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	L9423/2024/1
Licence Holder	Golden Grove Operations Pty Ltd
ACN	114 868 325
File Number	APP-0026189
Premises	Golden Grove Mine YALGOO WA 6635 Legal description – Part of Mining Tenements: M59/3, M59/90, M59/195, M59/227, M59/361, M59/362, G59/19-23, G59/24, L59/22, L59/26 and L59/41 As defined by the premises maps in Schedule 1 of the issued licence
Date of Report	04 June 2025
Decision	Revised licence granted

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1. Decision summary

Licence L9423/2024/1 is held by Golden Grove Operations Pty Ltd (Licence Holder) for the Golden Grove Mine (the Premises), located within mining tenements M59/3, M59/90, M59/195, M59/227, M59/361, M59/362, G59/19-23, G59/24, L59/22, L59/26 and L59/41 within the Shire of Yalgoo.

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 L9423/2024/1 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 Application summary

On 7 October 2024, the Licence Holder submitted an application to the department to amend Licence L9423/2024/1 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The amendment is limited to changes to Category 5 activities from the Existing Licence by means of proposing the recommissioning of a tailings storage facility (TSF), TSF2. No changes to the aspects of the existing Licence relating to Category 6, 54, 61, 89 and have been requested by the Licence Holder.

Golden Grove Operations Pty Ltd (the applicant) operates the Golden Grove Project which consists of two active underground mines, a processing facility, auxiliary facilities, and a number of closed open pits. The Premises is situated in the Shire of Yalgoo, approximately 50 km south-east of the town of Yalgoo.

Within the premises, a volcanic-hosted massive sulphide deposit is mined which produces a mix of concentrated Copper, Zinc, Gold, Silver and Lead products. Tailings from this activity are deposited into the active TSF, which is nearing capacity (TSF 3).

A works approval (W6934/2024/1) for the construction of TSF4 was approved in September 2024, which will allow tailings deposition once TSF 3 has reached capacity and for the life of the current mine. Given the timeframes between TSF3 reaching capacity and the operational commissioning of TSF4, a shortfall in available tailings storage is anticipated.

To cover this projected shortfall, the applicant is proposing to recommission a currently inactive paddock TSF (TSF 2), which reached capacity in 2013, and has since had tailings removed for use in the applicant's underground mining operations.

The ability to utilise existing voids in TSF2 is expected to provide a contingency option for the site while TSF 4 is being constructed, as well as providing an ongoing contingency option for tailings storage during the eventual operation of TSF4.

No changes to the production or design capacities are proposed as part of this application. The location of TSF 2 is shown in Figure 1.

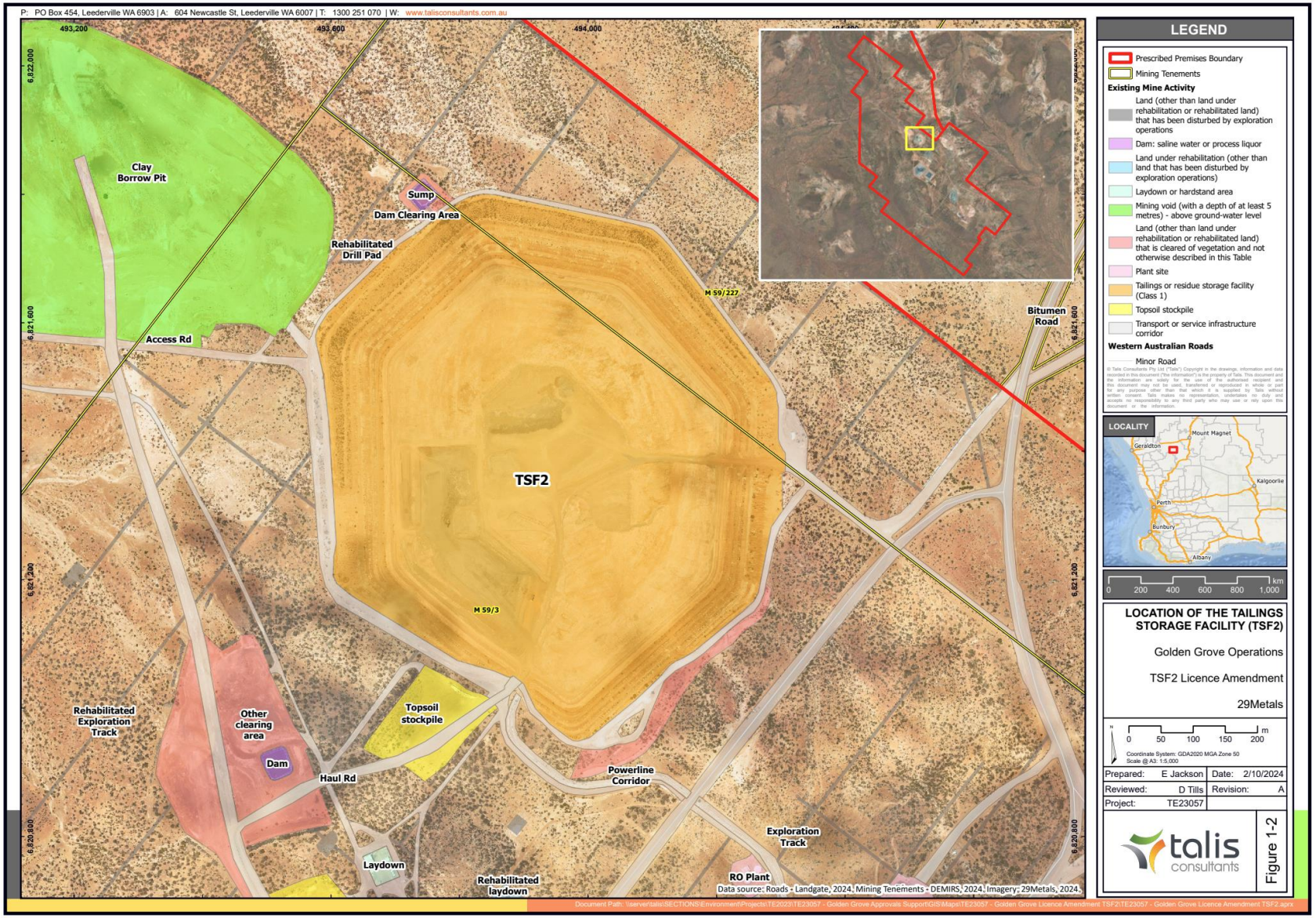

Figure 1: Location of Tailings Storage Facility 2 (TSF 2)

2.2.1 Overview of TSF 2

TSF 2 is an existing facility that reached capacity in 2013 and has since had tailings removed as feed for the paste backfill plant for use in their underground mining operations. This has allowed capacity for tailings to be deposited back into the voids created within TSF 2, with an estimate of up to 5 months capacity available.

TSF2 is currently included in Table 6 of Licence L9423/2024/1, which sets out the requirements for containment infrastructure located on the premises. However, Table 6 currently only permits TSF 2 to receive discharge of reclaimed tailings from TSF 2 and does not allow for the acceptance of material beyond this.

This Licence Amendment is seeking to amend Table 6 of Licence L9423/2024/1 to permit TSF 2 to receive all tailings materials. The applicant has advised that TSF 2 is planned to be recommissioned based on the conceptual backfilling plan completed by ATC Williams. The design includes consideration of the existing and future voids formed within TSF 2 from tailings harvesting. Harvesting of tailings from TSF2 is ongoing and has not yet been completed, however the design contemplates the proposed final landform following completion of harvesting activities. This design includes construction of several smaller cells within TSF which will be separated by dividing bunds within the voids of the TSF to allow for efficient and manageable tailings deposition which is explained below.

2.2.2 Tailings Deposition Strategy

The design for the backfilling of TSF2 includes return water and tailings delivery pipeline infrastructure (Figure 2) as well as dividing bunds which will separate TSF 2 into 3 distinct cells (Cell 1, Cell 2, and Cell 3).

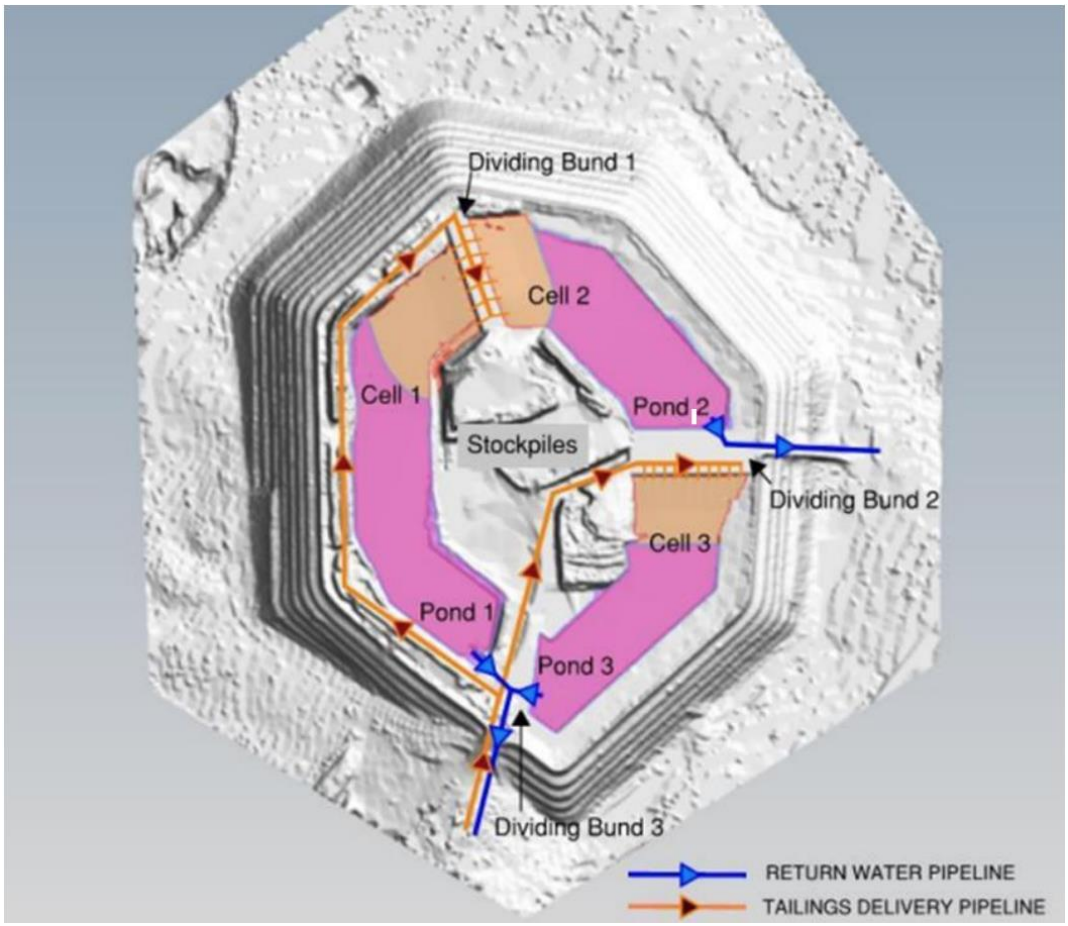

Figure 2: Tailings Deposition Design

Tailings will enter TSF 2 via the highest point of the dividing bunds which will promote water return to the lowest points of the embankment. Cell 1 and Cell 2 will deposit from Dividing Bund 1, while Cell 3 will deposit from Dividing Bund 2. Corresponding water return ponds will form at Dividing Bunds 2 and 3 as shown in Figure 2 above.

The plant production rate is assumed to be 97,200 tonnes per month during backfilling of TSF2, giving an estimated 5 months additional tailings storage capacity for the Golden Grove site.

2.2.3 Seepage Assessment

As part of the design of TSF 2, a seepage assessment was undertaken to evaluate the likely impacts of proposed backfill activities. The seepage assessment showed that tailings deposited around the perimeter embankment remain de-saturated without a constant pond on the surface of the facility, however re-saturation of the tailings occurs seasonally when water is ponded on the surface during the wet season (March to May inclusive).

Within TSF 2, seepage water migrates to locations that exhibit lower permeability and remains until excess water seeps into the below strata. Backfilling of voids will prevent re-saturation from happening in the future. The tailings beach outside of the pond area is identified to be de-saturated, and generally remains in that state throughout tailings backfilling. Seepage water sourced from the new tailings deposited migrates downwards, perching on lower permeability layers (as each lower permeability layer is encountered).

The Delegated Officer proposes additional monitoring of the seepage recovery bores be undertaken to observe the rates and potential impacts of seepage, particularly during deposition.

2.2.4 Stability and Liquefaction Assessment

A stability assessment was undertaken to determine the conditions allowable for the rapid filling of newly created cells with tailings materials. To prepare the site for final closure, a backfilling strategy will be implemented which will reduce the risk of instability created by prolonged exposure of voids.

A liquefaction assessment has also been undertaken, which determined that the tailings in TSF2 are not susceptible to seismic liquefaction under the Safety Evaluation Earthquake (SEE) for a “Significant Consequence Category” dam.

The backfilling strategy proposed reduces risk of instability susceptibility created by prolonged exposure of voids. This will enable creation of safe, stable surfaces to allow commencement of closure, and ensure closure designs are able to include a water-shedding landform.

3. Risk assessment

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

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

3.1 Source-pathways and receptors

3.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises operation which have been considered in this Amendment Report are detailed in Table 1 below. Table 1 also details the proposed control measures the Licence Holder has proposed to assist in controlling

these emissions, where necessary.

Table 1: Licence Holder controls

Emission	Sources	Potential pathways	Proposed controls
Dust	Construction of dividing bunds within TSF 2	Air/windborne pathway	• Watercarts to be utilised during construction of proposed deposition cells and dividing bunds. • Tailings deposition will result in an extended runout distance, ensuring large areas of tailing surface is saturated during deposition. • Ongoing dust monitoring on site as per the approved Dust Management Plan.
	Storage of tailings associated with the TSF2		
Tailings slurry water containing dissolved solids, metals and metalloids	Operation of TSF 2	Direct discharge caused from overtopping TSF2 embankment or release from tailings and return water pipelines.	• The TSF2 deposition design has been designed to meet the requirement (DEMIRS and ANCOLD) for the storage of stormwater from a 1:100-year AEP, 72- hour storm event (191 mm) above the normal operating pond level. • Total Freeboard (above Storm Storage Allowance) is minimum 1,000 mm. While maintaining a 300 mm operational freeboard. • Operation of the decant water recovery system to minimise supernatant ponds. • Daily inspections of TSF2 to ensure freeboard is maintained, infrastructure is operating correctly, and the supernatant pond is minimised.
Leachate	Operation of TSF 2	Seepage of tailings leachate through TSF embankments and through to the embankment toe and surrounds.	• Seepage collection bores are located on the perimeter of the embankment. Water collected from seepage bores will be returned for use within the plant. • Monthly monitoring of Standing Water Level (SWL) and quarterly monitoring of additional parameters at TSF2 compliance bore sites. Management actions including vegetation monitoring to be undertaken for any exceedances of SWL at compliance monitoring sites. • Daily inspections of TSF2 to ensure freeboard is maintained, infrastructure is operating correctly, and the supernatant ponds are minimised.

3.1.2 Receptors

In accordance with the *Guideline: Risk assessments* (DWER 2020), 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 2 below provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises *(Guideline: Environmental siting* (DWER 2020)).

Table 2: Sensitive environmental receptors and distance from prescribed activity

Environmental receptors	Distance from prescribed activity
Adjacent Vegetation	Native remnant vegetation surrounds and abuts TSF 2.
Groundwater	The DWER elevation data shows an elevation of 380 m AHD, and the applicant's groundwater monitoring show an approximate groundwater level of 321 m AHD, indicating a groundwater depth of approximately 59 m. Despite the depth to groundwater, seepage from TSF has the potential to adversely impact groundwater quality. TSF 2 has already been in operation in the past and there have been recorded instances of groundwater mounding having occurred at the site.
Threatened Ecological Community	The Minjar and Chulaar Hills vegetation complex is located approximately 600 m west of TSF 2 and within the Prescribed Premises boundary. Shallow sub-surface drainage paths flow in a north-east direction, which means the ecological community is unlikely to be impacted by surface and groundwater contamination, however the TEC still has the potential to be impacted by fugitive dust emissions from the deposition of tailings into TSF 2.

3.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) 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 incomplete 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 3.

The Revised Licence L9423/2024/1 that accompanies this Amendment Report authorises emissions associated with the operation of the Premises i.e. Category 5 activities.

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

Table 3: Risk assessment of potential emissions and discharges from the Premises during construction and operation

Risk Event					Risk rating C = consequence L = likelihood	Applicant controls sufficient?	Conditions of licence	Justification for additional regulatory controls
Source/ Activities	**Potential emissions**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
Construction								
Construction of dividing bunds within TSF 2	Dust	**Pathway:** Air/windborne pathway **Impact:** Health and amenity	Threatened Ecological Community 600 m west of TSF 2 Adjacent Vegetation	• Watercarts to be utilised during construction of proposed deposition cells and dividing bunds. • Tailings deposition will result in an extended runout distance, ensuring large areas of tailing surface is saturated during deposition. • Ongoing dust monitoring on site as per the approved Dust Management Plan.	C = Minor L = Rare **Low Risk**	Y	Condition 1, Table 1	N/A
Operation								
Operation of TSF 2	Dust	**Pathway:** Air/windborne pathway **Impact:** Health and amenity	Threatened Ecological Community 600 m west of TSF 2 Adjacent Vegetation	• Tailings deposition will result in an extended runout distance, ensuring large areas of tailing surface is saturated during deposition. • Ongoing dust monitoring on site as	C = Minor L = Rare **Low Risk**	Y	N/A	N/A

Risk Event					Risk rating C = consequence L = likelihood	Applicant controls sufficient?	Conditions of licence	Justification for additional regulatory controls
Source/ Activities	**Potential emissions**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
				per the approved Dust Management Plan.				
	Tailings slurry water containing dissolved solids, metals and metalloids	**Pathway:** Direct discharge caused from overtopping TSF2 embankment or release from tailings and return water pipelines. **Impact:** Ecosystem disturbance and impact to groundwater quality	Adjacent Vegetation Groundwater	• The TSF2 deposition design has been designed to meet the requirement (DEMIRS and ANCOLD) for the storage of stormwater from a 1:100-year AEP, 72- hour storm event (191 mm) above the normal operating pond level. • Total Freeboard (above Storm Storage Allowance) is minimum 1,000 mm. While maintaining a 300 mm operational freeboard. • Operation of the decant water recovery system to minimise supernatant ponds. • Daily inspections of TSF2 to ensure freeboard is maintained, infrastructure is operating correctly, and the supernatant pond is minimised.	C = Moderate L = Possible **Medium Risk**	Y	Condition 11, Table 6 Condition 14, Table 7	N/A

Risk Event					Risk rating C = consequence L = likelihood	Applicant controls sufficient?	Conditions of licence	Justification for additional regulatory controls
Source/ Activities	**Potential emissions**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
	Leachate	**Pathway:** Seepage of tailings leachate through TSF embankments and through to the embankment toe and surrounds. **Impact:** Ecosystem disturbance and impact to groundwater quality	Adjacent Vegetation Groundwater	• Seepage collection bores are located on the perimeter of the embankment. Water collected from seepage bores will be returned for use within the plant. • Monthly monitoring of Standing Water Level (SWL) and quarterly monitoring of additional parameters at TSF2 compliance bore sites. Management actions including vegetation monitoring to be undertaken for any exceedances of SWL at compliance monitoring sites. • Daily inspections of TSF2 to ensure freeboard is maintained, infrastructure is operating correctly, and the supernatant ponds are minimised.	C = Moderate L = Possible **Medium Risk**	N	Condition 11, Table 6 Condition 14, Table 7 **<u>Condition 30, Table 15</u>** **<u>Condition 37(d)</u>**	Seepage Recovery Bores for TSF 2 are currently monitored, however this wasn't present on the licence. The licence has been updated to include monitoring for these bores and for the Annual Environmental Report to report on deposition and seepage.

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

Note 2: Proposed Licence Holder's controls are depicted by standard text. **<u>Bold and underline text</u>** depicts additional regulatory controls imposed by department.

4. Consultation

Table 4 provides a summary of the consultation undertaken by the department.

Table 4: Consultation

Consultation method	Comments received	Department response
Department of Mines, Industry Regulation and Safety (DEMIRS) advised of proposal on 16 January 2025.	Monitoring to be undertaken from seepage recovery bores on a Monthly basis during deposition and for additional twelve months post on a monthly basis.	Additional monitoring requirements of the recovery bores were proposed as part of the 21-day draft that was sent to the applicant for comment. The applicant's response demonstrated that monitoring of the seepage recovery bores would be unnecessary as they do not accurately represent water quality and levels of water that may have seeped or overflown from TSF 2. The Delegated Officer considers the existing monitoring of compliance bores to be adequate in determining licence exceedances.
	EOR to provide Monthly deposition and seepage report during deposition.	Reporting on seepage recovery bores is not required considering the applicant's response to the 21-day draft.
	Compliance to Table 4-1: Controls for the Proposed Licence Amendment, located in Licence Amendment Supporting Documentation Attachment 8 Supporting Document 29 Metals.	Table 4-1 of the application lists the Licence Holder controls, which have been considered in the risk rating and have been included in the licence as appropriate.
	9 points located in section 8 NEXT STEPS are to be completed, reviewed or implemented prior to deposition.	Noted. These steps form part of the Licence Holder's Tailings Backfill Design and subsequent Closure Plan.
	Golden Grove Operations Pty Ltd should be reminded that where an activity is outside of the approved activity/scope of a Mining Proposal, a further approval would be required under the *Mining Act 1978*.	Noted. The responsibility for ensuring all relevant approvals and compliance with the *Mining Act 1978* and the *Environmental Protection Act 1986* are obtained remains that of the Licence Holder.

Licence Holder was provided with draft amendment on 28 April 2025	Golden Grove Operations (GGO) would like to remove the monitoring requirements for the TSF2 seepage recovery bores (Seepage Recovery Bores RB1, RB2, RB3, RB4 and RB5) as specified in Table 15 of the draft licence. Groundwater quality around TSF2 is already monitored under licence L9423/2024/1 with compliance bores GGW50, MB58, MB64 and MB65. Exceedances of the licence limits are not reported in these wells. It is considered the above wells are more representative of groundwater conditions in the area as opposed to the recovery bores which are representative of the recovered seepage. Seepage and groundwater quality surrounding TSF2 has been monitored at regular intervals using monitoring wells and recovery bores. The main indicator that has been used to define the severity of changes due to seepage is the concentration of sulphate. Sulphate and TDS concentrations in recovery wells RB1, RB3 and RB5 have historically been reported in concentrations above the limits proposed in the draft licence amendment. The water quality and characteristics of the TSF2 mounding and seepage recovery are reported to DWER annually in in our Annual Groundwater Monitoring reports. The latest report was the 2024 Triennial Groundwater Monitoring Review (AECOM 2025) which was submitted on 30 April 2025. This is provided in attachment 1. As detailed in this report, the modelling shows that the seepage recovery abstraction has controlled the extent and height of seepage related mounding. The mound is now constrained by the recovery bores and the cone of depression surrounding the Scuddles Mine. These results are reflected in the groundwater quality for the licensed monitoring wells GGW50, MB58, MB64 and MB65 which do not report any impact to surrounding environmental receptors. Based on the above GGO believe the following; • That there are sufficient controls in place to mitigate seepage impacts to groundwater receptors surrounding TSF2 • The current monitoring regime is sufficient to assess for impacts to potential receptors, and to inform the effectiveness of the seepage recovery system.	Noted. The Delegated Officer has reviewed the requirements for monitoring seepage recovery bores in the context of this further information being provided and considers the monitoring via existing compliance bores to be sufficient in determining exceedances of licence limits.

	• The monitoring requirements in existing licence conditions are sufficient to assess environmental impacts without the addition of conditions for the recovery bores, and the current compliance bores are more representative of the ambient groundwater conditions. • The proposed conditions for the monitoring of the TSF2 recovery bores as presented in Table 15 on condition 30 should therefore be removed from the final licence.	

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 5 provides a summary of the proposed amendments and will act as a record of implemented changes. All proposed changes have been incorporated into the Revised Licence as part of the amendment process.

Table 5: Summary of licence amendments

Condition no.	Proposed amendments
Condition 1, Table 1	Addition of design and construction details for TSF 2 cells 1, 2 and 3 and associated dividing bunds.
Condition 11, Table 6	Addition of operational requirements for TSF 2 including maintenance of dividing bunds.
Condition 14, Table 7	TSF 2 inserted into the table for the inspection of infrastructure with TSF 1 and 3.
Conditions 18 and 19	TSF 2 added to these conditions which require operation of TSF's in accordance with licence conditions, and undertaking of monthly water balance for active TSF's.

References

1. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
2. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
3. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.
4. Talis Consultants 2024, *Licence Amendment Supporting Documentation*, Leederville, Western Australia.