associated pipelines	Direct discharge to land causing vegetation poor health/death for threatened flora and adjacent native vegetation	Commissioning will include (but is not limited to) the following: • Pressure testing of nominated pipework • Equipment installation and calibration checks (GR Engineering Services, 2021) At the time of commissioning the following controls will be in place to ensure no emissions to the environment: • Carbon in Pulp (CIP) circuit to be located on a concrete floor and bunded with a capacity of 110% of the largest CIP tank. • Stormwater from the process plant and plant area will be directed to spoon and v-drains established as part of the site earthworks and road construction, directing internal stormwater to staged sedimentation sumps to allow deposition of suspended material before discharge to the natural water courses. • Sumps inspected daily and surplus water pumped into the process water pond with sediment disposed in the IWL TSF. • Chemicals and hydrocarbons to be stored within double walled/bunded containment, designed to minimise the risk of contamination to the surrounding environment by containing any spilled products. • Lime for processing will be stored in a silo on a concrete pad and, being a dry powder, any spillage would be cleaned up by front end loader and shovel; • Spill response equipment will be available on each maintenance/service vehicle • Routine shift inspection for spillage and sump clearance. Recording of spills/incidents
Operation			
Processing plant and process water ponds			
Spills/leaks of process water contaminated with environmentally hazardous materials (metalloids, cyanide, processing plant reagents)	Operation of the processing plant	Direct discharge to land causing vegetation poor health/death for threatened flora and adjacent native vegetation	**Controls** • Carbon in Pulp (CIP) circuit to be located on a concrete floor and bunded with a capacity of 110% of the largest CIP tank. • Stormwater from the process plant and plant area will be directed to spoon and V drains established as part of the site earthworks and road construction,

Emission	Sources	Potential pathways	Proposed controls
Contaminated surface water run-off			directing internal stormwater to staged sedimentation sumps to allow deposition of suspended material before discharge to the natural water courses. • Sumps inspected daily and surplus water pumped into the process water pond with sediment disposed in the IWL/TSF • Chemicals and hydrocarbons to be stored within double walled/bunded containment, designed to minimise the risk of contamination to the surrounding environment by containing any spilled products. • Spill response equipment will be available on each maintenance/service vehicle • Routine shift inspection for spillage and sump clearance. Recording of spills/incidents **Monitoring** • Four groundwater monitoring bores will be installed surrounding the processing plant/ROM/workshop (see Figure 5) and baseline groundwater quality information collected over at least two monitoring occasions. The bores will then monitored quarterly thereafter.
Dust		Air/windborne pathway causing poor vegetation health/death for threatened flora	• Dust suppression using saline groundwater carried in water carts and infrastructure-mounted water spray nozzles. • During periods of high wind, topsoil handling will be restricted if dust cannot be adequately controlled.
Water contaminated with environmentally hazardous materials (metalloids, cyanide, processing plant reagents).	Process water pond (to accept decant return water from IWL TSF)	Seepage through base and embankments to soil and groundwater causing vegetation poor health/death	• Lined with high density polyethylene (HDPE) 2mm • Inspected daily
		Overtopping and direct discharge to land causing vegetation poor health/death	• Process Water Pond can be switched to pump back to the IWL TSF • Process control alarms for loss of containment • Designed and constructed with a lined overflow emergency sump. • 500mm freeboard to be maintained at all times • Inspected daily and monitored for overflow

Emission	Sources	Potential pathways	Proposed controls
Hypersaline dewater (firstly from pit lakes and eventually from mine dewater) potentially contaminated with metalloids	Raw water pond (raw water obtained from existing pit lakes and eventually mine dewater)	Seepage through base and embankments to soil and groundwater causing vegetation poor health/death	• Lined with high density polyethylene (HDPE) 2mm • Inspected daily
		Overtopping and direct discharge to land causing vegetation poor health/death	• Raw water pond overtops into the Process water Pond • 500mm freeboard to be maintained at all times • Inspected daily and monitored for overflow
IWL Tailings Storage Facility			
Tailings and contaminated water (metalloids, cyanide)	Discharge and storage of tailings in the IWL TSF	Seepage through base and embankments to soil and groundwater causing vegetation poor health/death and groundwater contamination	**Controls** • Underdrainage system by gravity to a collection tower. • Decant water will be collected from the IWL TSF via the decant tower and removed from the IWL by a pontoon mounted decant pump. Return water will be pumped directly to the process plant for reuse. • Ground preparatory works to create impermeable layer for IWL construction. • Recovery bores to be installed “should monitoring bores indicate seepage issues” **Monitoring** • Five groundwater monitoring bores will be installed surrounding the IWL TSF (see Figure 5) before the IWL TSF becomes operational (minimum 30 days) and baseline groundwater quality information collected over at least two monitoring occasions. The bores will then monitored every quarter thereafter. • Three pairs of vibrating wire piezometers installed in embankments • Annual remote sensing of vegetation condition, including baseline monitoring. • Daily inspection of the IWL TSF

		Overtopping of IWL TSF and direct discharge to land causing vegetation poor health/death	• Designed to accommodate a 1:100 yr. AEP, 72-hour duration storm event
			• The total freeboard for the IWL TSF will be 0.7 m which includes:
			  ○ 0.3 m operational freeboard;
			  ○ 0.2 m beach freeboard;
			  ○ And nominally 0.2 m allowance

Emission	Sources	Potential pathways	Proposed controls
			for a 1 in 100 year or 1% average exceedance probability (AEP) 72-hour storm event • Daily inspection of IWL freeboard
		Pipeline leak/rupture and direct discharge to land causing vegetation poor health/death	• Pipelines will be constructed from HDPE and placed in an unlined trench and within a pipe-type culvert as it passes under the site access road as it approaches the Processing Plant. • Pipelines constructed and installed to Australian Standards AS4130 and AS413 and Plastics Industry Pipe Association of Australia Limited (PIPA) Guideline POP003 • Transfer pipelines are connected to the processing plant control system which live monitors pressure in pipelines. In the event of an immediate drop in pressure within a pipeline, an alarm will be activated to notify mill control operators. The plant will be shut down immediately and to stop the flow • Pipelines to be visually inspected daily – return water & tailings • Pipelines to be stored in trenches sufficient to contain spillages between routine inspections
		Contaminated stormwater run-off	The applicant indicates that the IWL TSF has been located such that no major diversion or erosion protection associated with surface water run off or stormwater events is required, based on the site hydrological assessment (Hydrologia 2021; Attachment 8A). Hydrologia (2021) indicates that the IWL TSF is located to the northwest of a creek line that flows from the north/northeast, bypassing the IWL TSF to the west of the plant site. A small catchment extends to the northeast of the IWL, and most flow from the catchment is concentrated in a flow path that passes to the south of the IWL.
Dust from tailings beaches		Air/windborne pathway causing poor vegetation health/death for threatened flora	No controls proposed

Emission	Sources	Potential pathways	Proposed controls
Pit dewatering (ancillary to prescribed activities)			
Hypersaline brine, potentially contaminated with environmentally hazardous materials (metalloids) from the existing pit lake	Discharge of hypersaline brine from reverse osmosis plant into pit lakes	Seepage through base and embankments to soil and groundwater causing vegetation poor health/death and groundwater contamination	No controls proposed.
Hypersaline water, potentially contaminated with environmentally hazardous materials (metalloids)	Dewatering of existing pit lakes for dust suppression	Over-spraying of saline dewater for dust suppression causing vegetation poor health/death	No controls proposed
Landfill operation			
Dust	Operation of a category 64 landfill	Air/windborne pathway causing impacts to adjacent threatened flora and native vegetation	• Water cart to be used as required.
Windblown waste		Air/windborne pathway causing impacts to health and amenity	• Will be placed in trenches and covered on a weekly basis. • The applicant indicates that a fence placed around the landfill will act as a barrier to windblown waste. • Any waste that is blown outside of the landfill will be returned to the tipping area at least once every month.
		Fauna access/scavenging	• Fence to be placed around the boundary of the landfill to ensure barrier in place to prevent fauna from accessing the waste material. • Gates kept closed when no access required. • Daily inspections • Waste covered weekly. Frequency of waste covering to be increased if fauna observed trapped in trenches or scavenging.
Leachate		Seepage through base and	No controls proposed. The applicant has indicated that the waste

Emission	Sources	Potential pathways	Proposed controls
		embankments to soil and groundwater causing vegetation poor health/death and groundwater contamination	facility has been “sited on higher ground, approximately 26-44m above groundwater level”.
Contaminated surface water		Surface water run off causing contamination of nearby ephemeral creek lines	No controls proposed

3.1.2 Receptors

In accordance with the *Guideline: Risk Assessment* (DWER 2020), the Delegated Officer has excluded the applicant’s employees, visitors, and contractors from its assessment. Protection of these parties often involves different exposure risks and prevention strategies, and is provided for under other state legislation.

Table 3 and Figure 3 below provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises *(Guideline: Environmental Siting* (DWER 2020)). The premises is approximately 73 km north-west of the nearest town Menzies.

Table 3: Sensitive human and environmental receptors and distance from prescribed activity

Environmental receptors	Distance from prescribed activity
RIWI Goldfields Groundwater Area	Groundwater depth: 28.9 - 44.3 metres below ground surface (mbgs) within semi-confined to confined aquifers (Groundwater Development Services, 2019) Groundwater quality: Marginal (500mg/L total dissolved solids [TDS]) to hypersaline (35,000mg/L TDS) depending on the area. Existing groundwater sources indicate elevated concentrations of: • sulfate 530mg/L - 4,460mg/L; • nitrate (0.2mg/L – 15.7mg/L); • boron (0.5 – 11.9mg/L); and minor concentrations of metals: • arsenic (0.001 - 0.240mg/L); • barium (0.005 – 0.089mg/L); and • manganese (0.001 – 2.42mg/L). (Groundwater Development Services, 2019)
Threatened ecological community (TEC): Priority 1 Perrinvale/Walling vegetation complex (Figure 3)	2.3km west of prescribed premises boundary
Threatened fauna Long-tailed dunnart (*Sminthopsis longicaudata)* Malleefowl (*Leipoa ocellata*) (Figure 3)	– 1.8km west of prescribed premises boundary ~2.5km west of the prescribed premises boundary. The applicant has also indicated the site and 40km surrounds are potential habitat for Malleefowl for foraging. DMIRS assessed potential impacts to Malleefowl and Priority flora during the assessment of vegetation clearing permit application CPS 9383/1. The permit includes a condition requiring searches for active Malleefowl mounds within two weeks prior to clearing, if undertaking clearing during the Malleefowl breeding season, and no clearing within 50 metres of identified active mounds, unless first approved by the CEO. DWER notes that while the native vegetation permit will cover the Malleefowl mounds affected by vegetation clearing, it will not cover on-going impacts (e.g. dust) to remaining nearby Malleefowl mounds, which will be considered under this Part V assessment.
Priority Flora • Priority 1 flora - Jacksonia lanicarpa populations (Figure 3 and Appendix 2 - Figure 6, Figure 7) • One Priority 1 (Drosera eremaea); • Two Priority 3 (Calotis sp. Perrinvale Station) • Two Priority 4 (Hemigenia exilis,	Multiple Priority 1 Jacksonia lanicarpa populations are within the prescribed premises. The applicant has indicated “The taking of Priority flora (Jacksonia lanicarpa P1) will be regulated under clearing permit CPS 9383 and Department of Biodiversity, Conservation and Attractions (DBCA) has been advised of the presence of a Priority flora”.

Lepidosperma lyonsii). (Figure 3)	DMIRS clearing permit CPS 9383/1 includes a condition stipulating a maximum number of individuals of Priority 1 species Jacksonia lanicarpa to be impacted. DWER notes that while the native vegetation permit will cover the Jacksonia planned for clearing, it will not cover on-going impacts (i.e. dust/seepage) to remaining Jacksonia populations, which will be considered under this Part V assessment.
Ephemeral creek lines Bottle Creek (Figure 3)	Bottle Creek and a number of ephemeral creek lines intersect with the project area. The applicant states the project areas lies in the headwaters of Bottle Creek which eventually drains to Lake Ballard, a RAMSAR listed wetland. As Lake Ballard is ~20km south-east of the prescribed premises, the proposed activities are unlikely to have a negative impact on the lake. (Page 16, Aurenne Mining 2021)

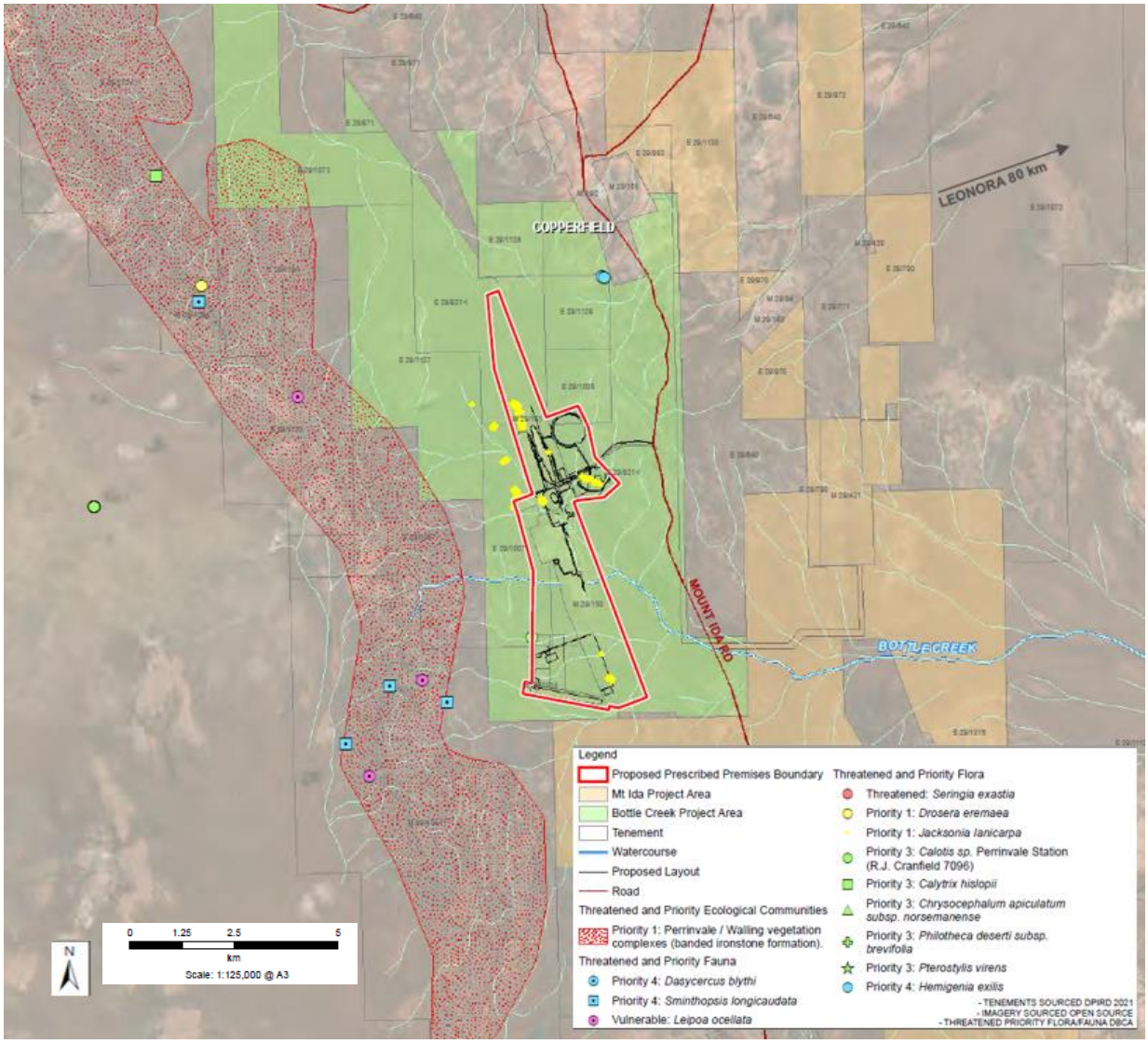

Figure 3: Distance to sensitive receptors (Aurenne Mining, 2021)

3.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for each identified emission source and takes into account potential source-pathway and receptor linkages as identified in Section 3.1. Where linkages are in-complete they have not been considered further in the risk assessment.

Where the applicant has proposed mitigation measures/controls (as detailed in Section 3.1), these have been considered when determining the final risk rating. Where the delegated officer considers the applicant's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the works approval as regulatory controls.

Additional regulatory controls may be imposed where the applicant's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 4.

Works approval W6640/2022/1 that accompanies this decision report authorises construction and time-limited operations. The conditions in the issued works approval, as outlined in Table 4 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

A licence is required following the time-limited operational phase authorised under the works approval to authorise emissions associated with the ongoing operation of the premises i.e. category 5, 7 and 64 activities. A risk assessment for the operational phase has been included in this decision report, however licence conditions will not be finalised until the department assesses the licence application.

Table 4: Risk assessment of potential emissions and discharges from the premises during construction, commissioning and operation

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
Construction								
Construction of: • Gold processing plant; • IWL TSF • Landfill	Dust	Air/windborne pathway causing poor vegetation health/death for threatened flora and nearby threatened fauna	Priority flora within prescribed premises (Jacksonia lanicarpa) Adjacent native vegetation Nearby threatened fauna Malleefowl mounds during breeding season (1 September to 31 January)	Refer to Section 3.1	C = Moderate L = Unlikely **Medium Risk**	N	Conditions 1 and 2 – dust management Condition 3 – malleefowl survey	Applicant proposed dust suppression with a water cart has been included within the works approval as a regulatory control. <u>DWER control – saline water for dust management:</u> Additional regulatory control to prevent over-spraying of saline water during dust management has been placed on the works approval. Note that, due to presence of priority flora within the prescribed premises, DWER has conditioned that water must be applied in a manner to avoid damage to native vegetation, such as from over-spraying or run off (condition 2). See section 3.4 for further discussion. <u>DWER control – malleefowl management</u> The applicant has proposed gathering baseline information, including spatial data for malleefowl within the project area. To mitigate the risk to malleefowl and their habitat, where construction works will be undertaken during the breeding season (September to end January), a requirement for a survey and

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
								management action if any active malleefowl mounds are identified has been placed on the works approval as a regulatory control.
Commissioning								
Commissioning of ore processing plant and associated pipelines	Spills/leaks of process water contaminated with environmentally hazardous materials (metalloids, cyanide, processing plant reagents)	Direct discharge to land causing vegetation poor health/death for threatened flora and adjacent native vegetation	Priority flora within prescribed premises (Jacksonia lanicarpa) Adjacent native vegetation Nearby threatened fauna Ephemeral creek lines	Refer to Section 3.1	C = Moderate L = Possible **Medium Risk**	Y	Condition 13, 14 – environmental commissioning	The Delegated Officer considers that the Applicant proposed control for equipment testing and calibration of the process plant, pipelines and associated infrastructure are acceptable and has included these within the works approval as regulatory controls.
Time Limited Operations								
Processing plant and process water ponds								
Operation of the processing plant	Spills/leaks of process water contaminated with environmentally hazardous materials (metalloids, cyanide, processing plant reagents) Contaminated surface water run-off	Direct discharge to land causing vegetation poor health/death for threatened flora and adjacent native vegetation	Priority flora within prescribed premises (Jacksonia lanicarpa) Adjacent native vegetation Nearby threatened fauna Ephemeral creek lines	Refer to Section 3.1	C = Moderate L = Possible **Medium Risk**	Y	Condition 4, 5 – construction requirements	The Delegated Officer considers that the Applicant proposed controls for spill/leak and contaminated surface water management are acceptable and has included these within the works approval as regulatory controls.
	Dust	Air/windborne pathway causing	Priority flora within prescribed	Refer to Section 3.1	C = Moderate	N	Conditions 1 and 2 – dust	The Delegated Officer considers that the Applicant

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
		poor vegetation health/death for threatened flora	premises (Jacksonia lanicarpa) Adjacent native vegetation Nearby threatened fauna		L = Unlikely **Medium Risk**		management	proposed control for dust suppression with a water cart is acceptable and has included this within the works approval as a regulatory control. <u>DWER control:</u> Additional regulatory control to prevent over-spraying of saline water during dust management has been placed on the works approval.
Process water pond (to accept decant return water from IWL/TSF, overflow from the raw water pond and supernatant water from the pre-leach thickener overflow)	Water contaminated with environmentally hazardous materials (metalloids, cyanide, processing plant reagents).	Seepage through base and embankments to soil and groundwater causing vegetation poor health/death	Priority flora within prescribed premises (Jacksonia lanicarpa) Adjacent native vegetation Nearby threatened fauna (reliant on vegetation)	Refer to Section 3.1	C = Moderate L = Unlikely **Medium Risk**	Y	Condition 5 – requirement for pond to be HDPE lined Condition 21 – time limited operations - inspection for liner integrity	The Delegated Officer considers that the Applicant proposed HDPE lining to manage seepage is acceptable and has included this within the works approval as a regulatory control.
		Overtopping and direct discharge to land causing vegetation poor health/death		Refer to Section 3.1	C = Moderate L = Possible **Medium Risk**	Y	Condition 5 – requirement for 500m freeboard, control alarms and designed to contain a one in one hundred-year 72 hours ARI rainfall event. Condition 21 – time limited operations – maintenance of freeboard	The Delegated Officer considers that the Applicant proposed controls to manage overtopping are acceptable and has included these within the works approval as regulatory controls.
Raw water pond (raw water obtained from existing pit lakes and	Hypersaline dewater (firstly from pit lakes	Seepage through base and embankments to	Priority flora within prescribed premises	Refer to Section 3.1	C = Moderate	Y	Condition 5 – requirement for pond to be	The Delegated Officer considers that the Applicant proposed HDPE lining to

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
eventually mine dewater)	and eventually from mine dewater) potentially contaminated with metalloids	soil and groundwater causing vegetation poor health/death	(Jacksonia lanicarpa) Adjacent native vegetation Nearby threatened fauna (reliant on vegetation)		L = Unlikely **Medium Risk**		HDPE lined Condition 21 – time limited operations - inspection for liner integrity	manage seepage is acceptable and has included this within the works approval as a regulatory control
		Overtopping and direct discharge to land causing vegetation poor health/death		Refer to Section 3.1	C = Moderate L = Possible **Medium Risk**	Y	Condition 5 – requirement for 500m freeboard and control alarms Condition 21 – time limited operations – maintenance of freeboard	The Delegated Officer considers that the Applicant proposed controls to manage overtopping are acceptable and has included these within the works approval as regulatory controls.
Processing plant and process water ponds								
Discharge and storage of tailings in the IWL TSF	Tailings and contaminated water (metalloids, cyanide)	Seepage through base and embankments to soil and groundwater causing vegetation poor health/death and groundwater contamination	Priority flora within prescribed premises (Jacksonia lanicarpa) Adjacent native vegetation TEC (perrinvale/walling vegetation complex) Nearby threatened fauna (reliant on vegetation) Nearby ephemeral creek lines	Refer to Section 3.1	C = Moderate L = Unlikely **Medium Risk**	N	Condition 4 – construction requirements Condition 6 – groundwater monitoring well installation requirements **Condition 20 – tailings source** **Condition 23 – tailings characterisation** **Condition 25 – groundwater monitoring and standing water level limits** **Condition 26 – 27 –**	See section 3.3

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
							<u>groundwater monitoring limit exceedances</u> Condition 28 – reporting requirements Condition 29 – monitoring of water balance Condition 30 – baseline assessment of vegetation health by remote sensing	
		Overtopping of IWL TSF and direct discharge to land causing vegetation poor health/death	Priority flora within prescribed premises (Jacksonia lanicarpa) Adjacent native vegetation Nearby threatened fauna (reliant on vegetation) Nearby ephemeral creek lines	Refer to Section 3.1	C = Moderate L = Unlikely **Medium Risk**	Y	Condition 21 – operational requirements – 0.7m total freeboard	The Delegated Officer considers that the Applicant proposed control for 0.7m total freeboard is acceptable and has included this within the works approval as a regulatory control.
		Pipeline leak/rupture and direct discharge to land causing vegetation poor health/death		Refer to Section 3.1	C = Moderate L = Possible **Medium Risk**	N	Condition 4 – construction requirements	The Delegated Officer considers that the Applicant proposed controls for pipeline leak/rupture are generally acceptable and has included these within the works approval as regulatory controls. <u>DWER controls:</u> To further mitigate the risk associated with pipeline leaks/rupture, the Delegated Officer has included an additional requirement that the system has an operator alarm and automatic shut-off of pumping systems for a

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
								variation in flow rates by more than 5% for 10 minutes or more than 10% for two minutes.
	Tailings and contaminated water – decant pond (metalloids, cyanide)	Ingestion by wildlife, birds (decant pond water)	Nearby threatened fauna and native wildlife	Refer to Section 3.1	C = Moderate L = Possible **Medium Risk**	N	**Condition 21 - decant pond upper limit of 50mg/L weak acid dissociable cyanide (WAD) OR tailings storage facility to be netted and fenced to restrict access to birds and wildlife.** **Condition 24 – decant pond monitoring**	The International Cyanide Management Institute (2021) guidance indicate "One of the few numerical guidelines included in the Code is a 50 mg/L WAD cyanide limit for exposure of birds, other wildlife and livestock. This recommended limit is based on evidence that solutions with up to 50 mg/L WAD cyanide are typically non-lethal to wildlife. Operations that restrict access by birds and other wildlife to open waters above this level are typically in full compliance with this Standard of Practice" Therefore, DWER has placed a requirement to either limit the WAD cyanide of the of the decant pond to 50mg/L OR restrict access by birds and wildlife using netting and fencing.
	Dust from tailings beaches	Air/windborne pathway causing poor vegetation health/death for threatened flora	Priority flora within prescribed premises (Jacksonia lanicarpa) Adjacent native vegetation Nearby threatened fauna (reliant on vegetation)	Refer to Section 3.1	C = Slight L = Unlikely **Low Risk**	Y	N/A	Erosion of tailings beaches during short duration of time limited operations is unlikely to cause impact to sensitive receptors. No additional regulatory controls applied

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
Discharge of RO brine and pit dewatering (ancillary to prescribed activities)								
Discharge of hypersaline brine from reverse osmosis plant into pit lakes and Dewatering of existing pit lakes for dust suppression	Hypersaline water, potentially contaminated with environmentally hazardous materials (metalloids)	Over-spraying of saline dewater for dust suppression causing vegetation poor health/death	Priority flora within prescribed premises (Jacksonia lanicarpa) Adjacent native vegetation Nearby threatened fauna (reliant on vegetation) Nearby ephemeral creek lines	No controls proposed	C = Moderate L = Possible **Medium Risk**	N	Condition 2 – dust management	See section 3.4
Landfill operation								
Operation of a category 64 landfill	Dust	Air/windborne pathway causing impacts to adjacent threatened flora and native vegetation	Priority flora within prescribed premises (Jacksonia lanicarpa) – 150m north east of landfill Adjacent native vegetation and nearby threatened fauna	Refer to Section 3.1	C = Moderate L = Unlikely **Medium Risk**	Y	Conditions 1 and 2 – dust management	The Delegated Officer considers that the Applicant proposed control for dust suppression with a water cart is acceptable and has included this within the works approval as a regulatory control.
	Windblown waste	Air/windborne pathway causing impacts to adjacent threatened flora and native vegetation	Priority flora within prescribed premises (Jacksonia lanicarpa) Adjacent native vegetation	Refer to Section 3.1	C = Moderate L = Unlikely **Medium Risk**	Y	Condition 21 – time limited operations - landfill	The Delegated Officer considers that the Applicant proposed control for windblown waste management by placement within trenches and weekly covering to be acceptable and has included these within the works approval as regulatory

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
								controls.
		Fauna access/scavenging	Nearby threatened and native fauna	Refer to Section 3.1	C = Moderate L = Possible **Medium Risk**	Y	Condition 5 – construction – fencing Condition 21 – time limited operations – landfill	The Delegated Officer considers that the Applicant control for fencing to prevent fauna interactions is acceptable and has included this within the works approval as a regulatory control.
	Leachate	Seepage through base and embankments to soil and groundwater causing vegetation poor health/death and groundwater contamination	Priority flora within prescribed premises (Jacksonia lanicarpa) Adjacent native vegetation and nearby threatened fauna	Refer to Section 3.1	C = Moderate L = Rare **Medium Risk**	Y	N/A	The Delegated Officer considers that as groundwater is deep (>20m), contamination with leachate has been assigned a 'rare' likelihood criteria. No additional regulatory controls have been added to the works approval.
	Contaminated surface water	Surface water run off causing contamination of nearby ephemeral creek lines	Nearby ephemeral creek lines (closest 400m south east)	No controls proposed	C = Moderate L = Unlikely **Medium Risk**	N	Condition 5 – construction and location	The Delegated Officer has placed a requirement that the landfill must be located at least 100m from any permanent or perennial watercourse.

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guideline: Risk Assessments* (DWER 2020).

Note 2: Proposed applicant controls are depicted by standard text. **Bold and underline text** depicts additional regulatory controls imposed by department.

3.3 Detailed risk assessment – Integrated Waste Landform Tailings Storage Facility (IWL TSF)

3.3.1 Source

Tailings Characterisation

Graeme Campbell and Associates (GCA, 2021) investigated the chemical and physical properties of six tailings samples selected to represent stage 1 of the proposed mining areas. Each sample was subjected to grinding and cyanide leaching to replicate the proposed process plant conditions. All tailings samples were found to be non-acid forming, reflective of a negligible sulfide content (0.005 – 0.042%). Aurenne (2021) indicate that whilst stage 1 of the project will mine non-acid forming material, further stages may encounter potential acid forming material (PAF) and will be managed by encapsulation in cells within either waste rock landforms (WRL's or within the IWL).

The tailings-slurry-water samples (data available in Appendix 1, Table 9) were mildly-alkaline (pH 8.7-9.2), and hypersaline (total dissolved solids, 35g/L), with weak-acid-dissociable cyanide concentrations (CN_{WAD}) of 21-106mg/L. Whilst arsenic, antimony, selenium and molybdenum were found to be elevated within the tailings solids, they were detected in concentrations of less than 100µg/L within the tailings-slurry water. GCA (2021) indicated that as these elements were largely retained within the tailings solids they are therefore stable under aerobic, saline, alkaline conditions.

Estimated Seepage

CMW (2021) has modelled seepage from the TSF to be approximately 64 - 73m^3/day. The model used material permeabilities derived from a geotechnical site investigation undertaken by CMW (2021). CMW incorporated this seepage modelling into an estimated water balance for the site. Assumptions for the water balance include:

- tailings are proposed for deposition at 42% solids;
- a tailings area of ~26.3ha;
- low permeability base layer 1 x 10^{-6} m/s; and
- a decant pond area ~3% of the tailings area.

CMW have indicated that water recovery will vary according to the size of the decant pond and running beaches, but that under average climatic conditions, expected decant return will be 55 to 60% of the tailings slurry water.

3.3.2 Pathway

Hydrogeology

The project area lies within the Rebecca and Raeside subareas of the Goldfields which include fractured rock and paleochannel aquifers. Areas of faulting/shearing control the occurrence and movement of groundwater. Groundwater qualities are generally considered poor and unsuitable for non-potable and stock watering if untreated. Standing groundwater levels onsite (measured from existing groundwater abstraction bores on site and open pits) vary between 28.9m and 44.3m below surface. Pendragon (2021) indicate very little is known about the hydraulic parameters, transmissivities (i.e. the ability for groundwater to move) or aquifers underlying the project area itself. Pendragon (2021) indicate that, in the absence of groundwater level data, groundwater flow direction is likely to imitate the local and regional topography and drainage features and flow in a general southerly direction.

The surficial geology underlying the proposed TSF was gathered by CMW (2021) using data from 9 test pits (to 0.8 meters below ground level [mbgl]) and four boreholes (to a maximum depth of 21.5 mbgl) and comprised sandy clay rich gravel to an average depth of 6.1 mbgl, overlying clayey silts which grade to metamorphosed mafic rock from depths of more than 20 mbgl. Groundwater was not encountered in any of the boreholes advanced. Permeability within these near surface soils ranged from 8.9 x 10^{-5}m/s (7.7m/day) and 4.2 x 10^{-6}m/s (0.36m/day). The in-situ materials recovered from the test pits are proposed to be used as the foundation in the construction of the IWL. These materials are proposed to be tyned, moisture conditioned and roller compacted to provide a low permeability layer at the base to nominally 1x10^{-6} m/s.

Baseline groundwater information

Groundwater quality within the project area was characterised by Groundwater Development Services (2019), whereby samples were taken from existing groundwater abstraction bores and open pits (Table 5). Total dissolved solids range between marginal (598mg/L Mt Ida bore) to hypersaline (33,900mg/L) and pH ranged from 7.6 - 8. Samples indicate elevated concentrations of:

- sulfate 530mg/L - 4,460mg/L;
- nitrate 0.2mg/L – 15.7mg/L;
- boron 0.5 – 11.9mg/L;

and minor concentrations of metals:

- arsenic 0.001 - 0.240mg/L;
- barium 0.005 – 0.089mg/L; and
- manganese 0.001 – 2.42mg/L.

Table 5: Groundwater quality

Analyte	Bores					Open Pits	
	Tim's Find	Emu	Mt Ida	Shepherds	Boag	Boags	VB
pH Value	8.0	7.6	7.9	7.6	7.8	8.3	8.2
Electrical Conductivity	4,940	22,200	885	18,800	12,200	37,800	40,300
Total Dissolved Solids	3,220	16,600	598	12,500	8,000	29,700	33,900
Total Alkalinity as $CaCO_3$	294	162	44	314	122	134	106
Sulfate	530	2,200	67	2,200	1,030	4,460	4,000
Chloride	1,020	7,330	204	5,850	3,550	12,900	14,300
Calcium	123	543	29	269	266	686	1,140
Magnesium	183	703	24	544	369	1,320	1,520
Sodium	678	3,430	111	3,200	1,970	6,800	6,970
Potassium	20	174	7.0	83	86	241	246
Fluoride	0.2	0.8	0.2	1.0	1.0	0.7	1.1
Nitrite as N	<0.01	<0.01	<0.01	<0.01	0.4	0.04	<0.01
Nitrate as N	15.7	11.8	7.97	<0.01	4.3	1.08	0.2
Dissolved Metals							
Arsenic	0.002	0.107	0.001	0.001	0.047	0.089	0.240
Barium	0.005	0.026	0.089	0.024	0.007	0.061	0.076
Manganese	0.002	0.014	0.001	2.42	0.025	0.025	0.087
Nickel	<0.001	0.014	0.007	0.018	0.001	<0.005	<0.005
Zinc	<0.005	<0.025	0.104	0.007	0.016	<0.025	<0.025
Boron	1.22	6.96	0.5	8.66	4.72	11.9	9.43

Notes:
pH in pH units.
Electrical Conductivity in µS/cm.
All other analytes in mg/L.
The following dissolved metals occur sporadic and in very low concentrations: Cadmium, Chromium, Cobalt and Copper.
The following dissolved metals are absent: Aluminium, Beryllium, Lead, Molybdenum and Mercury.

3.3.3 Proposed seepage management and monitoring

The applicant is proposing the following controls to manage seepage from the TSF:

- Underdrainage system by gravity to a decant tower, decant water then removed by pump and return water pumped directly to the process plant for reuse;
- Ground preparatory works to create a 300mm low permeability layer for IWL construction. To reduce seepage, the subgrade of the IWL basin is proposed to be tyned, moisture conditioned and roller compacted to provide a 'low' permeability nominally 1 x 10^{-6} m/s.[1]
- Recovery bores to be installed "should monitoring bores indicate seepage issues"

The following monitoring program is proposed:

[1] This parameter was used for seepage estimates.

- Annual remote sensing of vegetation condition, including baseline monitoring.
- Daily inspection of the IWL TSF
- Five groundwater monitoring bores will be installed surrounding the IWL TSF (Figure 5) before the IWL becomes operational (minimum 30 days) and baseline groundwater quality information collected over at least two monitoring occasions. The bores will then be monitored every quarter thereafter. The bores are proposed for monitoring of standing water levels, pH, EC, TDS, weak acid dissociable cyanide (CN_{WAD}), Total Cyanide (CN).
- Installation of three pairs of piezometers in TSF embankments to detect seepage (and for assessment of stability etc.)

3.3.4 DWER assessment and regulatory controls

The closest receptors which may be sensitive to impacts from seepage are adjacent priority flora and native vegetation. As there are there are multiple Priority 1 *Jacksonia lanicarpa* populations within the prescribed premises, adjacent to the proposed IWL TSF, the consequence rating for impacts from seepage are considered "Moderate". As depth to groundwater is >20 mbgl and the modelled seepage from the TSF is relatively minimal (64 - 73m^3/day), the likelihood is considered as "Unlikely". The Delegated Officer therefore considers the overall risk rating impacts of seepage to adjacent priority and native vegetation to be "Medium".

The following DWER regulatory controls will be placed on the works approval.

Table 6: DWER regulatory controls (seepage)

Condition/control	Justification
Tailings: Condition 20 – tailings from Mt Ida project only Condition 23 – tailings characterisation	Only tailings from the Mt Ida project mine are permitted to be deposited into the IWL TSF. Tailings from other ore sources are not permitted (a works approval amendment will be required). Six tailings slurry samples were provided as representative samples for deposition into the IWL TSF. To verify the expected tailings composition, further tailings characterisation during time limited operations (10 samples) has been placed on the works approval.
Water balance: Condition 29 – water balance	While an estimated water balance has been provided, the seepage (~64-73m^3/day) calculated is approximate only, and likely to vary according to facility management. A requirement for monitoring monthly water balance during time limited operations has been placed on the works approval.
Tailings storage facility construction requirements Condition 4 - construction	Applicant proposed construction specifications to prevent seepage have been placed on the works approval as regulatory controls. Any known drill holes previously advanced within the foundation of the IWL TSF must also be filled and grouted to prevent formation of a preferential pathway for seepage to groundwater.
Infrastructure and equipment requirements during time limited operations Condition 21	Applicant proposed operational specifications to prevent seepage have been placed on the works approval as regulatory controls.
Groundwater monitoring Condition 6 - groundwater	The applicant proposes to install five groundwater monitoring bores surrounding the IWL TSF to monitor baseline groundwater

monitoring well construction Conditions 7, 25 – 28 – groundwater monitoring, limits and reporting	information and for on-going monitoring during operation. Installation of these monitoring bores, baseline monitoring and monitoring during and at the end of time limited operations have been placed on the works approval as a regulatory control. The applicant also proposes installation of three pairs of piezometers to give an early warning for seepage (and for assessment of stability etc). Installation of monitoring of piezometers has been placed on the works approval as a regulatory control. The applicant has only proposed monitoring for pH, EC, TDS, WAD CN and total CN. As there are other additional relevant contaminants of concern associated with deposition of tailings into the IWL TSF, additional analytes have been added to the works approval. Analytes for on-going monitoring, post time limited operations, will be reviewed again at the time of the licence application. Additionally, to protect adjacent priority and native flora, a standing water level limit of 4m bgl has been placed on the works approval. A trigger for management action at 6m bgl has also been placed on the works approval as a control.
Baseline vegetation health assessment Condition 30 – baseline vegetation health assessment	The applicant proposed control for baseline monitoring of vegetation condition by remote sensing has been placed on the works approval as a regulatory control.

3.4 Detailed risk assessment – pit lakes

3.3.5 Pit lakes

The applicant intends to use water from the pit lakes for on-site dust suppression until the borefield is developed under groundwater licence GWL204119(1).

Table 7 displays Boags and VB pit water quality (Pendragon, 2021). The pit lakes are saline where samples taken from Boags and VB Pit indicated total dissolved solids at 29,700mg/L and 33,900mg/L respectively.

Hypersaline brine (up to 523kL/day) from the reverse osmosis plant is intended for discharge into Boags pit lake. The brine will be added to the pit lake and water extracted for dust suppression. The applicant eventually intends to re-mine Boags pit which will need to be completely dewatered over the next 1-2 years. Mounding of groundwater associated with seepage of pit water has therefore been discounted from the risk assessment.

Typical brine salinities from reverse osmosis plants range from 50,000mg/L- 75,000mg/L (Lenntech, 2022).

Table 7: Pit water quality (adapted from Pendragon 2021, Table 2.4)

Analyte (mg/L)	Unit	Boags Pit	"VB" Pit
pH	pH units	8.3	8.2
TDS	mg/L	29,700	33,900
Sulfate		4,460	4,000
Nitrite as N		0.04	<0.01
Nitrate as N		1.08	0.2
Arsenic		0.089	0.240
Barium		0.061	0.076
Manganese		0.025	0.087
Nickel		<0.005	<0.025
Zinc		<0.025	<0.025
Boron		11.9	9.43

DWER outcome

As typical RO brine salinities typically range from 50,000mg/L- 75,000mg/L, discharge of RO brine to the Boags pit will further increase pit lake salinity (already sampled at ~29,700mg/L). Given the nearby threatened adjacent flora, DWER considers that use of water from Boags pit for dust suppression is considered "Medium", with a risk rating of "moderate" and a likelihood of "possible".

DWER has therefore conditioned that water must be applied in a manner that avoids damage to native vegetation, such as from over-spraying or run off (condition 2).

4. Consultation

Table 8 provides a summary of the consultation undertaken by the department.

Table 8: Consultation

Consultation method	Comments received	Department response
Application advertised on the department's website on 3 February 2022	None received	N/A
Local Government Authority advised of proposal on 3 February 2022	None received	N/A
Department of Mines, Industry Regulation and Safety (DMIRS) advised of proposal 3 February 2022	DMIRS replied on 7 April 2022 stating the relevant mining proposal was under assessment with DMIRS and that the IWL design has been deemed acceptable with respect to geotechnical design. DMIRS also made comment with respect to clearing of native vegetation and Malleefowl mounds (detailed in section 3.1.2). The mining proposal and environmental registration has since been approved by DMIRS (21 April 2022).	
Applicant was provided with draft documents on 9 June 2022.	Refer to Appendix 3.	Refer to Appendix 3.

5. Conclusion

Based on the assessment in this decision report, the delegated officer has determined that a works approval will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

References

1. Aurenne Mining, 2021. Mt Ida Gold Project – Stage 1 Works Approval Application Supporting Information
2. CMW, 2021. Integrated Waste Landform Tailings Storage Facility Design Report, Bottle Creek Project, WA
3. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
4. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
5. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.
6. Graeme Campbell & Associates Pty Ltd, 2021. Mt Ida Project: Geochemical Assessment of Tailings-Slurry Samples Derived from the Emu, Southwark Tims Find and Boags Deposists – Implications for Tailings Management
7. GR Engineering Services, 2021. Mount Ida Gold Project Commissioning Plan
8. Hydrologia, 2021. Mt Ida Gold Project; Stage 1 Bottle Creek – Surface Water Assessment
9. Lenntech, 2022. Reverse Osmosis Desalination: Brine disposal. Available from: https://www.lenntech.com/processes/desalination/brine/general/brine-disposal.htm
10. Pendragon, 2021. Mt Ida Gold Project – Groundwater Asessment, Revision 2
11. Pendragon, 2022. Mt Ida Gold Project – Groundwater Monitoring Plan, Revision 5

Appendix 1: Tailings-slurry water analyses

Table 9: Tailings-slurry water analyses

ELEMENT/ PARAMETER	Emu-Oxide-Ore-Tailings (GCA11953)	Southwark-Oxide-Ore-Tailings (GCA11951)	Emu-Transitional-Ore-Tailings (GCA11954)	Tims-Find-Oxide-Ore-Tailings (GCA11949)	Southwark-Fresh-Ore-Tailings (GCA11952)	Boags-Transitional-Ore Tailings (GCA11950)	ELEMENT/ PARAMETER	Emu-Oxide-Ore-Tailings (GCA11953)	Southwark-Oxide-Ore-Tailings (GCA11951)	Emu-Transitional-Ore-Tailings (GCA11954)	Tims-Find-Oxide-Ore-Tailings (GCA11949)	Southwark-Fresh-Ore-Tailings (GCA11952)	Boags-Transitional-Ore-Tailings (GCA11950)
Major-Parameters							***Minor-Ions (µg/L)***						
pH	8.9	9.2	9.1	8.7	8.9	8.9	As	77	45	94	11	45	37
pH (GCA)	9.0	9.3	9.2	8.8	9.1	8.9	Sb	4	5	13	3	23	38
EC (µS/cm)	45,410	46,610	45,490	43,350	47,640	46,610	Se	20	20	10	10	540	540
EC (GCA, µS/cm)	45,600	46,000	45,900	42,600	47,000	46,100	B	1,500	2,300	5,900	1,100	5,000	3,400
TDS-(grav.)	35,145	34,694	34,479	35,571	35,770	34,948	Mo	7	20	152	32	10	7
Major-Ions (mg/L)							Mn	<10	10	260	40	<10	<10
							Al	200	<100	300	200	500	<100
Na	8,423	8,259	8,186	7,036	8,439	8,393	Cd	<0.2	<0.2	12.8	5.5	<0.2	<0.2
K	281	289	289	166	289	272	Pb	<20	<20	<20	<20	50	<20
Mg	930.7	1200.2	1,464.6	755.5	1581.9	1326.8	Cr	<50	<50	<50	<50	<50	<50
Ca	1,752.2	1,709.7	1,463.5	2,570.4	1,372.0	1,524.3	Bi	<200	<200	<200	<200	<200	<200
Cl	16,428	16,342	15,996	15,996	16,342	16,342	P	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000
SO4	3,560	4,160	4,550	2,120	4,720	4,390	Ba	105	94	95	185	45	65
HCO3 (as CaCO3)	13	<2	<2	3	7	13	Sr	7,602	7,456	7,103	9,034	7,254	7,386
CO3 (as CaCO3)	45	110	141	91	125	60	Tl	<500	<500	<500	<500	<500	<500
OH (as CaCO3)	<1	63	43	<1	<1	<1	V	<5	<5	<5	<5	<5	<5
F	0.7	0.6	0.5	<0.1	0.3	0.1	Sn	<5	<5	<5	<5	<5	<5
Si	2.1	0.8	3.0	3.8	5.0	5.5	U	0.5	0.2	2.1	0.3	0.2	<0.2
							Th	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Nitrogen-Forms (mg/L)							***Cyanide-Complexing Metals (mg/L)***						
NH3-N	4.7	5.3	4.9	1.5	4.6	3.5							
NO3-N	0.85	1.20	1.40	0.26	1.40	1.20	Fe	56.3	59.9	20.1	18.2	59.2	74.2
							Cu	7.30	2.61	2.38	4.59	8.84	3.31
Cyanide Forms (mg/L)							Zn	<0.2	0.2	2.6	0.2	0.9	0.4
							Ni	1.43	0.77	0.98	1.33	0.85	0.28
CNtot	158	247	155	144	211	202	Co	0.492	0.050	0.967	1.234	0.087	0.094
CNwad	21	105	106	97	70	27	Ag	0.01	0.02	0.07	0.02	1.20	0.24
CNfree	18	112	107	96	60	24	Hg	<0.005	<0.005	0.010	<0.005	<0.005	<0.005
SCN	17.59	17.50	8.28	8.06	21.39	23.19							

Notes:
EC = Electrical-Conductivity; TDS-(grav.) = Total-Dissolved-Solids-(gravimetric).
CNtot = Total-Cyanide; CNwad = Weak-Acid-Dissociable-Cyanide; CNfree = Free-Cyanide; SCN = thiocyanate.

Due to the elevated salinity, the detection-limits for numerous minor-elements were raised, and reflect dilution required to avoid matrix-interference effects in assaying.

N.B. The ordering of the Sample_IDs above approximates the proposed order of development of the respective Pits.

Appendix 2: Additional Figures

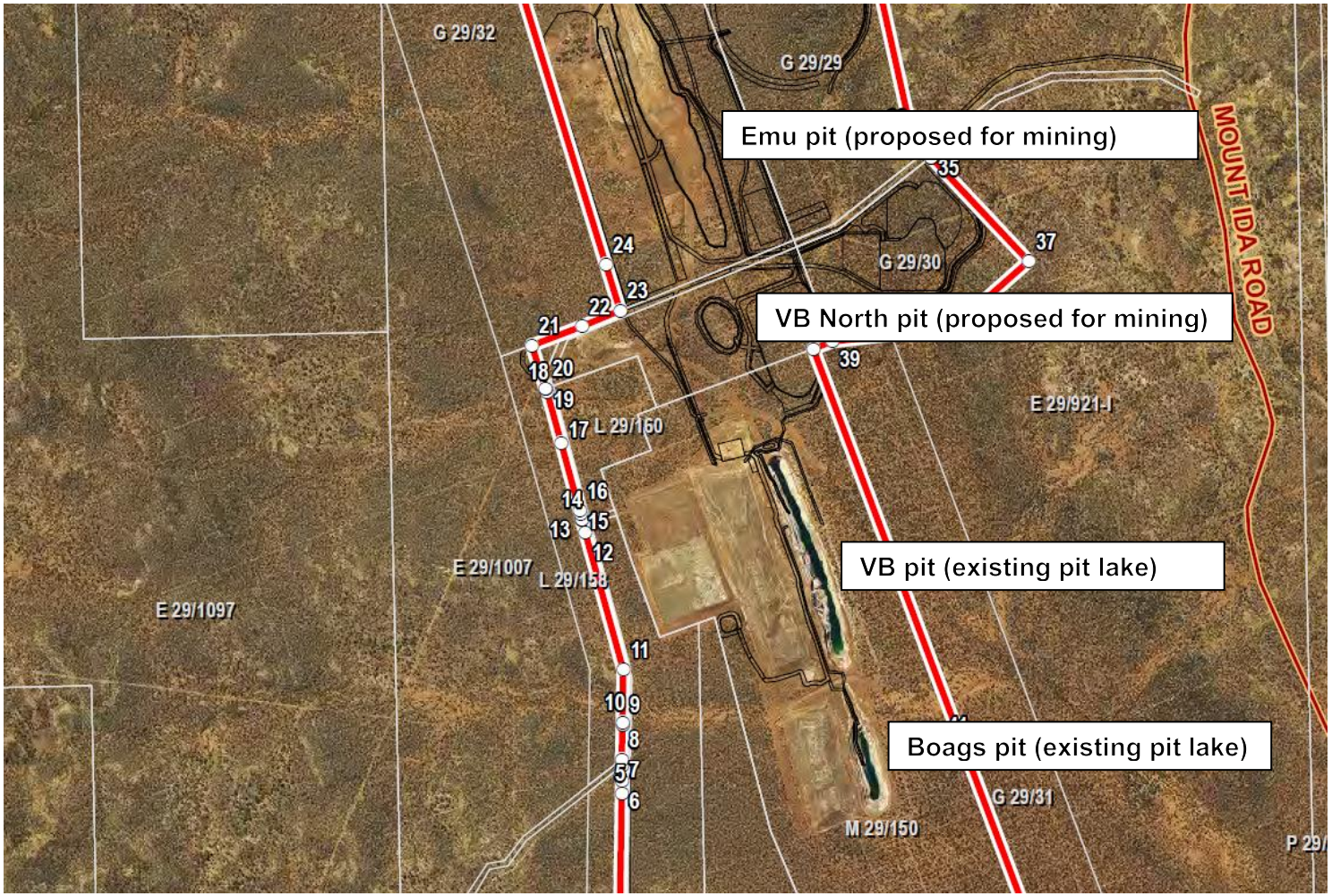

Figure 4: Pit lake locations

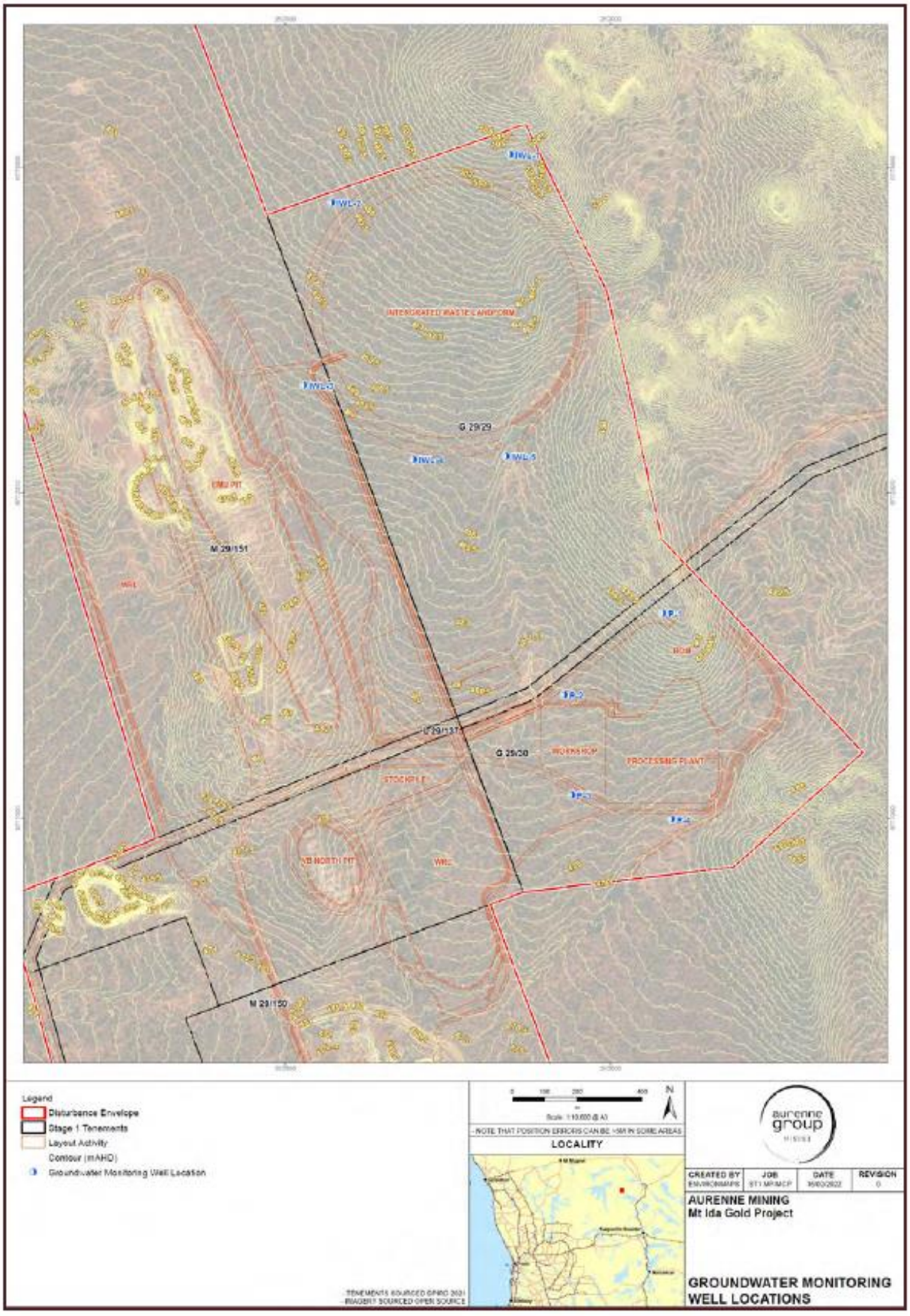

Figure 5: Proposed groundwater monitoring well locations

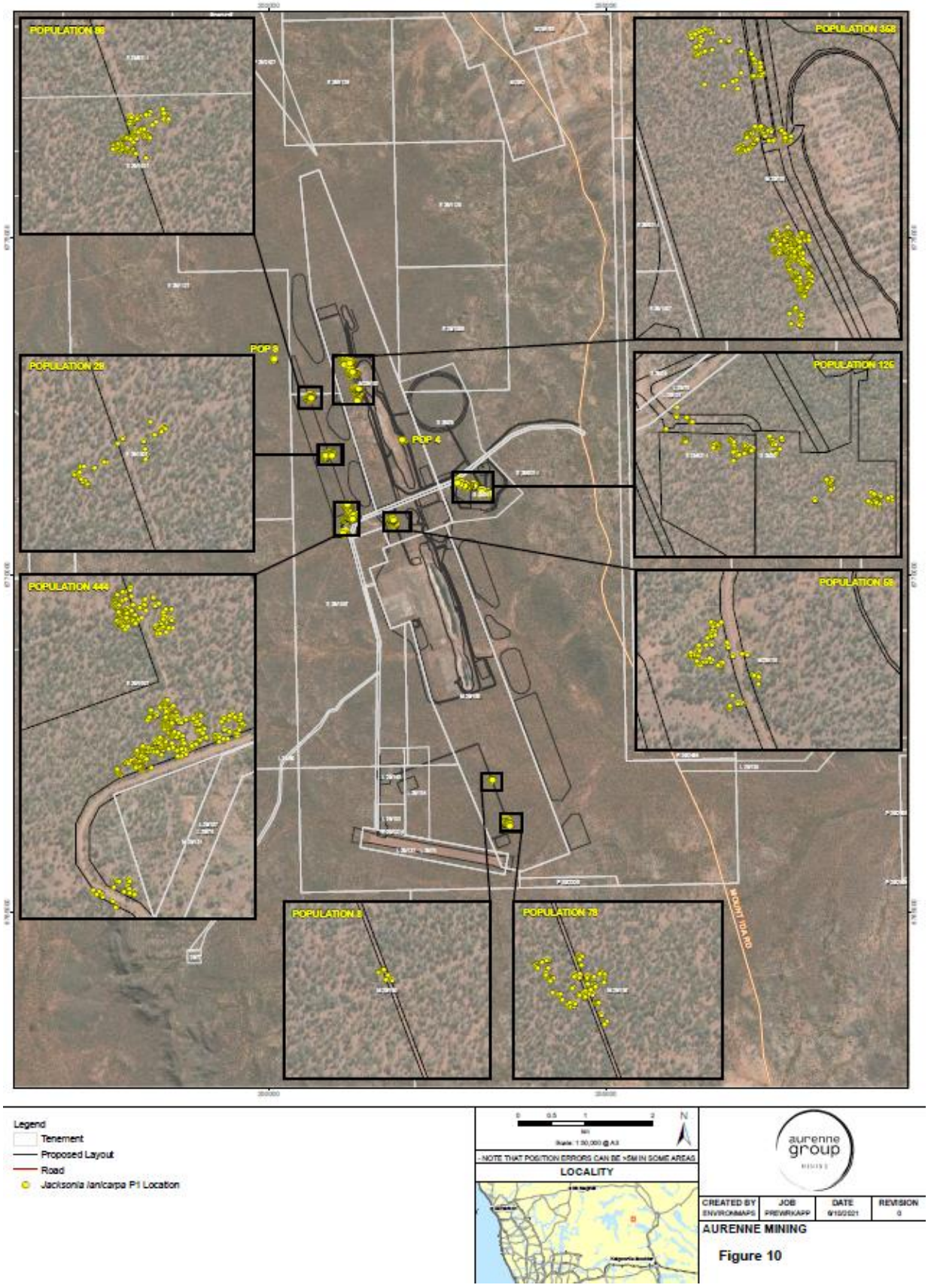

Figure 6: Distribution of Priority 1 flora - *Jacksonia lanicarpa*

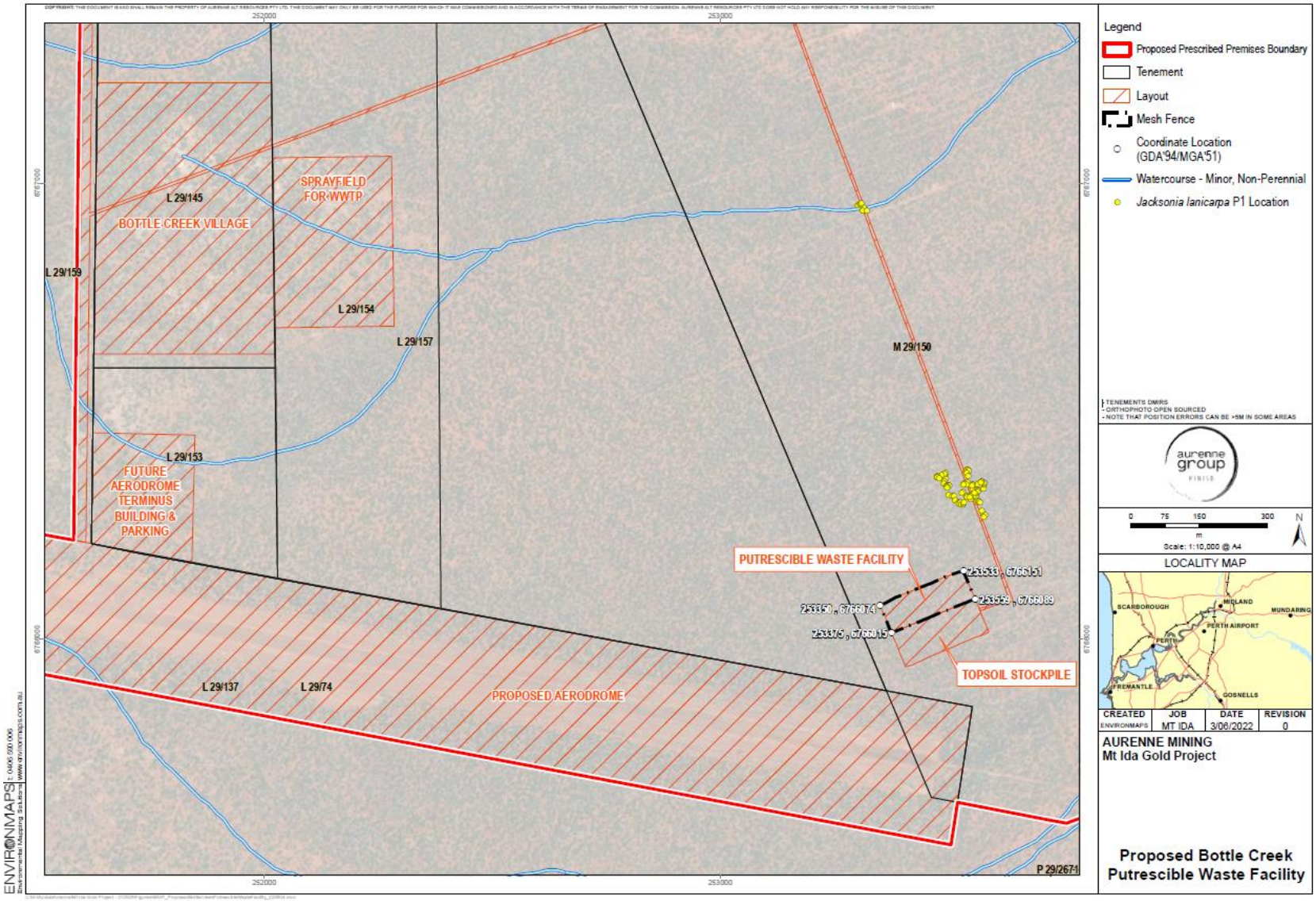

Figure 7: Distribution of *Jacksonia lanicarpa* flora in relation to category 64 landfill

Appendix 3: Summary of applicant's comments on risk assessment and draft conditions

Condition	Summary of applicant's comment	Department's response
4	The department requested clarification regarding the permeability of the 300mm compacted clay liner at the base of the TSF. Aurenne indicated that the permeability will be nominally $1x10^{-6}$ and that this was used for seepage estimates (64-73m^3/day).	The department has included a requirement for the compacted clay liner to have a permeability of $1x10^{-6}$m/s.
5	The department requested the proposed pipeline layout for the reverse osmosis plant and dewatering of pit lakes. The applicant replied that: "Pipelines associated with dewatering are not relevant to Stage 1. Stage 1b Mining Proposal is currently in preparation to include pipelines as tenements were not granted at the time of Stage 1 MPMCP Reg ID 101557 submission. A Works Approval amendment will be sought to include pipelines for the conveyance of brine, wastewater, and borefield saline waters once the pipeline network is finalised."	Following discussion with the applicant, the department has updated the scope in the decision report and removed category 6 from the instrument. Use of pit lake water for dust suppression will be included as an activity ancillary to prescribed activities.
10	Request commissioning duration of 6 months.	The authorised commissioning duration has been granted for a period not exceeding six months in aggregate. Note that commissioning activities conditioned in the works approval include testing of plant, bunds, sumps, process control alarms, pipeline, flow meters and pressure metres. The works approval holder should note the difference between commissioning and time limited operations, which may only commence once the relevant environmental compliance reports and the commissioning report has been submitted.
30	DWER requested detail regarding the remote sensing method proposed for vegetation assessment. The applicant provided the raw data and processing techniques which have been used at the site so far and have indicated that the same consultant will be commissioned for the 2022 scope of works to ensure integrity of the comparison of data. However, future annual remote sensing & comparative vegetation condition assessment will be appointed to a consultant based on an assessment of market-based proposal for the scope of works.	The department notes that remote sensing techniques may vary between consultants and that the works approval holder would seek to appoint different consultants according to market. Specific methodology has therefore not been listed, but a requirement to allow a direct comparison with baseline data has been placed in the condition so that the intent of the condition remains.

Appendix 4: Application validation summary

SECTION 1: APPLICATION SUMMARY		
Application type		
Works approval	☒	
Date application received		8 December 2021
Applicant and Premises details		
Applicant name/s (full legal name/s)		Aurenne MIT Pty Ltd
Premises name		Aurenne Mining, Mt Ida Gold Project; Bottle Creek Premises
Premises location		M 29/150, M 29/151, G 29/29, G 29/30, L 29/145, L 29/153, L 29/154, L 29/137, E 29/1007 & E 29/1014
Local Government Authority		Shire of Menzies
Application documents		
HPCM file reference number:		DER2021/000714
Key application documents (additional to application form):		Commissioning plan (Attachment 3A) Hydrologia 2021 Surface Water Assessment (Attachment 8A) Baseline soil characterisation survey (Attachment 8B) Pendragon 2021 Hydrogeological Assessment (Attachment 8C) TSF Design report (Attachment 8D) Tailings characterisation (Attachment 8E) Tailings test work GCA (Appendix J of design report – page 658) TSF operations manual (Appendix K of design report – page 730)
Scope of application/assessment		
Summary of proposed activities or changes to existing operations.		Works approval Cat. 5, 7 and 64 to allow for the processing of gold bearing ore to gold ore bars, disposal of tailings into an integrated waste landform (tailings facility); and to support the offices and accommodation village a putrescible and inert waste facility to bury appropriate types of waste. Categories 5 (processing and deposition into IWL TSF): The IWL has been designed to store approximately 6 Mt of tailings over a 6-year life assuming an ore processing rate of 1.2 Mtpa and a minimum tailings in-situ density of 1.5 t/m3 (dry). The IWL has a footprint of approximately 29 ha and will have a maximum embankment height of 28 m. Category 7 (vat leaching): 1.2 – 1.4Mtpa Category 64: expected volume of up to 360m3 per year <u>Environmental commissioning</u> Environmental commissioning of the Processing Plant and IWL (tailings storage facility) will be required for up to 16 weeks.

Category number/s (activities that cause the premises to become prescribed premises)

Table 1: Prescribed premises categories

Prescribed premises category and description	**Proposed production or design capacity**	***Proposed changes to the production or design capacity (amendments only)***
Category 5 – processing and beneficiation and metallic and non-metallic ore	1.2 – 1.4Mtpa	*Is there a proposed change to the previously assessed production or design capacity?*
Category 7 – Vat or insitue leaching of metal: premises on which metal is extracted from ore with a chemical solution	1.2 – 1.4Mtpa	
Category 64 (class II or III putrescible landfill)	expected volume of up to 360m3 per year	

Legislative context and other approvals

Has the applicant referred, or do they intend to refer, their proposal to the EPA under Part IV of the EP Act as a significant proposal?	Yes ☐ No ☒	Referral decision No: Managed under Part V ☐ Assessed under Part IV ☐
Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?	Yes ☐ No ☒	Ministerial statement No: EPA Report No:
Has the proposal been referred and/or assessed under the EPBC Act?	Yes ☐ No ☒	Reference No:
Has the applicant demonstrated occupancy (proof of occupier status)?	Yes ☒ No ☐	Certificate of title ☐ General lease ☐ Expiry: Mining lease / tenement ☒ Expiry: multiple mining lease – occupancy demonstrated Other evidence ☐ Expiry:
Has the applicant obtained all relevant planning approvals?	Yes ☒ No ☐ N/A ☐	Approval: Expiry date: Received DMIRS (stage 1 proposal) approval on 21 April 2022
Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes ☒ No ☐	A clearing permit (NVCP CPS 9383/1) to clear up to 1,000 hectares of native vegetation was granted on 4 February 2022
Has the applicant applied for, or have an existing CAWS Act clearing licence in relation to this proposal?	Yes ☐ No ☒	Application reference No: N/A Licence/permit No: N/A

Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes ☒ No ☐	Application reference No: Licence/permit No: GWL204119(1) – 250,000kL/annum entitlement CAW 26D license 204120(1) – to develop additional bores for future processing and potable water
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes ☒ No ☐	Name: Goldfields Groundwater Area Type: RIWI Act Has Regulatory Services (Water) been consulted? Yes ☐ No ☒ N/A ☐ Regional office: Goldfields
Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes ☐ No ☒	Name: N/A Priority: N/A Are the proposed activities/ landuse compatible with the PDWSA (refer to WQPN 25)? Yes ☐ No ☐ N/A ☒
Is the Premises subject to any other Acts or subsidiary regulations (e.g. *Dangerous Goods Safety Act 2004, Environmental Protection (Controlled Waste) Regulations 2004, State Agreement Act xxxx*)	Yes ☒ No ☐	*Mining Act 1978*
Is the Premises within an Environmental Protection Policy (EPP) Area?	Yes ☐ No ☒	
Is the Premises subject to any EPP requirements?	Yes ☐ No ☒	
Is the Premises a known or suspected contaminated site under the *Contaminated Sites Act 2003*?	Yes ☐ No ☒	Classification: N/A Date of classification: N/A