



Application for Works Approval

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

Works Approval Number W6939/2024/1

Applicant Crimson Metals Pty Ltd

ACN 169 977 155

File number DWERVT15028~3

Premises Mount Gibson Gold Project WWTP

Legal description:

Mining tenements M59/772, G59/72, L59/53

As defined by the premises maps attached in Schedule 1 to the issued works approval.

Date of report 20/09/2024

Decision Works approval granted

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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 W6939/2024/1 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 13 May 2024, Crimson Metals Pty Ltd (the applicant) submitted an application for a works approval to the department under section 54 of the *Environmental Protection Act 1986* (EP Act). The application proposes construction and operation of a Class II putrescible landfill facility (category 64) and sewage facility (category 85) at the Mount Gibson Gold Project (MGGP) (the 'premises').

The premises relates to the categories and assessed production / design capacity under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) which are defined in works approval W6939/2024/1. 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 W6939/2024/1.

The premises is located about 280 km northeast of Perth in the Avon Wheatbelt region. The applicant proposes to develop, construct and operate an Open Pit Gold Mine via cutbacks of historically mined open pits, with an ore processing plant and supporting infrastructure. Over the course of an 11 year mine life, the proposal is anticipated to process five million tonnes per annum (Mtpa) of ore and recover roughly 215 million tonnes (Mt) of waste.

The scope of this works approval assessment only covers the proposed landfill, wastewater treatment plant and sprayfield to support the accommodation village.

2.2.1 Category 64 activities

A Class II landfill is proposed to be built on the historical, inactive and inert MGGP Southern Tailing Storage Facility (TSF) to accept putrescible and inert waste generated in the village (Tetris Environmental 2024). The proposed landfill will include a sequence of trenches each 70 m long, 20 m wide and 4 m deep (Figure 1) that are constructed one at a time and gradually backfilled as waste is dumped. A ring-lock fence rising to a height of 1.8 m and an earthen bund built from the dirt dug up for the trench will encircle the landfill. A bund at least 2 m tall is to be built on three sides of each trench to reduce trash that is blown by the wind and stop surface water from flowing into the trench.

The landfill is designed with capacity to accept up to 340 tonnes annually, with the applicant proposing to dispose about 258 tonnes annually. The landfill is expected to be inspected every week and any rubbish in the surrounding area will be picked up at least monthly.

2.2.2 Category 85 activities

On the abandoned TSF, which is undergoing rehabilitation, a Wastewater Treatment Plant (WWTP) is proposed to be built to supply water to the lodging camp (Figure 1). The WWTP will

take raw sewage flow from the village via a transfer station located in the village (Wilshaw, 2024). Raw sewage will be plumbed to pump pits, where macerator pumps will move the sewage to the larger sewage transfer station. From there, the station will pump sewage to the WWTP through an high-density polyethylene (HDPE) pipeline laid in an open trench.

The WWTP will have a coarse solids separation tank that will discharge into the first of two HDPE-lined stabilisation ponds. A weir in the primary stabilisation pond allows effluent to overflow into the secondary stabilisation pond. Treatment function of each pond is facultative.

The maximum daily volume to be treated at the WWTP is 70 m³ per day. The WWTP is designed to process wastewater (sewage) and create effluent that meets the water quality criteria indicated in Table 1 (Tetris Environmental 2024).

Table 1: Expected treated effluent water quality

Description	Expected value in raw sewage (provided by applicant)	Target Value	Units
BOD Concentration	300-600	30	mg/L
TSS Concentration	-	40	mg/L
Total Nitrogen Concentration	40-150	30	mg/L
Total Phosphorous Concentration	4-15	7.5	mg/L
pH	-	6.5-8.5	pH units
<i>E. coli</i>	-	100,000	cfu/100ml
Chlorine residual	-	0.2-2	mg/L
Total Dissolved Solids (TDS)	-	1,000	mg/L

Pond Water Balance

A review of the stabilisation pond water balance provided in the application supporting documents found that the ponds are sufficiently sized to store and treat the predicted effluent inflow without overtopping. Holding times are estimated to be about 46 days in the first pond and 34 days in the second pond, based on a constant inflow of 70 m³/day into each pond. However, this value is likely to vary considerably, particularly the volume entering the second pond due to evaporation in the first pond. Solids will be removed from the coarse solids separation tank on a regular or as required basis by a licenced contractor and disposed off-site. As a result, solids are not anticipated to build up in the ponds and no excavation is required during the life of the pond, and therefore no risk of impact to the pond liner from exvacations activities. *Water Quality Protection Note (WQPN) 22 - Irrigation with nutrient-rich wastewater* (Department of Water 2008) recommends holding times of at least 7-10 days for anaerobic ponds and over 30 days for aerobic ponds.

Irrigation Spray Field

The effluent will be discharged to a spray field on a regular basis using a pump and irrigation spray system. The spray field is located within a former TSF, where tailings were last deposited in the 1990's.

In the absence of site-specific studies, the applicant has applied Risk Category 'D' nutrient loading rate limits set out in WQPN 22 and calculated a minimum irrigation area of 1.6 ha to accommodate the predicted nitrogen and phosphorus loading (Table 2).

Table 2: Minimum area required for spray field

	Nitrogen	Phosphorus
Expected nutrient output concentration	30 mg/L	7.5 mg/L
Daily effluent discharge rate	70,000 L/day	70,000 L/day
Recommended Loading (Risk Category 'D' in WQPN 22)	480 kg/ha/year	120 kg/ha/year
Minimum area required for spray field	1.6 ha	1.6 ha
Predicted nutrient loading rates (1.6 ha field)	479.1 kg/ha/year	119.8 kg/ha/year
Predicted nutrient loading rates (2.4 ha field)	319.4 kg/ha/year	79.8 kg/ha/year

The applicant has specified a 2.4 ha spray field to accommodate the minimum required area calculated in Table 2, to distribute the treated effluent discharge over an area sufficient to maximise infiltration and evaporation, minimise the potential for soil saturation and ponding and ensure nutrient loading is within the required limits. Therefore, the proposed irrigation area is considered sufficient to accommodate the predicted nutrient loading.

Nutrient loading rates to the irrigation field will vary significantly across the year due to variation in evaporation rates across the year. Based on a daily flow of 70 m³, no excess water for irrigation is predicted in January (driest month), while in June (wettest month) about 1,905 kL excess (treated water) will require disposal via irrigation.

Annual net evaporation across the irrigation field (41,563 kL) is also predicted to exceed the volume of treated water discharge from the stabilisation ponds for the same period (11,686 kL), allowing sufficient capacity for the hydraulic loading. However, the applicant notes there may be some temporary local pooling during the winter months.

2.3 Other relevant approvals

2.3.1 Mining Act 1978

A Mining Proposal and Mine Closure Plan (MPMCP) (Reg. ID: 123454) was approved by the Department of Energy, Mines, Industry, Regulation and Safety (DEMIRS) on 12 August 2024 under the provisions of the *Mining Act 1978* for the infrastructure to support the accommodation village at the premises. The approved MPMCP states that the WWTP will require up to 5.9 ha of land to be disturbed and the new landfill will require up to 1.7 ha. The WWTP and landfill will be located on the historical, inactive and inert MGGP Northern and Southern TSF, respectively, eliminating any need to clear remnant native vegetation. In addition, using the old TSF will facilitate closure and rehabilitation with relative ease at the end of the mining project. Tenement conditions set by DEMIRS also include avoiding, where practicable, clearing of large, mature trees.

2.3.2 Part IV of the EP Act 1986

Mount Gibson Gold Project is being assessed by the Environmental Protection Authority (EPA) under Part IV of the EP Act. The Proposal is to develop, construct and operate an Open Pit Gold Mine, including Process Plant and supporting infrastructure. The proposal submitted to the EPA excludes the wastewater treatment plant to support the accommodation village, landfill and the related infrastructure being assessed for this work approval application.

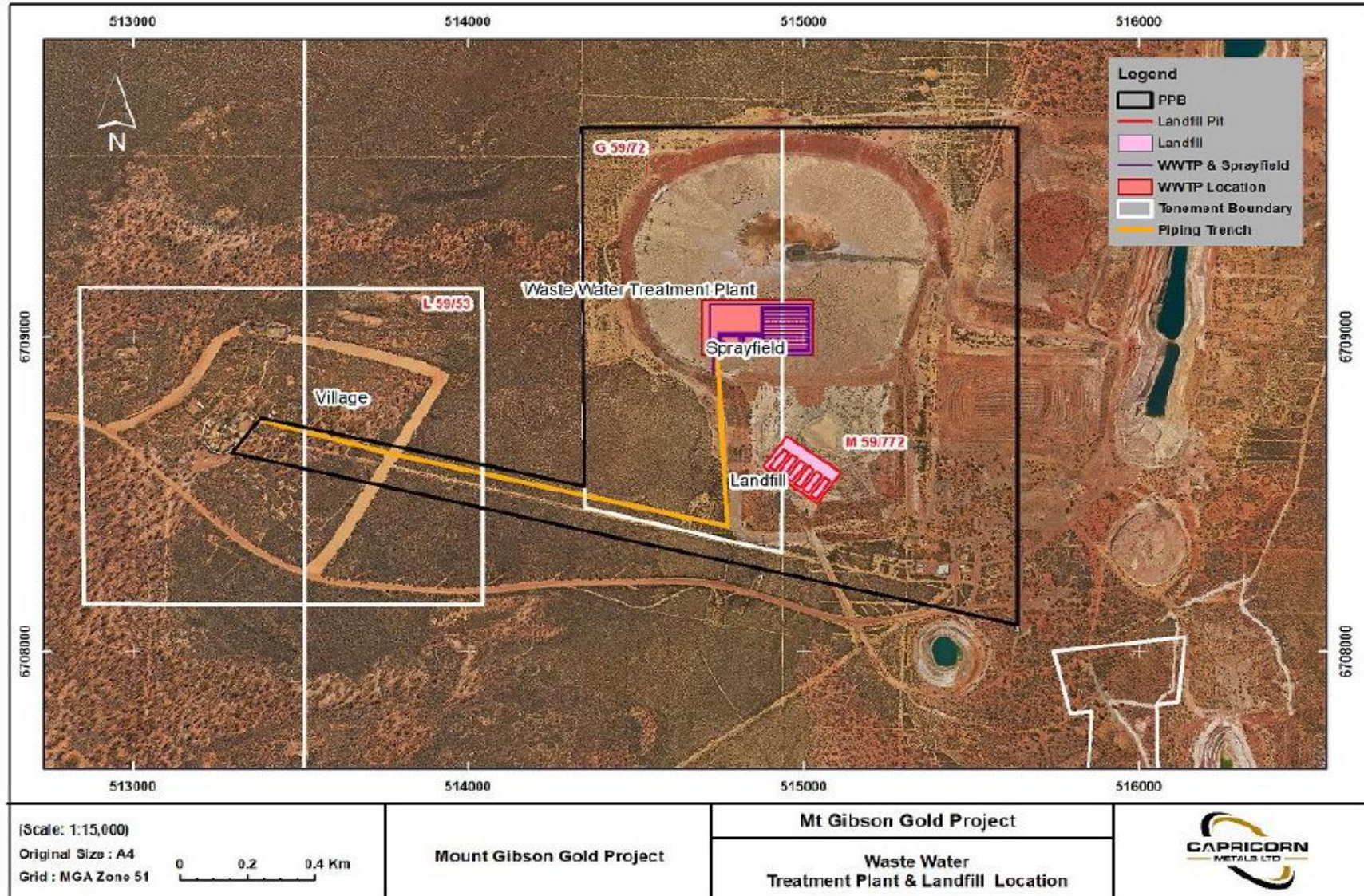


Figure 1: Location of the proposed landfill, wastewater treatment plant and irrigation area

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 3 below. Table 3 also details the control measures the applicant has proposed to assist in controlling these emissions, where necessary.

Table 3: Proposed applicant controls

Emission	Sources	Potential pathways	Proposed controls (TE, 2024)
Construction			
Dust	Construction of primary and secondary WWTP stabilization ponds, open landfill trenches and HDPE pipelines in open trenches Vehicle movements	Air/windborne pathway	<ul style="list-style-type: none"> Construction works will be of short duration Watering of roads and surfaces Halting works during extremely high winds
Time limited operations – Category 64			
Dust	Category 64: Class II Putrescible and inert waste landfill site activities	Air/windborne pathway	<ul style="list-style-type: none"> Watering of roads and surfaces Halting works during extremely high winds
Contaminated Stormwater		Surface water run-off	<ul style="list-style-type: none"> The earthen bund will be at least 2 m height covering three sides of the landfill to prevent the surface water runoff entering the trench
Leachate		Seepage through the base and embankments of the landfill infiltration	<ul style="list-style-type: none"> No controls proposed
Time limited operation – Category 85			

Emission	Sources	Potential pathways	Proposed controls (TE, 2024)
Spillage of raw sewage, partially treated sewage and/or treated sewage	Operation of the stabilisation ponds and solids separation tank	Overtopping or leaks causing contamination	<ul style="list-style-type: none"> The banks of the primary stabilisation ponds will be 1.5 m higher than the base of the ponds, with overflow channels into the secondary ponds at 1 m high (Wilshaw, 2024) The secondary stabilisation ponds will be of similar construction, with overflow channels into the evaporation/irrigation basin (Wilshaw, 2024) Recommended freeboard of 400 mm (40 cm). The external and internal slope of the stabilisation pond sides will be 1 in 3 (Wilshaw, 2024) Maintenance will be carried out to ensure there will be no vegetation on the banks of the ponds (to protect pond performance)
	Storage of wastewater in ponds - stabilisation pond lining deteriorating or breaking WWTP pipeline leaks/spills causing contamination	Seepage and infiltration	<ul style="list-style-type: none"> Proposed stabilisation ponds will be lined with 1.6 mm HDPE liner which exceed the permeability requirement in WQPN39 and has an approximate UV lifetime of 20 years Weekly inspections of the stabilisation pond bank and HDPE liner. Routine inspection of transfer pipeline and discharge points
Nutrient rich treated effluent	Direct discharge to land via irrigation sprayfield	Seepage and infiltration	<ul style="list-style-type: none"> Irrigation area located on historical, inactive TSF under rehabilitation, elevated away from native vegetation and drainage lines Effluent discharge will be managed to ensure there is no surface ponding or runoff from the irrigation area Overall monthly measurement of flows at the discharge points to be taken Routine maintenance and inspection of pipelines and discharge points will occur Irrigation areas will be fenced off with a 1.8 m high wire mesh fence to restrict access Monitoring of treated wastewater quality prior to discharge to the irrigation field Weed control undertaken as required

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 4 provides a summary of potential 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)).

Table 4: Sensitive human and environmental receptors and distance from prescribed activity

Environmental receptors	Distance from prescribed activity
Aboriginal and other heritage sites	<p>Closest record is approximately 900 m west.</p> <p>Geocortex shows closest Aboriginal sites and heritage place is approximately 1.9 km northeast from the activities (Object ID – 5808).</p> <p>Several artefact scatters and culturally significant locations recorded around the project. No sites occur within the proposed prescribed premise boundary.</p> <p><i>This receptor has been screened from the assessment due to separation distance.</i></p>
Groundwater	<p>The Proposal is within the Meekatharra area of East Murchison proclaimed Groundwater Water Management Area.</p> <p>Current groundwater levels are estimated to be 46 – 51 mbgl (Tetris Environmental 2024).</p>
<p>Remnant native vegetation, including a Threatened Ecological Community (TEC's)</p> <p>Native vegetation in rehabilitated areas within the TSF. The department considers rehabilitated native vegetation to hold the same value for environmental protection as remnant vegetation.</p>	<p>The 'Eucalypt woodlands of the Western Australian Wheatbelt' TEC is the nearest remnant native vegetation, about 140 m east of the WWTP and about 271 m northeast of the landfill.</p> <p>The WWTP and landfill will be installed on the inactive TSF which is under rehabilitation (Tetris Environmental 2024).</p>

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 5.

Works approval W6939/2024/1 that accompanies this decision report authorises construction and time-limited operations. The conditions in the issued works approval, as outlined in 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 operation of the premises i.e. category 64 and 85 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 5: Risk assessment of potential emissions and discharges from the premises during construction, 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 primary and secondary stabilization ponds in WWTP, open landfill trenches and to install HDPE pipelines in open trenches. Vehicle movements, installation of infrastructure and equipment.	Dust	Air/windborne pathway causing impacts to ecosystem disturbance	Native vegetation including TEC, 140-270 m from activity	Refer to Section 3.1	C = Slight L = Unlikely Low Risk	Y	N/A	N/A
Operations (including Time limited operations)								
Category 64: Operation of Class II Putrescible and inert waste landfill site activities	Dust	Air/windborne pathway causing impacts to vegetation health	Rehabilitated native vegetation Native vegetation including TEC, 140-270 m from activity	Refer to Section 3.1	C = Slight L = Unlikely Low Risk	Y	Condition 1: Design and construction / installation requirements	N/A
	Contaminated stormwater	Surface water run-off to soil and groundwater causing ecosystem disturbance, degradation to groundwater quality Adverse impacts to native vegetation on TSF	Soil and groundwater Rehabilitated native vegetation	Refer to Section 3.1	C = Slight L = Possible Low Risk	Y	Condition 1: Design and construction / installation requirements	N/A
	Leachate	Seepage through the base and embankments of the	Soil and	Refer to	C = Minor	N	Condition 6: Requirements during	The Delegated Officer has

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				
		landfill, infiltration to groundwater causing contamination of shallow soils within rehabilitation area Adverse health impacts to nearby vegetation via groundwater migration and root uptake	groundwater Rehabilitated native vegetation on TSF	Section 3.1	L = Possible Medium Risk		<u>time limited operations – compacted trench base</u>	specified that the base in each landfill trench is to be mechanically compacted to reduce infiltration of leachate during operation.
Operation of sewage facility – coarse sediment tank	Spillage of raw sewage, partially treated sewage and/or treated sewage	Overtopping or leaks causing contamination to soil and groundwater causing degradation to groundwater quality and adverse impacts to rehabilitated native vegetation within TSF	Soil and groundwater Rehabilitated native vegetation on TSF	Refer to Section 3.1	C = Slight L = Unlikely Low Risk	Y	N/A	N/A
Operation of sewage facility – stabilisation ponds	Stabilisation pond lining deteriorating or breaking and pipeline leaks/spills causing contamination	Seepage and infiltration to soil and groundwater causing ecosystem disturbance, degradation to groundwater quality and adverse impacts to rehabilitated native vegetation within TSF		Refer to Section 3.1	C = Minor L = Unlikely Medium Risk	Y	Condition 1: Design and construction / installation requirements Condition 6: Operational requirements during TLO (regular inspections)	N/A
	Overtopping of ponds causing contamination			Refer to Section 3.1	C = Moderate L = Unlikely Medium Risk	Y	Condition 1: Design and construction / installation requirements Condition 6: Operational requirements during TLO (minimum freeboard)	N/A
Irrigation of treated wastewater to irrigation sprayfield	Nutrient rich treated effluent (wastewater that exceeds anticipated quality) or treated wastewater to	Direct discharges to irrigation area to soil and groundwater causing ecosystem disturbance, degradation to groundwater		Refer to Section 3.1	C = Moderate L = Possible Medium Risk	Y	Condition 1: Design and construction / installation requirements Condition 6: Operational	N/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				
	the irrigation sprayfield	quality and adverse impacts to rehabilitated native vegetation within TSF					requirements– meet design treatment criteria by the end of TLO Condition 7: Authorised discharge points Condition 8 and 9: Monitoring treated effluent discharge volumes and quality	

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.

4. Consultation

Table 6 provides a summary of the consultation undertaken by the department.

Table 6: Consultation

Consultation method	Comments received	Department response
Application advertised on the department's website on 28 June 2024	None received	N/A
Applicant was provided with draft documents on 12 September 2024	Refer to Appendix 1	Refer to Appendix 1

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. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
2. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
3. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.
4. Department of Water (DoW) 2008, Water Quality Protection (WQPN) Note 22, Irrigation with nutrient-rich wastewater, Perth, Western Australia.
5. Tetris Environmental (TE) 2024, *Mount Gibson Gold Project, Works Approval Supporting Document*, Perth, Western Australia.
6. Wilshaw (August) 2024, *Mount Gibson Gold Project, Wastewater treatment plant – overview and design capacity*, Perth, Western Australia.

Appendix 1: Summary of applicant's comments on risk assessment and draft conditions

Condition	Summary of applicant's comment	Department's response
1 Table 1, 1(i)	The applicant asked to include the referenced location as Schedule 1, Figure 2.	Noted and amended accordingly.
1 Table 1, 3(d) Bottom soil must be compacted by machines to reduce the infiltration risk	The applicant asked to remove this condition due to the landfill is located on the historic TSF/tailings. There is no bottom soil to be compacted. Based on the trench design and the risk of infiltration to the environment being very minor, this condition is not applicable and should be removed.	The Delegated Officer accepts the justification and has determined to remove the requirement in each condition.
6 Table 2, 3(e) The base of each trench must be mechanically compacted.		