Government of Western Australia
Department of Water and Environmental Regulation

Amendment Report

Application for Licence Amendment

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

Licence Number	L4611/1987/11
Licence Holder	Agnew Gold Mining Company Pty Ltd
ACN	098 385 883
Application Number	APP-0029971
Premises	Agnew Gold Mine Mining tenements M36/27, M36/32, M36/53, M36/55, M36/65, M36/91, M36/150, M36/171, M36/174, M36/208, M36/248, M36/293, M36/314, M36/383, M36/450, M36/635, L36/143, L36/154, L36/162, L36/173, L36/177, L36/211, L36/212, L36/228, G36/36, G36/37, G36/38, G36/39 and G36/42. LEINSTER WA 6437 As defined by the maps in Schedule 1 attached to the revised licence
Date of Report	14 January 2025
Decision	Revised licence granted

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1. Decision summary

Licence L4611/1987/11 is held by Agnew Gold Mining Company Pty (licence holder) for the Agnew Gold Mine (the premises), located on tenements: M36/27, M36/32, M36/53, M36/55, M36/65, M36/91, M36/150, M36/171, M36/174, M36/208, M36/248, M36/293, M36/314, M36/383, M36/450, M36/635, L36/143, L36/154, L36/162, L36/173, L36/177, L36/211, L36/212, L36/228, G36/36, G36/37, G36/38, G36/39 and G36/42 in Leinster.

This amendment report documents the assessment of potential risks to the environment and public health from proposed changes to the emissions and discharges during the operation of the premises. As a result of this assessment, revised Licence L4611/1987/11 has been granted.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this Amendment Report, the department 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 Amendment summary

On 25 July 2025, the licence holder submitted an application to the department to amend licence L4611/1987/11 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The following amendments are being sought:

- Increase operational height of Songvang Tailings Storage Facility (TSF4) embankments from 422.0 mRL to 425.0 mRL;
- Construct and operate a ferrous sulfate automatic dosing unit at the EMU processing plant;
- Construct and operate a pipeline from the Crusader Complex (consisting of Cox, Pilgrim and Deliverer pits) to Waroonga Turkeys Nest for the proposed discharge at:
    - Waroonga Turkeys Nest;
    - Barren Lands Turkeys Nest; and
    - TSF3 Return Water Pond (RWP).
- Construct and operate a pipeline from Daisy Queen Pit to the TSF3 RWP and Crusader Complex for proposed discharge at:
    - TSF3 RWP;
    - Redeemer Water tanks;
    - Barren Lands Turkeys Nest; and
    - Crusader Complex.
- Reconfigure an existing pipeline from New Holland Turkeys Nest to Hidden Secret Pit to enable discharge from New Holland Turkeys Nest to Waroonga Turkeys Nest;
- Inclusion of two new putrescible landfill facilities to be situated on waste rock dumps (WRD) located at Barren Lands and Upper Redeemer and increase the footprint size of the existing Redeemer WRD landfill; and
- Inclusion of new prescribed activity (Category 73) to authorise bulk storage of chemicals.

This amendment is limited only to the proposed inclusion of Category 73 activities and changes

to Category 5, 6 and 64 operation activities from the existing licence. No changes to the aspects of the existing licence relating to Category 52 and 54 have been requested by the licence holder.

2.3 Category 5 activities

2.3.1 Songvang In-pit TSF4

Songvang In-pit TSF4 is situated on mining tenements M36/450 and M36/89 and is located at the southern portion of the prescribed premises (Figure 1).

Approval to discharge tailings into Songvang In-pit TSF4 was granted on 8 September 2017 with a maximum authorised operating height of 404 mRL. On 30 January 2023 the licence holder submitted a licence amendment application to authorise the increase of Songvang In-pit TSF4 operating height from 404 mRL to 422 mRL. The department granted the increase in operational height on 17 October 2023 which increased the available capacity by approximately 8.3 million tonnes (Mt) and extended the operating life of the TSF from 2022 to 2029.

This licence amendment is to authorise the increase in the operating height of Songvang In-pit TSF4 by an additional three meters from 422 mRL to 425 mRL. The proposed increase has been estimated to extend Songvang In-pit TSF4 operating life by up to another two years (AGMC 2025a).

Tailings discharge into the into Songvang In-pit TSF4 occurs via multiple spigot points surrounding the rim of Songvang In-pit TSF4, a single spigot will be operational at any time to assist in the control of the decant pond size and location within the pit. There is no proposed change to the existing spigot layout within this amendment.

There is no proposal for an increase in throughput for category 5 within this licence amendment application and no modification to tailings discharge locations, pipeline routes or tailings parameters with exception to the inclusion of the Ferrous Sulfate Dosing Unit as described in the section below (Section 2.3.2).

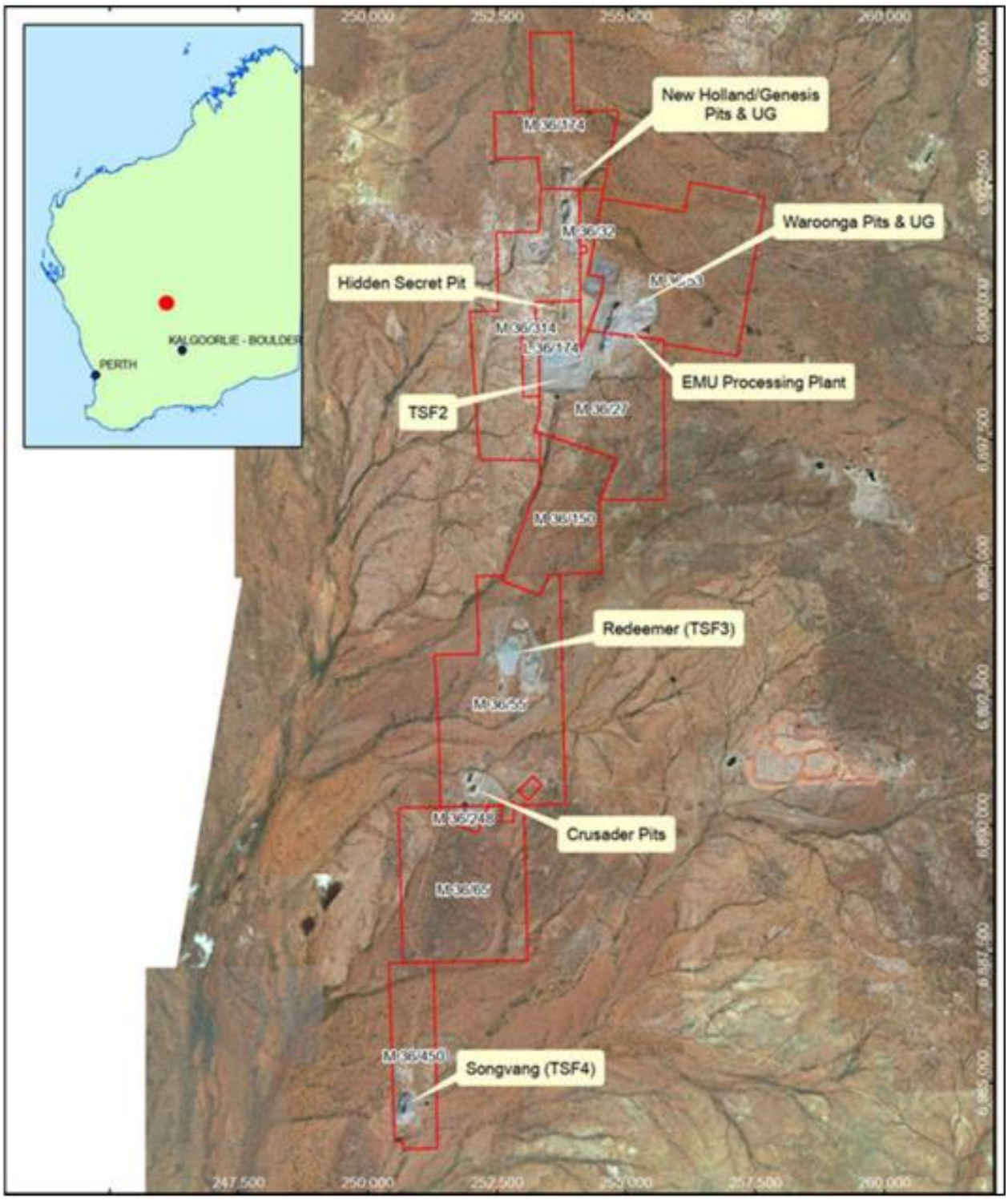

Figure 1: Songvang TSF location (Sourced from CMW 2024)

2.3.2 Ferrous Sulfate Dosing Unit

Background

The objective of the proposed Ferrous Sulfate Dosing Unit is to reduce arsenic concentrations within the TSF decant ponds on the premises.

This requirement was identified following observations of avian wildlife deaths by the licence holder, reported to the department during routine inspections in the 2021–2022 and 2022–2023 summer periods.

The licence holder investigated the cause of death, including submitting suitable carcasses for autopsy. Results showed elevated arsenic concentrations in the skin (0.9–4.93 mg/L), kidney (4.75–17.8 mg/L), and liver (6.5–19.1 mg/L) of the birds. These findings indicate that arsenic was ingested or adsorbed and subsequently metabolised.

Sampling of the tailings supernatant within Songvang In-pit TSF4 revealed high dissolved arsenic concentrations, ranging from 16 mg/L to 31 mg/L during January 2022 incidents. Concentrations decreased to 8.6–11.0 mg/L during daily monitoring in July 2023 (DWER 2023).

On 17 October 2023, the department granted a licence amendment to L4611/1987/11, which included new conditions requiring the licence holder to report to the department on actions to reduce and prevent future wildlife deaths. Conditions required the licence holder to undertake and complete a pilot plant trial for adding ferrous sulfate to the tailings stream at the EMU processing plant.

Ferrous sulfate dosing trial

The licence holder conducted the pilot trial on 16 August 2023 and submitted the subsequent report to the Department on 24 January 2024. The Department reviewed the report and deemed it compliant on 26 February 2024 in accordance with the licence condition.

The trial involved manual dosing of ferrous sulfate into the tailings stream. Approximately 100 kg/hr of ferrous sulfate was mixed in a 1 m^3 tank and fed into the tails hopper at a rate of 16 L/min. Dosing commenced at 07:00 and ceased at 13:00, with a total of approximately 625 kg of ferrous sulfate used.

To assess the trial's effectiveness, samples were collected from four monitoring points:

- Tails Screen (tailings prior to dosing);
- Pump at Mill (dosing point);
- Redeemer In-pit TSF3 (approx. 9 km from the process plant, en route to Songvang In-pit TSF4); and
- Songvang In-pit TSF4 spigot (discharge point, approx. 15.5 km from the process plant).

Monitoring results (Figure 2) showed an immediate drop in arsenic concentrations at the dosing point and an increase once dosing ceased. The lag in concentration changes at Redeemer In-pit TSF3 and Songvang In-pit TSF4 correlated with their distance from the dosing point.

The licence holder demonstrated that introducing ferrous sulfate to the tailings stream effectively reduced arsenic concentrations, which will subsequently lower arsenic levels in the decant ponds.

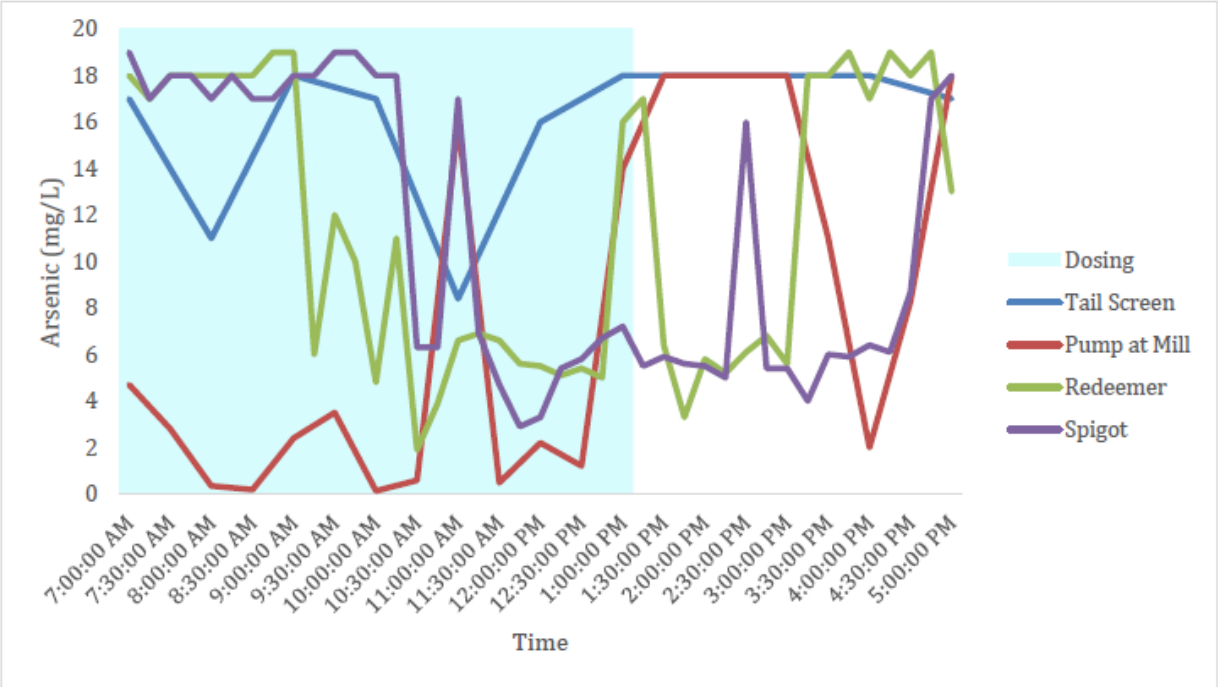

Figure 2: Arsenic concentrations during the ferrous sulfate dosing trial period (Sourced from GFA 2024)

Inclusion of the Ferrous Sulfate Dosing Unit

To manage and reduce arsenic concentrations within Songvang In-pit TSF4, which have been impacting native fauna, the licence holder has proposed constructing a Ferrous Sulfate Dosing Unit within the EMU processing plant (Figure 3).

The unit will include a self-bunded 30 kL tank designed to hold a ferrous sulfate and water mixture, achieving a final concentration equivalent to 40% ferric sulfate. The ferrous sulfate and water mixture will be supplied to the premises. The dosing system will be automated, and will enter the tailings steam directly into the tailings hopper with all delivery pipelines contained within the processing plant at a rate of 4 L/min. The unit will operate during the warmer months when arsenic-related mortalities have previously been observed.

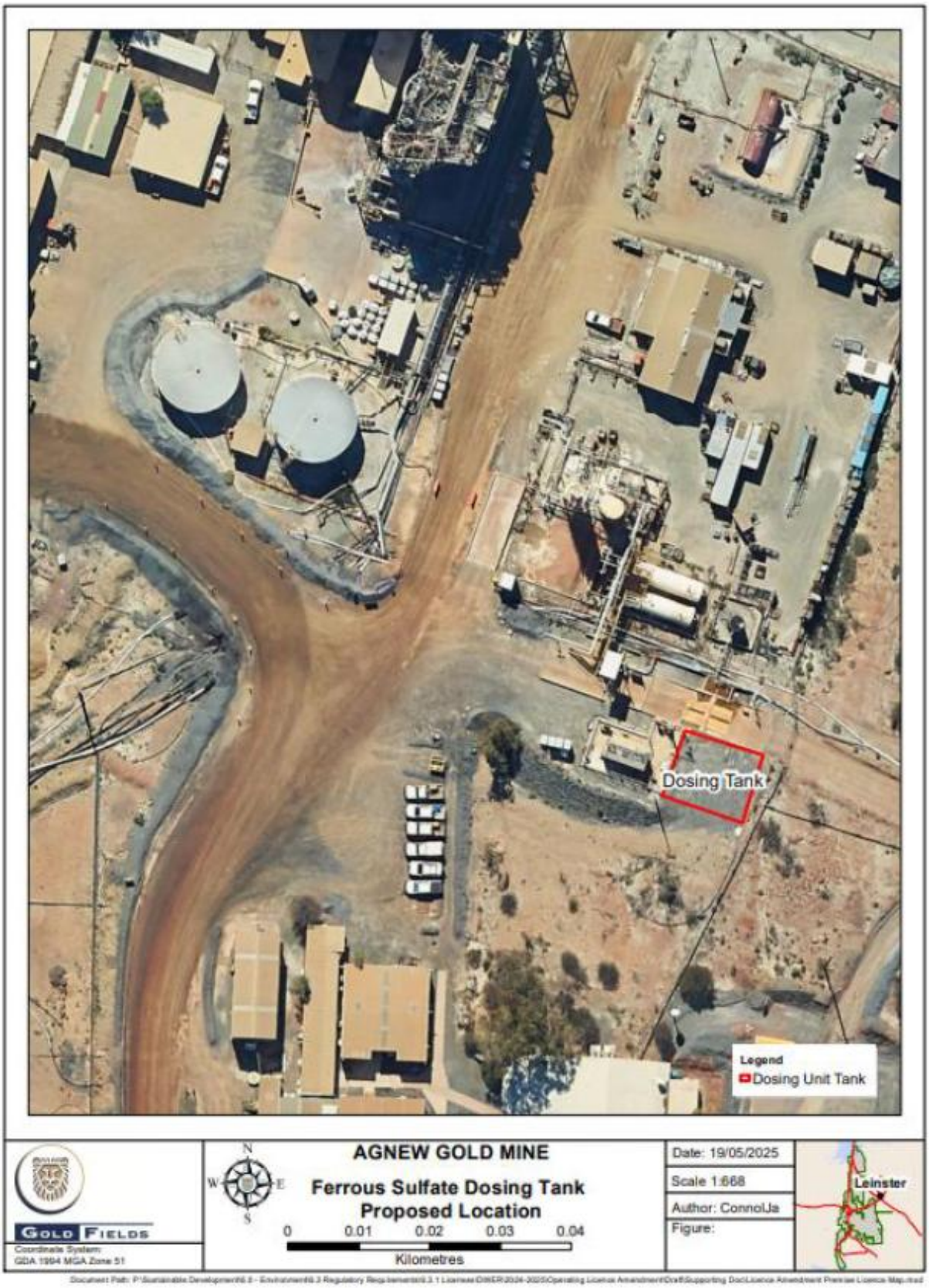

Figure 3: Location of proposed Ferrous Sulfate Dosing Unit

2.4 Category 6 activities

The licence holder has identified a need for additional water sources to support ongoing mining operations. Recently, the site experienced a water shortage at the Waroonga Turkeys Nest and across the operation due to a temporary halt in water extraction from Genesis Pit while sumps and pumps were repaired. The licence holder has also reported a reduced water yield at Waroonga, New Holland, and Genesis pits, further increasing the need for alternative water sources.

To ensure a sufficient future water supply for mining operations, the licence holder proposes constructing two additional dewatering pipelines:

- Daisy Queen Pit to the TSF3 RWP, Redeemer Raw Water Tanks and Crusader Complex; and
- Crusader Complex (Cox, Pilgrim and Deliverer pits) to the lined Waroonga Turkeys Nest.

These pipelines will allow water to be discharged from Daisy Queen Pit and Crusader Complex to the TSF3 RWP, Barren Lands Turkeys Nest, Redeemer Water Tanks, the Waroonga Ponds and the Crusader Complex.

The pipelines will consist of a double sleeved pipeline through creek crossings and limited clearing activities will occur to place the pipelines.

Clearing activities may be required to install the pipelines, involving the removal of approximately 2 hectares (ha) of native vegetation for the Crusader Complex to Waroonga Turkeys Nest pipeline and approximately 6.7 ha for the Daisy Queen Pit to Redeemer Return Water Pond pipeline. Clearing (if required) will be undertaken under the *Mining Act 1978*, which authorises up to 10 ha of native vegetation clearing per financial year. Therefore, the clearing activity and associated emissions will not be assessed or regulated by the department.

The licence holder has not applied for an increase in Category 6 throughput as part of this licence amendment.

2.4.1 Crusader Complex to Waroonga Turkeys Nest

The licence holder proposes to construct a pumping pontoon and a dewatering pipeline from the Crusader Complex to the Waroonga Turkeys Nest (Figure 4).

Additional discharge points are planned along this route, including the TSF3 RWP, Barren Lands Turkeys Nest, and Waroonga Turkeys Nest.

The Crusader Complex is an approved mine dewater discharge location for water from Barren Lands, Waroonga, Genesis, New Holland, and Vivien mines; however, no mine dewater has been discharged there to date.

Figure 4: Crusader Complex to Waroonga Turkeys Nest

Crusader Complex water quality

Water quality samples from the Crusader Complex could not be collected due to safety concerns; therefore, the current water quality within the complex is unknown.

To provide an indication of pit water quality for this Amendment Report, the licence holder submitted groundwater monitoring results from a nearby bore located approximately 90 m from the edge of the Crusader Complex.

Monitoring data from 2022 to 2024 show pH levels ranging from 6.77 to 8.8 and total dissolved solids (TDS) between 845 and 3,217 mg/L, indicating water quality from fresh to brackish.

All monitored parameters were below the Australian and New Zealand Guidelines for Fresh and Marine Water Quality – Primary Industries (ANZECC & ARMCANZ, 2000) livestock drinking water guidelines for beef cattle and sheep, except for sulfate, which marginally exceeded the guideline. The highest recorded sulfate concentration was 1,260 mg/L, compared to the recommended limit of 1,000 mg/L.

2.4.2 Daisy Queen Pit to TSF3 Return Water Pond

Daisy Queen Pit is located on the eastern portion of the prescribed premises and was incorporated into Licence L4611/1987/11 during an amendment that amalgamated Licence L5110/1988/10 previously held by the licence holder.

This historic mining pit was originally dewatered and mined between 1924–1925 and again from 1991–1996. From 2003 to 2013, Daisy Queen Pit accepted mine dewater from Fairyland Pit and Lawlers Gold Mine pits under the now surrendered Licence L5110/1988/10. Between 2013 and 2015, borefield water was discharged to Daisy Queen Pit until the borefield was reconfigured to supply the EMU Processing Plant directly.

Currently, water in Daisy Queen Pit comprises of historic mine dewater, borefield water, localised groundwater, and surface runoff. It is an approved water source under Groundwater Licence GWL55840 for use across the Agnew Mining Tenements.

The licence holder proposes to utilise this water as a supplementary source if volumes in the TSF3 RWP or Crusader Pits decline. Water will be extracted via a pumping pontoon and transported through a proposed pipeline along an existing powerline corridor to the Redeemer Complex. This pipeline (Figure 5) will result in the following discharge locations:

- TSF3 RWP;
- Redeemer Water Tanks;
- Crusader Complex; and
- Barren Lands Turkeys Nest.

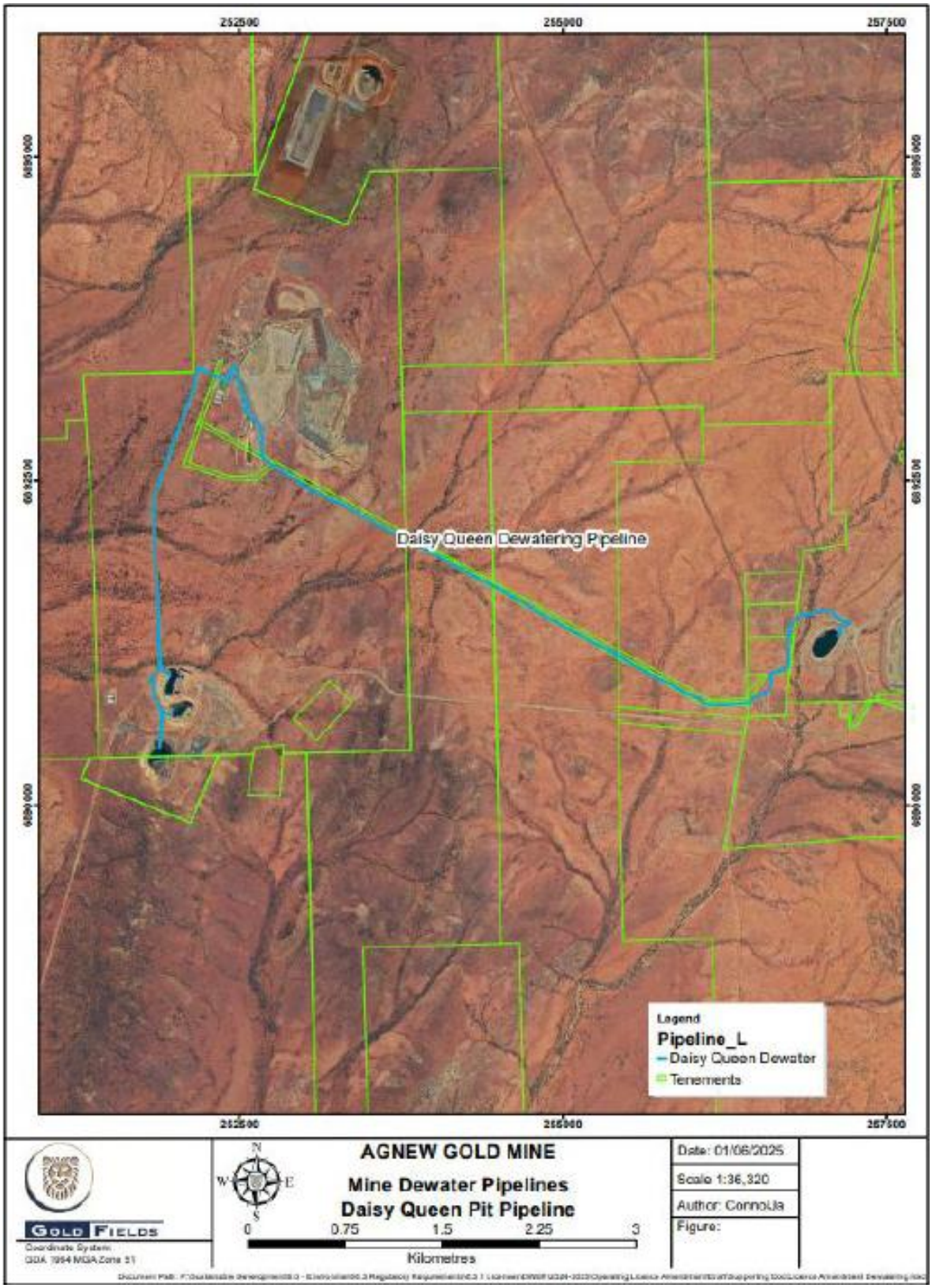

Figure 5: Daisy Queen to TSF3 RWP and Crusader Complex (Sourced from AGMC 2025a)

Daisy Queen Pit water quality

Water quality within Daisy Queen Pit have been measured and sampled on a quarterly basis since 2020. Reported pH values range from 7.76 to 8.46, and TDS concentrations range from approximately 2,200 mg/L to 4,300 mg/L.

The licence holder has indicated that no elevated metal concentrations were detected, stating that “laboratory results for major ions and metals are all below respective ANZECC (2000) Watering Criteria guideline values” (AGMC 2025a).

2.4.3 Pipeline modification to enable transfer of water from New Holland to Waroonga

The licence holder has proposed discharging mine dewater from the New Holland Turkeys Nest to the Waroonga Turkeys Nest. Currently, water from the New Holland Underground Operations is discharged to the New Holland Turkeys Nest and then transported to Hidden Secret Pit.

A pipeline to enable this change has been installed with a butterfly valve (Figure 7), but the discharge to Waroonga Turkeys Nest has not yet commenced. The licence holder also proposes installing additional flow meters to measure discharge volumes and track cumulative flow between the two activities.

The department has determined that, due to the minimal construction required for this change, the pipeline installation (including flow meters) is not included in the risk assessment in Section 3. However, the operation of the pipeline is considered within the discharge to Waroonga Turkeys Nest for the Crusader Complex to Waroonga Turkeys Nest pipeline (Table **4**).

Figure 6: New Holland to Hidden Secret pipeline modification to allow discharge to Waroonga Ponds

2.4.4 Additional monitoring bores

The licence holder is required to construct and monitor five bores surrounding the Crusader Complex. This requirement was included in the licence amendment granted on 30 May 2025.

On 11 November 2025, the licence holder requested to include bores CLMB001 and CLMB002 on to the licence as part of this amendment, which are located near the Crusader Complex. The department has approved this request and updated the monitoring requirements. Monitoring of the bores surrounding the complex will only be required after the bores are constructed and before mine dewater is discharged to the complex.

2.5 Category 64 activities (Landfills)

The request for additional landfill locations and expansion is due to mining activities at the premises extending south and the only authorised landfill in the area is the existing Redeemer WRD Landfill. This landfill is currently used for special class 1 and 2 waste (asbestos and biomedical waste), and the licence holder wishes to limit its use for inert and putrescible waste.

To address this, the licence holder has requested:

- Increasing the footprint of the Redeemer WRD Landfill to incorporate the additional Redeemer WRD area;
- Develop two new putrescible landfill locations on existing WRDs at Barren Lands WTD and Upper Redeemer WRD; and
- Extending the footprint of the Redeemer Landfill within the WRD.

The department has not assessed the “construction” of these landfills. Any construction activities, including trench excavation for waste storage, have been considered as part of the operational risk assessment in Section 3.

Existing and proposed landfill locations are shown in Figure 7 below.

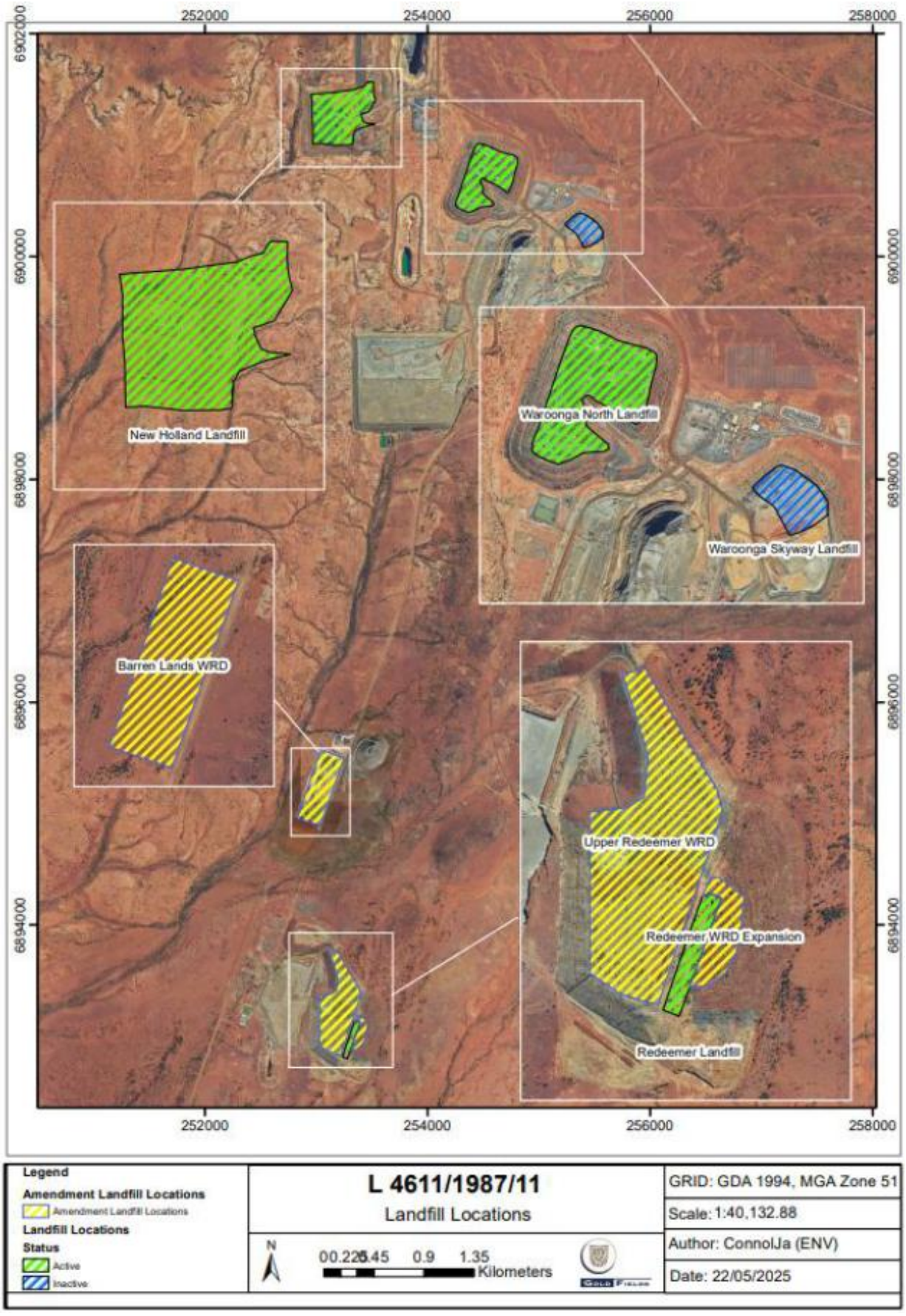

Figure 7: Current and proposed landfill locations (Sourced from AGMC 2025a)

2.5.1 Redeemer WRD Landfill

The licence holder has proposed to expand the Redeemer WRD landfill towards the north and eastern side of the landfill, the proposed expansion is presented in Figure 7.

The Redeemer WRD was constructed by Western Mining Corporation Resources Ltd (WMC) prior to 2000, with progressive rehabilitation commencing after the Redeemer underground operation was decommissioned in 2001. The WRD is located on mining tenement M36/55 and is classified as “shut” by the Department of Mining, Petroleum and Exploration (DMPE).

Since 2010, the WRD has been used as a landfill facility under a registration issued by the department. The Redeemer WRD landfill is primarily authorised for special class 1 and 2 waste (asbestos and biomedical waste) under licence L4611/1987/11.

The applicant has not proposed any changes to the RL elevation of the landfill, which is situated on the first embankment lift of the WRD. Proposed trench dimensions are approximately 2–3 metres in depth and width, and up to 30 metres in length.

The closest monitoring bore, REDIPMW10, is located about 330 metres west of the landfill, with groundwater levels generally reported between 17.4 and 18.36 metres below ground level (AGMC 2025b).

Mining Proposal (MP) 36230 (AGMC 2012) specifies that upon completion of the landfill, topsoil will be applied and ripped to a minimum depth of 1 metre, followed by an additional 50 mm topsoil layer. The area will then be seeded with locally occurring species.

2.5.2 Barren Lands WRD Landfill and Upper Redeemer WRD Landfill

The licence holder has proposed utilising the Barren Lands WRD and Upper Redeemer WRD as additional landfill sites to support expanding operations in the south, including the Barren Lands underground mine and the re-entry of the Redeemer Underground Facility. The additional landfills aim to reduce waste transport from the southern portion of the premises to the northern area, where current authorised landfill facilities are located.

The Barren Lands WRD Landfill and Upper Redeemer WRD Landfill are primarily intended for deposition of putrescible and inert waste. The licence holder has requested flexibility to accept special waste types 1 and 2 (medical and asbestos waste) at these sites also. The department has agreed to include these waste types to allow operational flexibility.

Bores EMSC6066, EMSC6067, and EMSC6068 were previously located near the Barren Lands WRD but have since been enveloped by the Barren Lands Pit. Prior to their removal groundwater levels within the bores ranged from 26.76 to 32.9 meters below ground level (mbgl) (AGMC 2025a). The current height of the Barren Lands WRD is approximately 25 m, providing over 50 m of vertical separation between the landfill and local groundwater (AGMC 2024a).

The proposed Upper Redeemer WRD Landfill is located immediately west of the existing Redeemer WRD Landfill (Figure 7). As noted in Section 2.5.1, groundwater levels in the area are reported at 17.4 to 18.36 mbgl (in bore REDIPMW10). The Upper Redeemer WRD Landfill will be situated on the WRD surface at a higher elevation than the existing Redeemer WRD Landfill.

2.6 Category 73 activities (Bulk storage)

The licence holder identified that the inclusion of additional fuel storage facilities and a ferric sulfate dosing unit may require the premises to be registered for prescribed activity Category 73. Consequently, the licence holder has proposed to include Category 73 within this licence amendment. The current holding volume of Category 73 chemicals on the premises is 1,038.806 m^3, and the storage area of each vessel is presented in Table 1. However, the licence holder has proposed that the design capacity for Category 73 be set at 1,400 m^3 in aggregate to allow for future storage requirements.

Storage and containment of these materials is regulated under the general provisions of the EP Act, the *Dangerous Goods Safety Act 2004*, and the Dangerous Goods Safety (Storage and Handling of Non-Explosives) Regulations 2007 to prevent impacts on receptors.

The department has assessed the proposed Category 73 chemical storage as part of the risk assessment in Section 3 of this Amendment Report. However, the department notes that liquefied petroleum gas (LPG) was initially proposed for inclusion under this category, but this request has been removed because LPG does not meet the Category 73 description (it is not a liquid at standard temperature and pressure (STP)).

Table 1: Containment infrastructure that meets the description of category 73

Area	Chemical type	Holding volume (m^3)
Emu Gatehouse	Fuels, Diesel	53
Process Plant	Sodium Cyanide 30% Solution	70.403
Process Plant	Sodium Cyanide 30% Solution	70.403
Process Plant	Sodium Hydroxide	63.5
Process Plant	Process Plant Hydrochloric Acid	11.5
Process Plant	Corrosive liquid Inorganic (Ferric Sulfate)	60
Process Plant	Hydrogen Peroxide	26
Power Station	Fuels, Diesel	53
Power Station	Fuels, Diesel	53
Power Station	Bulk Lubricant	10
Power Station	Waste Oil	5
Waroonga Surface	Fuels, Diesel	56
Waroonga Surface	Fuels, Diesel	56
Waroonga Surface	Fuels, Diesel	56
Waroonga Surface	Ammonium Nitrate Emulsion or Suspension or Gel	55
Waroonga Underground	Nitrites, Inorganic, Aqueous Solution	2
New Holland	Fuels, Diesel	55
New Holland	Fuels, Diesel	55
New Holland	Fuels, Diesel	55
New Holland	Fuels, Diesel	55
New Holland	Fuels, Diesel	55
New Holland	Fuels, Diesel	10
Barren Lands	Fuels, Diesel	53
Total holding volume		1038.806

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 2020a).

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 Amendment Report are detailed in Table 2 below. Table 2 also details the proposed control measures the licence holder has proposed to assist in controlling these emissions, where necessary.

Table 2: Licence holder controls

Emission	Sources	Potential pathways	Proposed controls
Construction			
Dust	Construction of ferrous sulfate dosing unit including any required earthworks.	Air/ windborne pathway	• Water cart utilised during construction to reduce dust emissions.
Sediment laden stormwater		Overland runoff	None proposed.
Dust	Construction of dewatering pipeline from Crusader complex to the Waroonga Ponds, via the Redeemer Return Water Pond and Construction of pipeline from Daisy Queen to the Redeemer Return Water Pond and Crusader Complex.	Air/ windborne pathway	• Water cart utilised during construction to reduce dust emissions.
Sediment laden stormwater		Overland runoff	None proposed.
Operation			
Dust	Increase operational height of Songvang In-pit TSF4 from 422 mRL to 425 mRL.	Air/ windborne pathway.	None proposed.
Tailings slurry		Overtopping of TSF resulting in overland runoff.	• TSF Inspection including: ○ Decant pond position and size; and ○ Tailings disposal tonnage rates. • Quarterly Aerial Imagery and

Emission	Sources	Potential pathways	Proposed controls
			Capacity Surveys to assist in determining remaining capacity and freeboard; and • TSF freeboard designed to temporary store a 1% annual exceedance probability (AEP), 72-hour duration storm event, provision of a minimum total freeboard of 500 mm to be maintained. Existing licence conditions: • Freeboard maintained to ensure water level does not exceed RL 422.0 m (amended to 425.0 m within this amendment).
Tailings supernatant		Vertical infiltration and lateral migration of tailings supernatant water.	• Monitoring of groundwater level and quality from existing monitoring bores; • Decant pond management via multiple spigot discharge locations with a single spigot open for discharge at any time; and • Pontoon mounted pump used to remove decant from the TSF.
		Ingestion of supernatant water.	• Operation of ferrous sulfate dosing unit during the warmer months of the year to reduce concentrations of arsenic within tailings and TSF decant pond; and • Gas guns used to deter birds from landing in the TSF supernatant pond.
Ferrous sulfate	Operation of the Ferrous Sulfate Dosing Unit to treat tailings at the EMU processing plant and then discharge to the premises TSFs.	Ferrous sulfate discharged to land from rupture/leak or from overtopping of the tank.	• 30 kL self-bunded tank; and • No significant quantities of Ferrous Sulfate will be used or stored without secondary containment.
		Discharge of tailings treated from the ferrous sulfate dosing unit to TSFs.	None proposed.
	Transportation of	Pipeline spills	• Pipelines will have telemetry

Emission	Sources	Potential pathways	Proposed controls
Mine dewater	mine dewater from Crusader Complex to Waroonga Turkeys Nest and from Daisy Queen to the Redeemer Return Water Pond and Crusader Complex.	or leaks resulting in overland runoff.	systems, pressure sensors and automatic cut-outs in the event of pipe failure; • Sections of pipeline that intersect creek crossings will have secondary containment sleeve bunding; and • Locations where pipelines intersect creek crossings will include engineered design measures to prevent changes to natural water flow via culverts, buried and concreted pipelines or raised stilt containment measures. Existing licence conditions: • Inspection of pipelines to occur daily; and • Pipelines containing environmentally hazardous materials contain either: automatic cut-outs, secondary containment or telemetry systems.
	Discharge of mine dewater to Waroonga Turkeys Nest, Barren Lands Turkeys Nest, Redeemer Return Water Pond, Redeemer Water tanks and Crusader Complex.	Overtopping of ponds.	• Pipelines from Waroonga Turkeys Nest to Hidden Secret Pit automatically discharges with the pond capacity reaches 95% of the 300 mm freeboard allocation, the discharge is continually monitored via Citec alarm enabled via calibrated float sensor within the pond; and • Daily mine dewater pipelines inspects completed to monitor flow meter functionality and pipeline integrity and butterfly valves inspected. Existing licence conditions: • Minimum freeboard of 300 mm maintained or containment for a 1 in 100 year/72 hour storm event (whichever is greater).
		Overtopping of pits.	Existing licence conditions: • Minimum freeboard of 3 m is maintained for each pit; and • Flow meters to be installed to calculate volumes of mine

Emission	Sources	Potential pathways	Proposed controls
			dewater discharged.
		Seepage of mine dewater through turkeys nests/ponds	• Turkeys nests and ponds are lined with a HDPE liner. *Due to the presence of the liner the department has discounted potential seepage from the turkeys nests and ponds.*
		Seepage of mine dewater through pits	Existing licence conditions: • Future groundwater monitoring bore network
Landfill Leachate	Operation of Barren Lands WRD Landfill, Upper Redeemer WRD Landfill and operation of the expanded Redeemer Landfill. *Operations include: waste handling, decomposition of wastes, tipping, application of landfill cover and vehicle movements.*	Rainfall causing seepage infiltration through wasterock soil profile to groundwater.	• Landfill facilities are to be situated on top of existing WRDs providing additional separation distance between groundwater and the landfill facilities; and • WRD have fresh rock capping to act as a capillary break to minimise water movement within the WRD. Existing licence conditions: • Separation distance between base of the landfill and the highest groundwater level shall not be less the 3 m. • Waste covered following deposition and prior to compaction and cover with 1 m of solid waste or soil by the end of the working day in which it was deposited.
Medical waste			Existing licence conditions: • Waste covered following deposition and prior to compaction and cover with 1 m of solid waste or soil by the end of the working day in which it was deposited.
Windblown waste		Air/ windborne pathway.	• Perimeter fencing installed *(Redeemer WRD Landfill only)*; • Waste covered at least monthly (or as required by licence conditions); • Only one landfill cell will be constructed and open at a time; and

Emission	Sources	Potential pathways	Proposed controls
			• Waste deposited in trenches approximately 2-3 m deep and 2-3 m wide *(Redeemer WRD Landfill only)*. Existing licence conditions: • Waste to be placed within defined trench with the active tipping area restricted to a maximum linear length of 70 and a width of 30 m; • Inert Waste Type 2 covered by then end of each fortnight which waste was deposited; • Plastic waste that has the potential to become windblown shall be covered as soon as practicable after deposit; and • Windblown rubbish contained within the boundary of the landfill and returned to the tipping area on at least a monthly basis.
Dust			• Dust managed by watering unsealed areas with a water cart as required.
Contaminated stormwater runoff		Overland runoff/migration into surrounding land and waterways from stormwater.	• Waste deposited in trenches approximately 2-3 m deep, 2-3 m wide and up to 30 long *(Redeemer WRD Landfill only).* Existing licence conditions: • Active tipping area to be a maximum length of 70 m and a width of 30 m.
Pests / vermin		Putrescible waste attracting pest and/or vermin creating biological pathways.	• Perimeter fencing installed; and • Waste covered at least monthly (or as required by licence conditions). Existing licence conditions: • Waste covered at the end of the week for putrescible waste.
Asbestos		Air/ windborne pathway.	• Asbestos waste to only be disposed of into a designed asbestos disposal area with the landfill. Existing licence conditions: • Waste covered following deposition and prior to

Emission	Sources	Potential pathways	Proposed controls
			compaction and cover with 1 m of solid waste or soil by the end of the working day in which it was deposited; • Asbestos not deposited within 2 m of the final tipping surface of the landfill; and • No works shall be carried out on the landfill that could lead to a release of asbestos fibres.
Diesel, waste oil, sodium cyanide, hydrochloric acid, ferric sulfate, hydrogen peroxide, bulk lubricant, ammonium nitrate emulsion or suspension or gel, inorganic, aqueous solution.	Storage of bulk chemicals.	Spills or leaks from storage infrastructure.	• Regular inspections schedules are maintained to report any loss of containment; and • Containment structures on Dangerous Goods License have been designed and commissioned with appropriate infrastructure and bunding with requirements of the *Dangerous Goods Safety Act 2004 (WA)* and *Australian Standards (AS) 1940-2004: The storage and handling of flammable and combustible liquids*.

3.1.2 Receptors

In accordance with the *Guideline: Risk assessments* (DWER 2020a), the Delegated Officer has excluded employees, visitors and contractors of the licence holder's 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 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 2020b)).

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

Environmental receptors	Distance from prescribed activity
Native vegetation	Category 5 • Native vegetation comprises of low mulga (*Acacia aneura*) woodlands, with an understory of Acacia shrubland. Sparse vegetation is located approximately **100 m south** and **100 m west** from the TSF pit crest; and • Remnant native vegetation approximately **190 m southeast** of the proposed ferrous sulfate dosing unit.

	Category 6 • Native vegetation is located along both proposed pipeline routes. Once cleared it is estimated that native vegetation will be located approximately **2 m** from the pipelines. • The nearest remnant native vegetation to the proposed discharge locations is located approximately **50 m west** of the TSF3 RWP and **30 m east** of the Barren Lands Turkeys Nest.
	Category 64 • Remnant Native vegetation is located approximately: ○ **170 m west** of the proposed Barren Lands Landfill; ○ **150 m east** of the proposed Redeemer Landfill expansion; and ○ **120 m east** of the proposed Upper Redeemer Landfill.
	Category 73 • Remnant native vegetation is located approximately **150 m** south of the waste oil storage location near the New Holland Pit; • Remnant native vegetation is located approximately **140 m** southeast of the diesel fuel storage location situated south of the processing facility; and • All other storage locations are situated over **300 m** from native vegetation.
Fauna (birds)	Native birds are known to inhabit native vegetation and areas within and surrounding the premises.
Lawlers Creek / Songvang Creek	Category 5 Lawlers Creek (also referred to as Songvang Creek) is an ephemeral creek that was historically diverted to allow pit mining within Songvang Pit. The creek is described as shallow and relatively wide (~30 m) (CMW 2024). The lowest surveyed elevation of creek is 440.5 mAHD (AGMC 2025a). The creek flows from the northeast to the south, passing within approximately **230 m south** of Songvang In-pit TSF4 pit crest. The creek does not intersect groundwater and only flows following heavy storms, with some water infiltrating the creek bed to recharge groundwater (CMW 2024).
Drainage/water lines	Category 6 (Dewater) Multiple drainage and ephemeral creek lines intersect

	both proposed pipeline routes.
	<u>Category 64 (Landfill)</u> • Drainage lines appear to be located approximately **850 m west** of the proposed Upper Redeemer Landfill which flows downstream into Scotty Creek approximately 4.9 km away; and • A drainage line is located approximately **120 m west** of the proposed Barren Lands WRD Landfill. The line flows downstream into Scotty Creek located approximately 4.2 km away.
	<u>Category 73</u> • All category 73 storage locations are situated over **500 m** from other drainage lines.
Claudius Creek	<u>Category 64 (Landfill)</u> • Claudius Creek is located approximately **800 m east** of the proposed Redeemer Landfill expansion.
Underlying groundwater (Goldfields Groundwater Area)	<u>All categories</u> Pre groundwater levels were approximately **17-18 mbgl** (426 mAHD). Historical and recent groundwater results within surrounding monitoring bores report the following: • Current groundwater table varies from **20 to 37 mbgl** (405 mAHD to 425 mAHD); • **TDS:** reported between approximately 800 to 3,700 mg/L; • **pH** – 7.7 – 8.4; • **Arsenic:** <LOR to 0.092 mg/L; and • **Weak Acid Dissociable (WAD) Cyanide**: 0.004 – 0.008 mg/L. Groundwater appears to flow in a southerly direction.
Groundwater future use: Livestock drinking water	<u>All categories</u> Mine closure plan includes a performance indicator for “Groundwater quality/depth remains within livestock drinking guidelines” (MP 92409).
Other groundwater uses *[Discounted]*	*<u>Category 5</u>* *There are no production bores of third-party groundwater users in the surrounding of Songvang In-pit TSF4. The closest potential receptor being the Hanson Well, located 3.6 km south-west of the pit.* *The department considers the distance from the TSF to Hanson Well is significant enough that it is unlikely that seepage would impact the bore.*

Cultural receptors	Distance from prescribed activity
Category 5 • ACH-00020666 – Lawlers Creek – Creation / Dreaming Narrative; Water Source; • ACH-00020722 – Songvang 1 – Artefacts / Scatter; Other; and • ACH-00020723 – Songvang 2 – Artefacts / Scatter; Other.	• Lawlers Creek – located approximately 230 km south of the Songvang TSF 4; • Songvang 1 – located approximately 360 m southwest of the TSF; and • Songvang 2 – located approximately 160 m south of the TSF.
Category 6 Pipeline from Daisy Queen Pit to the Redeemer Return Water Pond pipeline: 1. ACH-00020666 – Lawlers Creek – Creation / Dreaming Narrative; Water Source; and 2. ACH-00001493 – Lawlers – Camp. Pipeline from Crusader Complex to Waroonga Pond: 3. ACH-00028453 – NHRC_WH_02 – Creation / Dreaming Narrative; Landscape / Seascape Feature; and ACH-00028451 – NHRC_WH_03 – Creation / Dreaming Narrative; Landscape / Seascape Feature.	1. Daisy Queen to Redeemer Return Water Pond pipeline intersects Lawlers Creek (ACH-00020666). A pre-existing haul road currently crosses the creek which the proposed pipeline will follow. 2. Daisy Queen to Redeemer Return Water Pond pipeline intersects the ACH-00001493 public boundary and is approximately 90 m from the dwelling. An additional pipeline (assumed to be from the Fairylands Borefield) is located approximately 20 m from the dwelling. 3. Pipeline intersects NHRC_WH_02 and NHRC_WH_03 public boundary, it's noted that the Crusader Complex Pits are located within the heritage boundary.

3.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020a) for those emission sources which are proposed to change 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 licence holder 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 licence holder's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the licence as regulatory controls.

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

The Revised licence L4611/1987/11 that accompanies this Amendment Report authorises emissions associated with the operation of the Premises i.e. construction and operation of the Ferrous Sulfate Dosing Unit, dewatering pipeline, new landfill facilities and increase in operational height of Songvang In-pit TSF4.

The conditions in the Revised Licence have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

Table 4. Risk assessment of potential emissions and discharges from the premises during construction and operation

Risk Event					Risk rating[1] C = consequence L = likelihood	Licence holder's controls sufficient?	Conditions[2] of licence	Justification for additional regulatory controls / DWER comments
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Licence holder's controls**				
Construction								
Earthworks and construction of Ferrous Sulfate dosing unit.	Dust	**Pathway:** Air/ windborne pathway. **Impact:** Impact to ecological health.	• Native vegetation (remnant)	Refer to Section 3.1	C = Slight L = Rare **Low Risk**	Y	**Condition 28:** Water cart to be utilised to reduce dust emissions during earthworks.	The department considers the construction works (including earthworks) required are minor and short-term. As a result, the department considers the construction of the ferrous sulfate dosing unit poses an acceptable risk to the environment health. No additional regulatory conditions have been placed on the licence.
	Sediment laden stormwater	**Pathway:** Overland runoff from rainfall or excessive dust suppression. **Impact:** Smothering of native vegetation leading to health impacts or death.				Y	N/A	
Earthworks, installation of culverts for creek crossing points and the construction of dewatering pipeline and associated supporting infrastructure for pipelines: • Crusader Complex to Waroonga Turkeys Nest; and • Construction of pipeline from Daisy Queen to the Redeemer Return Water Pond and Crusader Complex.	Dust	**Pathway:** Air/ windborne pathway. **Impact:** Impact to ecological health.	• Native vegetation (remnant)		C = Minor L = Rare **Low Risk**	Y	**Condition 28:** Water cart to be utilised to reduce dust emissions during earthworks.	
	Sediment laden stormwater	**Pathway:** Overland runoff from rainfall events or excessive dust suppression. **Impact:** Reduction in environmental health values via smothering native vegetation or sedimentation of drainage lines or ephemeral creeks interrupting flow or increasing turbidity.	• Ephemeral water lines / Drainage lines; • Claudius creek; and • Cultural receptors.	Refer to Section 3.1	C = Minor L = Unlikely **Medium Risk**	N	**<u>Condition 28: Water runoff from dust suppression activities must not enter water lines and/or creeks.</u>**	Due to the proximity of the proposed pipeline route and water lines/Claudius Creek, the department considers that during earthworks and pipeline construction, the use of a water cart for dust suppression may generate runoff that could potentially enter the water lines. To reduce this risk, the department requires that any runoff from dust suppression must not flow into water lines or creeks.
			• Native vegetation (remnant)		C = Minor L = Rare **Low Risk**	Y	N/A	N/A
Operation								
Category 5: Processing or beneficiation of metallic or non-metallic ore								
Increase in operating height for Songvang In-pit TSF4 from 422 mRL to 425 mRL.	Dust	**Pathway:** Air/ windborne pathway. **Impact:** Impact to ecological health.	• Native vegetation	Refer to Section 3.1	C = Slight L = Rare **Low Risk**	Y	None	N/A
	Tailings supernatant	**Pathway:** Ingestion of supernatant water. **Impact:** Impacts to wildlife health.	• Native fauna (birds)		C = Moderate L = Unlikely **Medium Risk**	Y	**Condition 2:** Bird deterrent utilised between December to March if birds are present within the TSF; **Condition 3:** Twice daily inspections of bird/wildlife mortality between December and March and weekly between March and December; **Condition 8:** Tailings treated via a cyanide detoxification unit; **Condition 9:** Tailings treated via a ferrous sulfate dosing unit during December to March;	The department considers current conditions, and the proposed Ferrous Sulfate Dosing Unit are appropriate to manage potential risks to native fauna.

Risk Event					Risk rating[1] C = consequence L = likelihood	Licence holder's controls sufficient?	Conditions[2] of licence	Justification for additional regulatory controls / DWER comments
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Licence holder's controls**				
		Pathway: Vertical infiltration and lateral migration of tailings supernatant water. **Impact:** Impacts to groundwater resources, surface water quality or mounding	• Groundwater; • Groundwater future use (livestock drinking water); and • Lawlers Creek/Songvang Creek (ACH site).		C = Moderate L = Unlikely **Medium Risk**	N	**Condition 2:** Restricted final operating height and monitoring bore network; **Condition 17: Groundwater monitoring requirements and trigger and limits for parameters;** **Conditions 18, 20 and 21:** Groundwater Recovery Plan if limits or targets under condition 17 are met; and **Condition 27:** Notification requirements.	Refer to section 3.3.
	Tailings slurry	**Pathway:** Overtopping of Songvang In-pit TSF4, resulting in overland runoff. **Impact:** Discharge to land, resulting in impacts to ecological health and amenity	• Native vegetation; • Creek lines and Songvang Creek / Lawlers Creek; and • Aboriginal heritage site.	Refer to Section 3.1	C = Moderate L = Rare **Medium Risk**	Y	**Condition 2:** Freeboard height; and **Condition 3:** Daily inspections of TSF freeboard when operating.	Songvang In-pit TSF4 is designed to temporarily store a 1% AEP, 72-hour duration storm event on top of the facility. A minimum total freeboard of 500 mm is provided, comprising: • Operational freeboard: 300 mm; • Beach freeboard: 200 mm; and • Allowance for the 1% AEP 72-hour event: 196 mm (AGMC 2025). The lowest point of the pit crest is estimated at approximately RL 442.2 m. By authorising an operating height of RL 425.0 m for the in-pit TSF, there will be approximately 17.2 m remaining between the maximum operating height and the crest of the TSF, making overtopping events rare.
Operation of the Ferrous Sulfate Dosing Unit to treat tailings at the EMU processing plant and then discharge to the premises TSFs.	Ferrous Sulfate	**Pathway:** Ferrous sulfate discharged to land from rupture/leak or from overtopping of the tank. **Impact:** Contamination via acidification soil, impacts to groundwater or reduction of health or death of receptors.	• Groundwater; and • Native fauna.	Refer to Section 3.1	C = Minor L = Unlikely **Medium Risk**	Y	**Condition 2:** Ferrous Sulfate Dosing Unit fitted with a high level and bund alarm contains a self-bunded tank.	The department considers the proposed controls sufficient to prevent leaks or spills from the tank. However, the department has strengthened the bunding requirement for the Ferrous Sulfate Dosing Unit by requiring the licence holder to ensure that: Bunding is capable of containing at least 110% of the tank's internal volume, or that internal bunding is constructed to prevent any spills or leaks from being discharged into the environment. The department also considers that the requirements under the Goods Safety (Storage and Handling of Non-Explosives) Regulations 2007 are appropriate to manage spills or leaks from the unit.
		Pathway: Discharge of tailings treated from the ferrous sulfate dosing unit to TSFs. **Impact:** Increased concentrations of sulfate ingested/absorbed by receptors causing reduction in health or contamination of groundwater.	• Groundwater; and • Native fauna	Refer to Section 3.1	C = Minor L = Possible **Medium Risk**	Y	**Condition 3:** Twice daily inspections of bird/wildlife mortality between December and March and weekly between March and December.	There is potential that use of the Ferrous Sulfate Dosing Unit to treat tailings may increase sulfate concentrations in the tailings and decant pond at TSFs on the premises. The draft *Livestock Drinking Water Guidelines*[1] (ANZG 2023) guidelines specify a maximum sulfate concentration of 250 mg/L for poultry drinking water. Laboratory analysis of a decant water sample collected on 14 December 2023 reported a sulfate concentration of 2,100 mg/L (CMW 2024). To reduce impacts on native fauna, the licence holder has previously implemented the following: • Upgraded pumping infrastructure on 30 August 2025 to achieve an approximate pumping rate of 280 m³/hour, reducing the size of the decant pond; and • Installed air cannons to deter birds from entering the

[1] *Australian and New Zealand Guidelines for Fresh and Marine Water Quality – Primary Industries* (ANZECC & ARMCANZ, 2000) livestock drinking water guidelines does not specify a sulfate concentration for poultry/birds.

Risk Event					Risk rating[1] C = consequence L = likelihood	Licence holder's controls sufficient?	Conditions[2] of licence	Justification for additional regulatory controls / DWER comments
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Licence holder's controls**				
								facility. The department considers that the overall risk of increased sulfate concentrations impacting native fauna is outweighed by the reduction in arsenic concentrations achieved by the Ferrous Sulfate Dosing Unit and that the use of air cannons should deter birds from entering the facility. Therefore, no additional regulatory controls have been included for its operation.
Category 6: Mine dewatering								
Transportation of mine dewater from Crusader Complex to Waroonga Turkeys Nest and from Daisy Queen to the Redeemer Return Water Pond and Crusader Complex and discharge at: • Redeemer Return Water Pond; • Redeemer Water Tanks; • Barren Lands Turkeys Nest; • Waroonga Turkeys Nest; and • Crusader Complex and Transportation of mine dewater from New Holland Turkeys Nest to the Waroonga Turkeys Nest.	Mine dewater (fresh to brackish)	**Pathway:** Mine dewater discharged to land from rupture/leak of dewatering pipeline. **Impacts:** Impacted areas may become dispersive, causing increased erosion/sedimentation and reduction of environmental or cultural values.	• Native vegetation (remnant); • Native heritage sites; and • Ephemeral water lines / Drainage lines.	Refer to Section 3.1	C = Slight L = Possible **Low Risk**	Y	**Condition 3:** Daily inspections of mine dewater pipelines when operating; and **Condition 4:** Containment requirements for pipelines containing environmentally hazardous materials.	Each creek crossing will utilise either a culvert, buried and concrete pipelines or raised stilt containment measures designed to maintain the natural flow of the creek and all pipelines will be fitted with secondary sleeve bunding to further reduce the risk of spills or leaks impacting sensitive receptors. Provided that water on the premises generally meets livestock drinking water guidelines and in combination with the proposed controls and existing licence conditions, the department considers the risk of receptors being impacted to be low.
		Pathway: Mine dewater discharged to land from overtopping of Turkeys Nest/Ponds or water tanks failure or leaks. **Impacts:** Impacted areas may become dispersive, causing increased erosion/sedimentation and reduction of environmental or cultural values.	• Native vegetation (remnant); and • Native heritage sites.		C = Minor L = Unlikely **Medium Risk**	Y	**Condition 2:** Freeboard requirements for containment infrastructure; and **Condition 4:** Pipeline equipment requirements (automatic cut-outs, secondary containment or telemetry systems).	Existing licence conditions require an available freeboard of 300 mm to be maintained on containment infrastructure for a 1 in 100/72 hour storm event (whichever is greater) to be maintained at all times. The department considers that overtopping events are unlikely provided that sufficient freeboard is maintained and managed. The department notes that a recent overtopping event occurred on the premises on 23 November 2025 resulting in the overtopping of the New Holland Turkeys Nest with approximately 2 to 5 kL fresh to brackish water discharged to the surrounding environment. The overtopping event was a result of a blockage of an overflow pipe due to windblown vegetation. The licence holder intends to clear the pipe blockage, reinstate the pipeline flow, investigate diversion strategy for dewatering such as pit sump capacities and potential install Citec monitoring system with an alarm set to 95% of the 300 mm freeboard requirement. This event is considered by the department to be a non-compliance against License L4611/1987/11 and has been recorded in the department internal records for future reference.
		Pathway: Mine dewater discharged to land from overtopping of Crusader Complex pits. **Impacts:** Impacted areas may become dispersive, causing increased erosion/sedimentation and reduction of environmental or cultural values.	• Native vegetation; • Ephemeral creek lines; and • Aboriginal heritage sites		C = Minor L = Unlikely **Medium Risk**		**Condition 2:** Freeboard requirements; **Condition 3**: Inspection of freeboard requirements; **Condition 10:** Mine dewater discharge location and volume restrictions; and **Condition 16:** Cumulative volume monitoring requirements.	The department considers the current licence conditions are suitable to manage the discharge of mine dewater sourced from Daisy Queen to the Crusader Complex. No additional regulatory controls are required.
		Pathway: Mine dewater seeping through pit walls to groundwater. **Impacts:** Seepage creating groundwater mounding potentially causing impacts to nearby native vegetation root systems	• Native vegetation; and • Groundwater		C = Minor L = Possible **Medium Risk**	Y	**Condition 2:** Freeboard requirements; **Condition 3:** Inspection of freeboard requirements; **Condition 10:** Mine dewater discharge location and volume restriction;	The department considers the current licence conditions are suitable to manage the seepage of mine dewater sourced from Daisy Queen to the Crusader Complex. No additional regulatory controls are required.

Risk Event					Risk rating[1] C = consequence L = likelihood	Licence holder's controls sufficient?	Conditions[2] of licence	Justification for additional regulatory controls / DWER comments
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Licence holder's controls**				
							Condition 15: Water sampling requirements; **Condition 17:** Groundwater monitoring bore monitoring requirements; **Condition 31 -32:** Groundwater monitoring bore construction requirement	
Category 64: Class II or III putrescible landfill site								
Operation of Barren Lands, Upper Redeemer Landfill and increased footprint of Redeemer Landfill (putrescible and inert material) including waste handling, decomposition of wastes, tipping, application of landfill cover and vehicle movements.	Leachate	**Pathway:** Rainfall causing seepage infiltration through wasterock and soil profile to groundwater. **Impacts:** Reduction of groundwater quality potentially causing contamination.	• Groundwater • Native vegetation	Refer to Section 3.1	C = Moderate L = Unlikely **Medium Risk**	Y	**Condition 5:** Separation distance requirement for base of landfill and maximum groundwater level; and **Condition 5:** Waste to meet the acceptance criteria for Class II landfills.	The department understands that the proposed expansion of the Redeemer WRD landfill will operate under the same conditions as the current licence. No additional conditions or requirements have been included, and the change has been addressed within the risk assessment. The only operational change is an increase in footprint. The proposed new landfills (Barren Lands and Upper Redeemer) have sufficient separation between groundwater and the active tipping area, as discussed in Section 2.5. The department considers that the proposed controls (Table 2) and existing licence conditions are appropriate to manage the risk of emissions to receptors.
	Medical waste						**Condition 5:** Separation distance requirement for base of landfill and maximum groundwater level.	
	Windblown waste	**Pathway:** Air/ windborne pathway. **Impacts:** Ingestion or entanglement of native fauna leading to a reduction in health or death.	• Native fauna		C = Minor L = Possible **Medium Risk**	Y	**Condition 5:** Requires waste to be placed in a defined trench with the active tipping area restricted to a maximum linear length of 70 m and a width of 30 m; **Condition 6:** Cover requirements for inert waste type 2; and **Condition 7:** Requirement to contain wind-blown waste to the landfill and return wind-blown waste to tipping area on at least a monthly basis.	The department considers that existing licence conditions are appropriate to prevent windblow waste impacting identified receptors. No additional regulatory conditions have been placed on the licence.
	Dust	**Pathway:** Air/ windborne pathway. **Impacts:** impact to ecological health via smothering.	• Native vegetation			Y	**Condition 5:** Requires waste to be placed in a defined trench with the active tipping area restricted to a maximum linear length of 70 m and a width of 30 m.	N/A
	Contaminated stormwater runoff	**Pathway:** Overland runoff/migration into surrounding land and waterways from stormwater. **Impacts:** Contamination and/or reduction of environmental health introducing metals or increased nutrients to receptors.	• Drainage lines; • Claudius creek • Native vegetation		C = Minor L = Rare **Low Risk**	N	**Condition 5:** Requires waste to be placed in a defined trench with the active tipping area restricted to a maximum linear length of 70 m and a width of 30 m; and **<u>Condition 5: Windrow constructed around landfill trenches to prevent contaminated stormwater from leaving the area and divert clean stormwater around the trenches.</u>**	The closest water line to the assessed landfills is located 120 m west of Barren Lands Landfill (Table 3). Due to the close proximity to the water line and to provide additional protection from all other landfills at the premises from impacting receptors the department has required the licence holder to ensure that a trench is constructed around each landfill facility to prevent contaminated stormwater from leaving the area and to prevent clean stormwater entering the landfill facilities.
	Pests / vermin	**Pathway:** Putrescible waste attracting pest and/or vermin creating biological pathways. **Impacts:** Increased concentration of pest and/or vermin competing with native fauna or spreading disease.	• Native fauna		C = Minor L = Unlikely **Medium Risk**	Y	**Condition 6:** Cover requirements for putrescible waste.	Due to the proximity of the Barren Lands WRD Landfill and the Upper Redeemer WRD Landfill (located approximately 170 m and 120 m, respectively, from nearby native vegetation) it is assumed that native fauna inhabits these areas and may be impacted by pests or vermin attracted to the landfill. The department considers the requirement to cover putrescible waste weekly after deposition to be sufficient to address this risk. As a result, no additional regulatory controls have been

Risk Event					Risk rating[1] C = consequence L = likelihood	Licence holder's controls sufficient?	Conditions[2] of licence	Justification for additional regulatory controls / DWER comments
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence holder's controls				
								imposed on the licence.
	Asbestos	**Pathway:** Air/ windborne pathway. **Impacts:** Contamination of surrounding environment and impacts to receptor health potentially causing death.	• Native fauna		C = Minor L = Unlikely **Medium Risk**	Y	**Condition 5:** Asbestos only disposed in a designated asbestos disposal area, not to be deposition within 2 m of the final tipping surface of the landfill and no works to be carried out that could lead to release of asbestos fibres; and **Condition 6:** Cover requirements for asbestos.	The department considers the proposed controls and current conditions within the licence are appropriate to manage potential asbestos emissions from impacting receptors.
Bulk storage of Chemicals	Diesel, waste oil, sodium cyanide, hydrochloric acid, ferric sulfate, hydrogen peroxide, bulk lubricant, ammonium nitrate emulsion or suspension or gel, inorganic, aqueous solution.	**Pathway:** Spills or leaks from storage infrastructure **Impact:** Contamination or reduction of health values of environmental receptors	• Groundwater • Local soils • Native vegetation	Refer to Section 3.1	C = Minor L = Unlikely **Medium Risk**	Y	**Condition 2:** Restriction of no more than 1,400 kL storage at premises and contained in accordance with Dangerous Goods Safety Act 2004 (WA) and *Australian Standards (AS) 1940-2004.* **Condition 3:** Inspection requirements	The department notes that the application states regular inspections are in place to ensure the operation and maintenance of the storage facilities however does not specify how often. The department considers that a weekly inspection of each storage infrastructure is sufficient to manage potential impacts on receptors from the bulk storage of chemicals and has therefore included this requirement in Condition 3 of Licence L4611/1987/11.

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

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

3.3 Detailed risk assessment for seepage from operation of Songvang In-pit TSF4 to 425 mRL

3.3.1 Background

Songvang In-pit TSF4 is unlined and is approximately 160 m deep with the pit floor at 285 mRL. The pit rim is 445 mRL and accommodates a surface area of approximately 30 ha (CMW 2024). Geological information from the Agnew mine site indicates that the Songvang In-pit TSF4 is surrounded by regolith and basement rocks that have a very low hydraulic conductivity.

Songvang In-pit TSF4 currently receives tailings from the EMU Processing Plant. The tailings are treated through a cyanide detoxification unit to reduce the concentration of WAD cyanide in tailings and will be treated by a ferrous sulfate dosing unit to reduce mobility of arsenic (section 2.3.2) prior to discharge. The process involves dosing the tailings with hydrogen peroxide, or with Caro's acid aka peroxymonosulfuric acid (H_2SO_5) by mixing sulfuric acid and hydrogen peroxide.

Current return water management system consists of a floating pontoon to pump decant water from Songvang In-pit TSF4 to a nearby lined process pond north of the pit (TSF4 RWP). Water is then pumped from TSF4 RWP to TSF3 RWP, then to TSF2 RWP and then again to the processing plant for reuse.

During a previous licence amendment (granted on 17 October 2023) the department undertook a detailed risk assessment for the increase in Songvang In-pit TSF4 operating height from 404 mRL to 422 mRL. The department determined that the consequence of seepage impacting identified receptors (Groundwater and Lawlers Creek / Songvang Creek) was minor and the likelihood of the event occurring was possible, resulting in an overall risk rating of medium in accordance with *Guideline: Risk assessments* (DWER 2020a).

3.3.2 Tailings geochemistry

Tailings characterisation was undertaken by Golder (2016) to support the operation of Songvang In-pit TSF4. It is understood that the tailings geochemistry is unchanged and the previous findings were still considered to be applicable and can be summarised as:

- In general, trace metal concentrations in tailings were similar or lower than their respective crustal abundances. The exception to this was arsenic, gold, cadmium, sulfur and selenium, which were all at least six times higher than their respective crustal abundances;
- Tailings had a negative net acid producing potential of -16 kg H_2SO_4/tonne, which indicated that the tailings were non-acid forming (NAF). This was supported by an acid neutralising capacity to maximum potential acidity ratio of 1.96; and
- Short-term leaching test (using deionised water as the leaching fluid) yielded a leachate with slightly alkaline pH (i.e., pH between 8.2 to 9.0), high salinity (i.e., 947 to 956 mS/cm) and enriched with soluble salts (i.e., sulfur, sodium, calcium).

The assessment concluded that the tailings seepage should not present a risk to the surrounding environment and could potentially progress above the ambient groundwater table without significant risks.

3.3.3 Existing monitoring data

Groundwater monitoring bores were installed around the perimeter of Songvang In-pit TSF4 in 2016, prior to its commissioning (Figure 8). Before mining commenced, groundwater levels were reported at approximately 17–18 mbgl (426 mAHD) (AGMC 2025a). Monitoring began in 2016, with initial groundwater measurements ranging from 20 to 37 mbgl (405–425 mAHD).

In 2023-2024, a noticeable rise in groundwater levels was observed in bores SV2-2 (~11 m) and SV6-1 (~9 m). The bores are located in the southern portion of the pit, which lies down the hydraulic gradient from the TSF. Recent data from March 2025 indicates that the groundwater levels have reduced in these bores to ~32 (SV2-2) and ~33 (SV6-1) mbtoc.

Currently, the bores are monitored quarterly for static water levels (SWLs) and water quality in accordance with licence L4611/1987/11. Metals and other parameters, including cyanide and major ions, are sampled biannually.

Groundwater flow in the vicinity of Songvang In-pit TSF4 generally moves from north to south (Figure 9), consistent with the area's topography. The highest SWL reading occurs in bore SV5-1, situated along the assumed cross-gradient, while the deepest SWL is recorded in bore SV6-1, located down-gradient.

Most groundwater samples exhibit a sodium–chloride water type, except for bore SV6-1. The distinct water type and lower salinity at SV6-1 are interpreted as being influenced by infiltration of runoff or leakage from the drainage diversion southeast of the pit (CMW 2024). Additionally, SV6-1 shows lower chloride concentrations and higher bicarbonate alkalinity (as $CaCO_3$) compared to other bores near TSF4, suggesting influence from Lawlers/Songvang Creek.

Concentrations of dissolved metals sampled within the Songvang TSF bores were low and were generally reported below the ANZECC criteria (CMW 2024), the department makes the following observations from monitoring data (AGMC 2025b) of the surrounding monitoring bores:

- WAD cyanide has not been reported above the limit of reporting[2] (LOR) for all laboratory submitted groundwater samples;
- Arsenic concentrations (both total and dissolved) range from 0.001 to 0.092 mg/L, with the highest value recorded at bore SV6-1 in September 2023. Generally, arsenic levels are very low compared to the ANZECC & ARMCANZ (2000) livestock drinking water guideline of 0.5 mg/L. However, the draft ANZG (2023) guidelines recommend a much lower threshold of 0.025 mg/L for livestock drinking water. The 0.092 mg/L result is therefore considered high and an outlier, especially when compared to the next highest recorded concentration of 0.016 mg/L;
- TDS concentrations have remained below 1,000 mg/L since 2022 with exception to SV1-1 where a recording reported amount of 3,699 mg/L was reported, however is considered an outlier and an error. There has been a very gradual increase in TDS since 2020. The trend continues to not appear to be correlated to changes in SWL;
- Sulfate as SO_4 concentrations have remain stable throughout the monitoring period, ranging between 13 mg/L to 108 mg/L;
- Concentrations of nickel are generally reported in very low concentrations (0.001 – 0.006 mg/L) when compared with the livestock drinking water guideline of 1 mg/L (ANZECC & ARMCANZ 2000). The highest concentrations of nickel are reported within SV4-1 with a maximum of 0.2 mg/L reported in 2022. SV4-1 is up groundwater gradient from Songvang In-pit TSF4 suggesting that seepage is not contributing to the result; and
- No other metals or metalloids analysed display any increasing trends within the Songvang In-pit TSF4 monitoring bores and it can be assumed that current deposition of tailings into the TSF is not impacting groundwater quality conditions.

[2] LOR for WAD cyanide is 0.004 mg/L

Figure 8: Groundwater monitoring bore locations

Figure 9: Indicative groundwater contours (Sourced from CMW 2024)

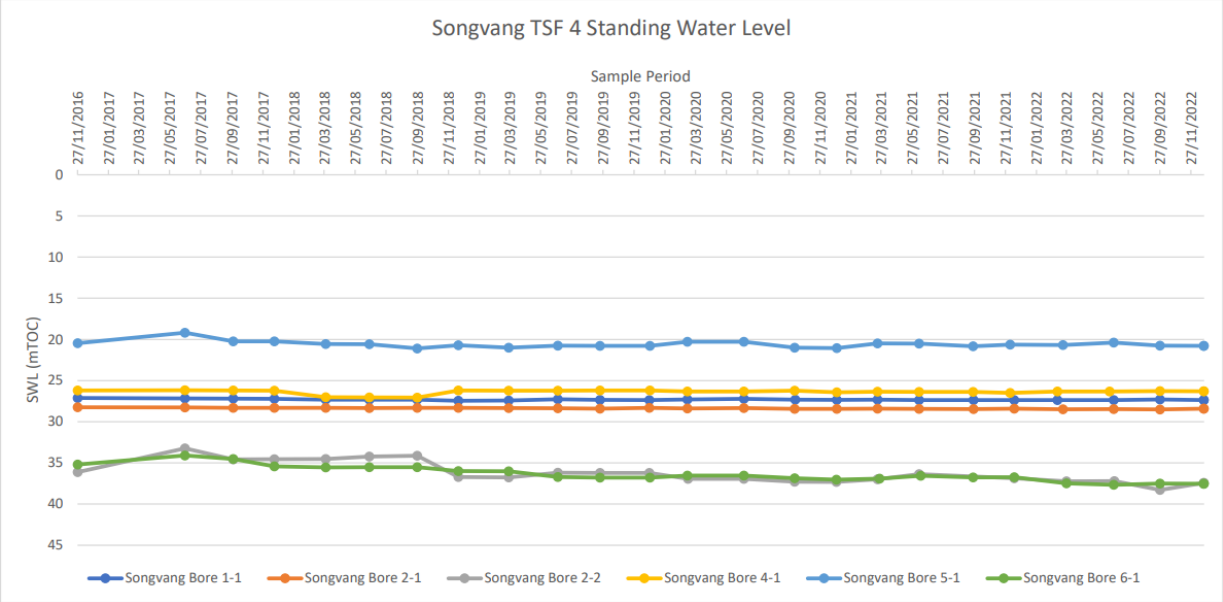

Figure 10: Standing water level for Songvang bores from 2016 to 2022 (Sourced form AGMC 2023)

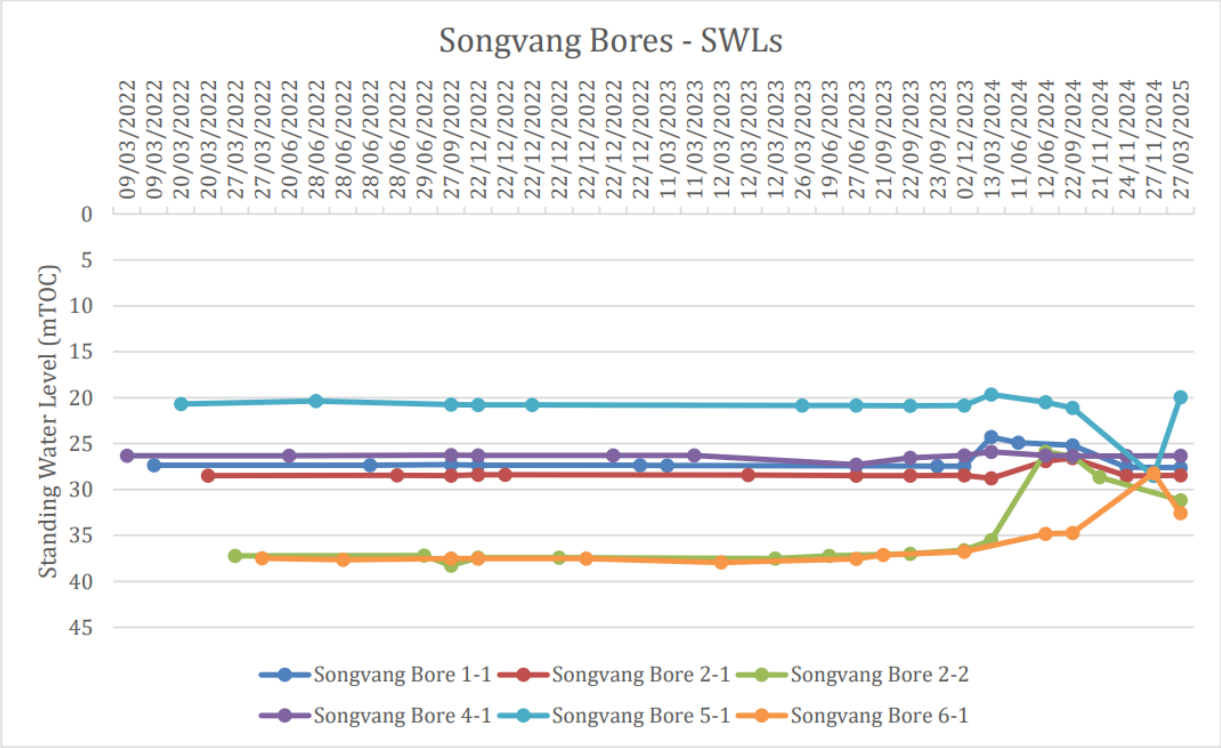

Figure 11: Standing water level for Songvang bores from 2022 to 2025 (Sourced from AGMC 2025)

3.3.4 Groundwater flow and transport modelling

CMW Geosciences conducted groundwater modelling to assess potential solute migration within Songvang In-pit TSF4 (CMW 2024). The objective was to simulate groundwater flow near the pit and estimate transport distances and concentrations for WAD cyanide, arsenic, selenium, nickel, and sulfate.

The groundwater model was developed using MODFLOW, which simulates three-dimensional groundwater flow. The baseline model representing pre-mining hydrogeological conditions was used to establish the initial head (combined pressure and elevation head at 425 mRL) for input into the MT3DMS model.

MT3DMS, an advanced multi-species transport model, was then applied to simulate solute movement through advection, dispersion, and diffusion. It operates on a finite-difference groundwater flow platform such as MODFLOW.

Hydraulic conductivity values were derived from falling head tests conducted in 2016 on monitoring bores surrounding the TSF. Results ranged from 0.005 m/day to 0.13 m/day, with a value of 0.02 m/day adopted for the weathered bedrock zone in the transport model.

A steady-state baseline model was calibrated to match pre-mining conditions and then run for a 200-year simulation period to evaluate potential TSF influence at an operational height of 425 mRL. The model domain extended 1.5 km from the pit in all cardinal directions.

A conservative approach was applied, source concentrations within the tailings were assumed constant throughout the simulation. In reality, these concentrations would likely decrease over time due to transformation and degradation processes; however, for modelling purposes, they were held steady to represent a worst-case scenario modelling results.

Local groundwater levels results

The proposed operating height of 425 mRL is below the pre-mining potentiometric surface (approximately 426 mAHD). As a result, the model predicts a localised decrease in groundwater levels both downgradient and upgradient of the pit lake. The upgradient drawdown is generally more pronounced than downgradient drawdown (CMW 2024).

The model indicates that drawdown effects would extend approximately 50 m downgradient and up to 300 m upgradient from Songvang In-pit TSF4. Under this model and assumption localised groundwater flow paths are oriented towards the TSF and will act as a groundwater sink.

If low permeability tailings are deposited above localised groundwater levels, groundwater mounding around the pit lake perimeter is may occur increasing seepage velocities from the TSF.

Solute transport modelling results

Solute transport modelling was completed as part of the CMW report, it comprised of transport modelling assessment against WAD Cyanide, arsenic, nickel, selenium and sulfate. Modelled concentrations generally elongate from the northwest to southeast along the TSF horizontal axis.

Arsenic, nickel and selenium simulations indicate short transport distance due to the strong attachment to soil when compared with other modelled analytes.

According to the model the aquifer concentrations for arsenic (0.5 mg/L), nickel (1.0 mg/L) and selenium (0.02 mg/L) is expected to be present after 200 years within 50 m of the pit edge. Concentrations of WAD cyanide is expected to be as low as 0.0001 mg/L approximately 130 m away from the pit perimeter.

Sulfate simulations indicates that transport up to 235 m southwest of the pit is expected. Concentrations above 1,000 mg/L is likely to be only exceeded in very close proximity to the TSF (i.e. <20 m from the pit edge) (CMW 2024).

CMW (2024) mentions that the plume expansion is indicated to be higher for the first 100 years after tailings deposition and is expected to then rapidly diminishes thereafter. As a result of tailings deposition local groundwater mounding around the circumference of the pit is likely resulting in an increase of seepage velocities directed outside of the pit (AGMC 2025).

Departments observations on the models

The department assessed the model in accordance with the Australian Groundwater Modelling Guidelines (National Water Commission 2012) and considers the model to provide the lowest level of confidence (class 1).

The groundwater flow model generated within MODFLOW had generally been developed in a technically sound manner however limited data availability means the model is considered to be a class 1 model which is the lowest level of confidence (National Water Commission 2012). It is noted that the model is considered to be sufficiently accurate to indicate that the proposed operations is unlikely to significantly change the level of risk from seepage impacting receptors.

The results of the solute transport modelling are considered less reliable as the model has assumed that the attenuation of contaminant concentrations with time and distance from the source could be simulated by the use of arbitrary solid-liquid distribution coefficients to account for adsorption by minerals in the aquifer matrix. There is not an adequate consideration of the nature of chemical interactions between groundwater solutes and minerals in the aquifer matrix.

The department agrees with the models demonstration that due to the regolith and the basement rocks surrounding Songvang In-pit TSF4 the increase in operational height of the TSF will only influence the groundwater flow in the immediate area of the TSF (provided that there are no significant structural features to provide a significant preferential pathway for groundwater flow through the pit).

3.3.5 Risk assessment

The department has assigned a **Moderate** consequence rating to this risk event and considers that there is a potential for low level offsite impacts on a local scale may occur if seepage enters nearby water lines/creeks and transported downstream offsite impacting the environment. The department also considers that moderate level impacts from seepage may occur on site from seepage reducing the quality of groundwater to exceed the livestock drinking water guidelines (ANZECC & ARMCANZ 2000) which is one of the licence holder's performance indicators (MP 92409).

The department considers the likelihood for seepage to impact groundwater (for current and future use) and nearby water lines/creeks to be **Unlikely**. This is due to the relatively low-level concentrations of solutes, the history of groundwater monitoring parameters in and the limited hydraulic conductivity of the area.

In accordance with the Guideline: Risk Assessments (DWER 2020a) a moderate consequence combined with an unlikely likelihood, results in a **Medium** risk rating. This rating is considered acceptable but typically is subject to regulatory controls. For this circumstance the department has included an additional regulatory control which is presented in section 3.3.6.

Existing monitoring data does not indicate any significant impact on ambient groundwater as a result of the operation of Songvang In-pit TSF4, however the increase in operational height to 425 mRL could increase seepage emitted from the TSF. Continued groundwater monitoring should and will be undertaken to assess any potential impacts to the groundwater aquifer as a result of the increase of operating height.

The department considers the existing groundwater monitoring bore network adequately surrounds the Songvang In-pit TSF4 pit allowing detection of any change in groundwater parameters caused by seepage. Three monitoring bores are present to the south of the pit, with SV6-1 being hydraulically downgradient of Lawlers Creek (assuming radial groundwater flow due to seepage from Songvang In-pit TSF4).

3.3.6 Additional regulatory controls

Limits for WAD cyanide, TDS and pH already exist for the Songvang In-pit TSF4 monitoring bores (SV series), however, to manage potential seepage from the increase in operational

height the department considers it appropriate to assign a **target** for arsenic (0.5 mg/L) and sulfate (1,000 mg/L) for Songvang In-pit TSF4 monitoring bores within condition 17. The department acknowledges that an updated livestock drinking water guideline (ANZG 2023) is in draft which may reduce the livestock guideline for arsenic and sulfate lower than the 2020 guideline to 0.025 mg/L and 500 mg/L respectively. The department has adopted the 2000 guideline under the guidance of Australian and New Zealand Guidelines for Fresh and Marine Water Quality publication details mentioning that the ANZECC & ARMCANZ (2000) guidance for livestock drinking water should be referred to until the updated guidance has been published.

Due to the uncertainty of the model, the department has assigned a SWL **limit** and **target** for four of the six monitoring bores surrounding the Songvang In-pit TSF4. The four bores are located between Songvang In-pit TSF4 and Lawlers Creek / Songvang Creek, the limits and targets are placed in order to protect the creek from any potential rise in groundwater levels. The department considers an appropriate **limit** for the bores surrounding the TSF is 4 mbgl and a **target** of 6 mbgl will provide sufficient time to implement a groundwater recover plan and provide a sufficient separation distance of a potential rise in groundwater and the creek.

These targets and limit if reached will require the licence holder to submit a groundwater recovery plan reduce these concentrations within the groundwater or reduce the groundwater levels.

To allow flexibility, the department has not prescribed specific requirements for the groundwater recovery plan but recommends measures such as:

- Conducting geophysical investigations to identify structural features in partially weathered basement rocks that act as groundwater conduits;
- Installing seepage recovery bores within these features to capture contaminated groundwater for re-disposal within the TSF; and
- Reducing the water content of tailings discharged to the TSF.

During the licence amendment assessment the department identified that no timeframe requirement for the submission of the groundwater recovery plan is required in the licence.

The department has included that in accordance with Condition 21 the licence holder must submit the groundwater recovery plan to the CEO within 60 calendar days, any delay in the submission and implementation of the groundwater recovery plan potentially increases the risk of receptors being impacted.

4. Consultation

Table 5 provides a summary of the consultation undertaken by the department.

Table 5: Consultation

Consultation method	Comments received	Department response
Department of Mining, Petroleum and Exploration (DMPE) advised of proposal (3 October 2025)	DMPE responded on 24 November 2025 and made the following comments: • The proposed increase to Songvang In-pit TSF4 In-pit operational height is currently under assessment within Mining Proposal ID 501907; • Geotechnical review by Local Government, Industry	Noted. As mentioned in section 2.6 the department has included category 73 (bulk storage of chemicals) to the licence within this licence amendment. The department recommends that the licence holder engages with DMPE for any future bulk storage facilities and the appropriate

	Regulation and Safety (LGIRS) Geotech did not raise any concerns with increase operating height of Songvang In-pit TSF4 from 422 to 425 mRL. • Dewatering activities are within the scope of previously approved activities at the premises. The construction and operation of additional dewatering pipeline infrastructure is included within Mining Proposal Reg ID 501907. • The use of ferrous sulfate dosing has been approved as a proposed activity under MP Reg ID 118700 and AGMC have updated risk implications in regard to ferrous sulfate in latest MP Reg ID 501907. DMPE have no concerns with this activity. • The Construction of a putrescible landfill has been previously assessed and approved in Mining Proposal Registration ID 118700 on M 36/55 (Redeemer). No restrictions on size or number were imposed by DMPE. • No bulk chemical storage facilities have been applied for or approved by DMPE. DMPE would expect if any bulk storage facilities were to be constructed in future, then appropriate applications/amendments would be submitted to DMPE.	applications/amendments are submitted.
Licence holder was provided with draft amendment on 10 December 2025 and a response was received on 22 December 2025.	See Appendix 1.	See Appendix 1.

5. Conclusion

Based on the assessment in this Amendment Report, the Delegated Officer has determined that a revised licence will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

5.1 Summary of amendments

Table 6 provides a summary of the proposed amendments and will act as record of implemented changes. All proposed changes have been incorporated into the revised licence as part of the amendment process.

Table 6: Summary of licence amendments

Condition no.	Proposed amendments	
Prescribed premises categories	Added Category 73 to the licence.	
Licence history	Updated licence history to include this licence amendment.	
Throughout licence	Changed condition wording from “shall” to “must”.	
Condition 1 (Table 1)	Included Ferrous Sulfate Dosing Unit and requirements to the table.	
	Included Category 73 bulk storage infrastructure to the table.	
Condition 2 (Table 2)	**Renamed the following infrastructure to keep consistency with figures and in text references:**	
	FROM:	**TO:**
	Songvang Inpit TSF	Songvang In-pit TSF4
	TSF2 Process Water Pond	TSF2 Return Water Pond
	Redeemer TSF Return Pond	TSF3 Return Water Pond
	Songvang TSF Process Pond	TSF4 Return Water Pond
	Songvang In-pit TSF	Songvang Inpit TSF4
	Changed operation final height and freeboard of Songvang In-pit TSF4 from RL 422.0 m to RL 425.0 m.	
	Included Waroonga Turkeys Nest as a mine dewater discharge location for: Cox pit, Pilgrim pit, Deliverer pit and New Holland Settlement Pond.	
	Included Barren Lands Turkeys Nest as a mine dewater discharge location for: Mine dewater from Cox, Pilgrim, Deliverer pits and Daisy Queen.	
	Included TSF RWP as a dewater discharge location for: Mine dewater from Cox, Pilgrim, Deliverer pits, Daisy Queen and TSF4 Return Water Pond.	
	Included Crusader Complex as a dewater discharge location for Daisy Queen.	
	Removed requirement for an under wall return drain for the TSF4 Return Water Pond.	
	Removed requirements all requirements for Lawlers TSF3 with exception for lining and freeboard requirements.	
	Included Lawlers TSF3 to Note 1 below the table mentioning it is decommissioned and not operational.	
Condition 3	Included weekly inspection requirements for Category 73 bulk storage infrastructure.	

(Table 3)	
Condition 5 (Table 4)	Added a requirement for trenches to be constructed around landfills to prevent contaminated stormwater from leaving the landfill facility and clean stormwater to enter.
Condition 9 (New condition)	Added a requirement for the Ferrous Sulfate Dosing Unit to treat tailings from December to March.
Condition 11 (Table 6)	Included Daisy Queen as a source for Crusader Complex.
Condition 15 (Table 11)	Included monitoring requirement for dewater discharge at Crusader Complex from Daisy Queen.
Condition 16 (Table 12)	
Condition 17 (Table 13)	Added arsenic and sulfate target levels to Songvang In-pit TSF4 monitoring bores.
	Added targets and limits for SWL for monitoring bores SV2-1, SV2-2, SV5-1 and SV6-1.
	Added CLMB001 and CLMB002 monitoring bores to the Crusader complex monitoring bore system.
	Amended note 9: to include “before mine dewater is discharged to the Crusader complex”
Condition 21	Added a requirement for the groundwater recovery plan that must be submitted to the CEO for review is submitted within 60 calendar days of becoming aware of the exceedance.
Condition 25 (Table 14)	Included requirement to report the volume of waste deposited in the Annual Environmental Report.
Condition 28 (Table 16)	Added construction requirements for the dewater pipeline from Crusader Complex to Waroonga.
	Added construction requirements for the pipeline from Daisy Queen to Redeemer Return Water Pond.
	Added construction requirements for the Ferrous Sulfate Dosing Unit.
Schedule 1: Map of Landfill locations	Added reference to Barren Lands WRD Landfill and Upper Redeemer WRD Landfill.
Schedule 1, Figure 2	Updated figure to rename HSDIS to TSF2 RWP.
Schedule 1, Figure 3	Updated figure of Redeemer TSF3 to show capping of decommissioned TSF.
Schedule 1, Figure 4	Updated figure with new imagery.
Schedule 1, Figure 6	Updated figure to include: the new landfill footprint for Redeemer Landfill, Barren Lands WRD Landfill and Upper Redeemer WRD Landfill.
Schedule 1, Figure 13	Included bores CLMB001 and CLMB002 to figure.
Schedule 1, Figure 14	New figure showing the Crusader Complex to Waroonga Turkeys Nest pipeline

Schedule 1, Figure 15	New figure showing the Daisy Queen to Redeemer Return Water Pond and Crusader Complex pipeline
Schedule 1, Figure 16	New figure presenting location of the Ferrous Sulfate Dosing Plant.
Schedule 1, Figures 17-19	New figures showing construction requirements for the Ferrous Sulfate Dosing Unit.

References

1. Agnew Gold Mining Company Pty Ltd (AGMC) 2014, Mining Proposal, Redeemer (Zone 2) North Project.
2. AGMC 2023, Annual Environmental Report 1st January 2024 – 31st December 2024, Approved 28 February 2025.
3. AGMC 2025a, L4611 – Agnew Gold Mine, Licence Amendment Attachment 3B – Supporting Information, Approved 16/07/2025.
4. AGMC 2025b, Licence L4611/1987/11 Annual Environmental Report 1 January 2024 – 31 December 2024, Approved 28 February 2025.
5. AGMC 2025c, Licence L4611 – Agnew Gold Mine, Licence Amendment Attachment 3C, Clearing Activities.
6. Australian and New Zealand (ANZG) 2023, DRAFT Livestock drinking water guidelines, Guidelines for Fresh and Marine Water Quality.
7. ANZECC & ARMCANZ 2000, Australian and New Zealand Guidelines for Fresh and Marine Water Quality. National Water Quality Management Strategy. Australian and New Zealand Environment and Conservation Council (ANZECC) & Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ). Volume 1: The Guidelines.
8. CMW Geosciences (CMW) 2024, Songvang Pit Groundwater and Solute Transport Modelling for RL 425 M Deposition Level. PER2018-0051AZ Rev0
9. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
10. Department of Water and Environmental Regulation (DWER) 2020a, *Guideline: Risk Assessments*, Perth, Western Australia.
11. DWER 2020b, *Guideline: Environmental Siting*, Perth, Western Australia.
12. DWER 2023, Amendment Report for L4611/1987/11, Dated 17 October 2023.
13. Gold Fields Australia Pty Ltd (GFA) 2024, *Ferrous sulfate trial report for EMU processing plant* [Letter to Department of Water Environmental Regulation]*, letter dated 24 January 2024.*
14. Golder Associates 2016, *Agnew Gold Mine – Design Report for In-pit Tailings Disposal at Songvang,* 1650018-001-R-Rev0, Perth, Western Australia.
15. National Water Commission, 2012. Australian Groundwater Modelling Guidelines. *Waterlines Report Series, No 82*.

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

Condition	Summary of licence holder's comment	Department's response
Amendment report	The licence holder has mentioned that water used for the ferrous sulfate is pre-supplied and no onsite water source is required to facilitate dosing. The licence holder has also mentioned that ferric sulfate will enter the tailings steam directly into the tailings hopper.	Noted and amended report to accurately present the operation of dosing the tailings stream.
	The licence holder requested to include Redeemer Raw Water Tanks to receive water from Daisy Queen Pit.	Amended, the department has risk assessed the transport and storage of water within the Redeemer Raw Water Tanks and a typographical error occurred and was left off the text within the Amendment Report.
2 (Table 2)	Licence holder has mentioned that the TSF4 Return Water Pond does not have an under wall return drain to manage overflow. Overflow is managed by Citec monitoring and automated discharge to Redeemer TSF3 RWP / decant water circuit is maintained at all times.	The department considers that the outcome based freeboard condition is sufficient to prevent impacts to receptors from the pond overtopping and the onus remains on the licence holder to have in place the appropriate means to meet this requirement. The department has removed the requirement for an under wall return drain.
	Licence holder has mentioned that Lawlers TSF3 was decommission in 2014 and capped/rehabilitated in 2017 and is now an inactive facility. The licence holder has proposed to amend Lawlers TSF3 containment infrastructure requirements to only include lining and freeboard requirements.	The department has amended the Lawlers TSF3 infrastructure requirements to align with TSF2 current requirements (lining and freeboard). The department considers the removal of the requirements will not increase risk to receptors.
	Naming nomenclature: Change "TSF 2 Return Water Pond" to "TSF2 Return Water Pond". Change "Redeemer In-pit TSF3 Return Water Pond" to "TSF3 Return Water Pond". Change "Songvang In-pit TSF4 Process Pond to TSF4 Return Water Pond (TSF4 RWP) Change "Songvang In-pit TSF4 Return water" to "TSF4 Return Water from In-Pit Decant Pond".	Amended.

<table>
<tr><td rowspan="9">2 (Table 2)</td><td colspan="2">Amended sources of containment infrastructure</td><td rowspan="9">Amended, risk assessment in the decision report has assessed this risk.</td></tr>
<tr><td>Source</td><td>Receiver</td></tr>
<tr><td>TSF3 RWP</td><td>TSF2 RWP</td></tr>
<tr><td>New Holland Settlement Pond</td><td>Waroonga Turkeys Nest</td></tr>
<tr><td>TSF4 RWP</td><td rowspan="5">TSF3 RWP</td></tr>
<tr><td>Cox Pit</td></tr>
<tr><td>Pilgram Pit</td></tr>
<tr><td>Deliverer Pit</td></tr>
<tr><td>Daisy Queen</td></tr>
<tr><td>3 (Table 3)</td><td colspan="2">The licence holder has proposed that weekly inspections of the bulk storage of chemicals occurs instead of daily. The facilities are designed to mitigate environmental risk and are included in the Dangerous Goods licensing for the premises.</td><td>The department considers the proposed change in inspections are appropriate and has updated the licence to reflect the change.</td></tr>
<tr><td>5 (Table 4)</td><td colspan="2">The licence holder has proposed that instead of the construction of windrows around the landfill facilities that “Landfill trenches must be constructed to prevent contaminated stormwater entering and leaving the facility”.

The licence holder has mentioned that these landfills are entirely encapsulated/atop existing waste rock dumps, which provide adequate containment (crestal bunds, toe drains) from nearby drainage channels. The construction of windrows will inhibit access to tipping faces and constricts cover activities to mitigate windblown waste.</td><td>The department considers that the proposed change does not alter the risk profile. The condition been amended.</td></tr>
<tr><td>17 (Table 13)</td><td colspan="2">The licence holder has proposed to remove CCMB2 from groundwater monitoring requirements as monitoring bores CLMB001 and CLMB002 have been included in the licence to replace this monitoring bore.</td><td>The department acknowledges the request, however, has not removed the monitoring requirement of CCMB2 during this licence amendment. Following the submission of the compliance report, a separate licence amendment should be applied for so the change in monitoring bore can be assessed.</td></tr>
<tr><td>28 (Table 16)</td><td colspan="2">The licence holder has consulted with the Traditional Owners who raised concerns over the construction of v-drains for the dewater pipelines creating vegetation clearing and potentially impacting natural surface water flow.

It was recommended that the pipeline to be double skinned and a mix of pipeline lift platforms and culvert crossings be placed for the pipeline intersection within creek lines to assist with natural water flow.

The licence holder has requested to remove the requirement for the pipelines to be located within v-drains. The licence holder instead proposes to</td><td>The department does not consider the proposed use of telemetry for leak detection instead of v-drains to significantly increase the risk of impacts to the receptors from leaks and/or spills. The department has increased the likelihood of receptors being impacted from ruptures or leaks from “Unlikely” to “Possible”. The department notes that it is still considered a Low Risk rating is accordance with the departments risk assessment guidelines (DWER 2020a)</td></tr>
</table>

	all pipelines to have telemetry for leak detection The licence holder has also requested to have flexibility for pipeline creek crossings and have proposed the following requirement for both pipelines “Engineered design measures, such as culverts, buried and concrete pipelines, or raised stilt containment measures to be incorporated within creek crossings.”	The department has granted the request to remove the construction of the v-drain requirement and granted the change of creek crossing methodologies for the pipeline route.