Amendment Report

Application for Licence Amendment

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

Licence Number	L8593/2011/1
Licence Holder	Golden Grove Operations Pty Ltd
ACN	114 868 325
File Number	2011/007842-1
Premises	Scuddles & Gossan Hill 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 attached to the Revised Licence
Date of Report	4 May 2023
Decision	Revised licence granted

Alana Kidd

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Date: 2023.05.04 12:57:23 +08'00'

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

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1. Decision summary

Licence L8593/2011/2 is held by Golden Grove Operations Pty Ltd (Licence Holder) for the Scuddles & Gossan Hill Mine (the Premises), located at 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.

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 construction and operation of the Premises. As a result of this assessment, Revised Licence L8593/2011/2 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 25 November 2022, the Licence Holder submitted an application to the department to amend Licence L8593/2011/2 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The following amendments are being sought:

- Embankment raise at Tailings Storage Facility 3 (TSF3).

A fifth embankment will be constructed at the TSF3 to increase the capacity for the storage of additional tailings material. The embankment will be raised by an additional 3 metres using an upstream construction method, with an expected final crest height of 384.0m RL. Compacted clayey borrow material will be used for the construction of the embankment 'core', with mine waste rock used for the downstream capping layer. The additional capacity will store approximately 1.6 million tonnes of tailings over approximately a two-year period.

The existing TSF3 is a paddock type facility with a footprint area of 52.2ha. The construction of the embankment is expected to take approximately three months with discharge of tailings material continuing during construction.

Tailings deposition will continue to be carried out to maintain a supernatant pond around the central decant facility which is accessed via a decant accessway. The decant facility is used to retrieve water from TSF3 through the use of a submersible pump located within the decant tower and also through the use of two skid-mounted pumps at the decant hammerhead ramp end. The decant facility will be raised as part of the embankment lift.

An existing seepage interception drainage system remains in place at the TSF3. The system was assessed as working efficiently in reducing pore pressure within the tailings and embankment and controlling the phreatic surface through the embankment (Wood, 2022). All collected seepage from the drainage system reports back to the process water system for use in the processing plant. No additional works is required to be undertaken on the drainage system.

The TSF3 embankment raise has been designed to meet the requirement for the storage of stormwater from a 1:100-year AEP, 72-hour storm event (191 mm) above the normal operating pond level, while maintaining a minimum 500 mm total freeboard (300 mm operational freeboard and 200 mm beach freeboard).

Groundwater levels in the bedrock aquifer in the TSF3 area are represented by five monitoring bores (MB70A, MB71A, MB67, MB73A and MB74). Groundwater levels in these bores have declined steadily in response to mine dewatering at Scuddles Mine since 2010. None of these

bores show any evidence of hydraulic mounding due to seepage from TSF3. Many of the bores are dry, supporting this conclusion.

- Construction of Clay Borrow Pit Water Storage Dam

The Licence Holder currently discharges excess dewatering water to Lake Wownaminya during the winter months due to a site water surplus. This discharge has occurred over many years (15+ years) with no detrimental effects observed. The Licence Holder now proposes to use an above water table clay burrow pit for the storage of the excess site water for reuse at the Premises during summer months when normally large volumes of water are drawn from the production borefield and from dewatering activities. The Licence Holder will retain the Lake Wownaminya discharge point as a backup discharge location.

The borrow pit will be used to source clayey material for the construction of the TSF3 embankment raise 5. Studies indicate the clay-rich upper saprolite layer of the borrow pit has a horizontal conductivity of about 5 x 10^{-7} m/s therefore providing good water storage properties (low permeability). The borrow pit will not be utilised as a water storage dam until the TSF3 embankment raise works have been completed.

No significant construction activities will be required to use the borrow pit for water storage with only the following works required:

- Install a 280 mm PN10 HDPE pipeline from the Lake Wownaminya pipeline at the mine to the borrow pit;
- Install a skid mounted pump at the borrow pit (capacity 250m^3/hr);
- Install a 250 mm PN10 HDPE pipeline from the borrow pit to the process plant; and
- Install three groundwater monitoring bores (MB76, MB77 and MB78).

The quality of the dewatering water is generally considered brackish (TDS between 8,000 to 10,000 mg/L) with the Licence Holder clarifying the water prior to discharge to Lake Wownaminya. The clarification process removes solids and metals and is pH treated. Table 1 below presents a summary of recent water quality sampling results for discharge to Lake Wownaminya during 2021 to 2022 following the clarification process.

Table 1: Lake Wownaminya water discharge quality

Parameter	Licence Limit	Result (sampling range)
pH	≥ 6.0 ≤ 9.0	7.0 – 8.5
Electrical Conductivity	NA	5390 – 9180 µS/cm
Total aluminium	NA	0.01 – 0.02 mg/L
Arsenic	0.05 mg/L	0.001 – 0.003 mg/L
Cadmium	<0.01 mg/L	0.0019 – 0.0039 mg/L
Chromium (Total)	<1.0 mg/L	<0.001 mg/L
Copper	<0.4 mg/L	0.008 – 0.023 mg/L
Total Iron	NA	0.05 – 0.06 mg/L
Lead	<0.1 mg/L	≤0.002 mg/L
Manganese	NA	0.0002 – 0.086 mg/L
Mercury	NA	<0.0001 mg/L
Nickel	NA	0.001 mg/L
Selenium	<0.02 mg/L	≤0.02 mg/L
Total Nitrogen (as N)	NA	1.6 – 5.5 mg/L
Nitrate (as NO_3)	NA	9.06 - 14.7 mg/L
Total phosphorus (as P)	NA	0.06 – 0.28 mg/L
Sulphate	<3800 mg/L	1190 – 2020 mg/L

TRH	<15 mg/L	<0.05 mg/L
Total suspended solids	<100 mg/L	≤22 mg/L
Total dissolved solids	NA	6830 – 9680 mg/L
Total acidity ($CaCO_3$)	<40 mg/L	1 – 4 mg/L
Zinc	<20 mg/L	0.05 – 0.49 mg/L

The Licence Holder will continue to clarify the dewatering water prior to discharging to the clay borrow pit.

A hydrological investigation was completed on the burrow pit to investigate potential impacts from the storage of raw water (Pennington Scott, 2021). The investigation determined:

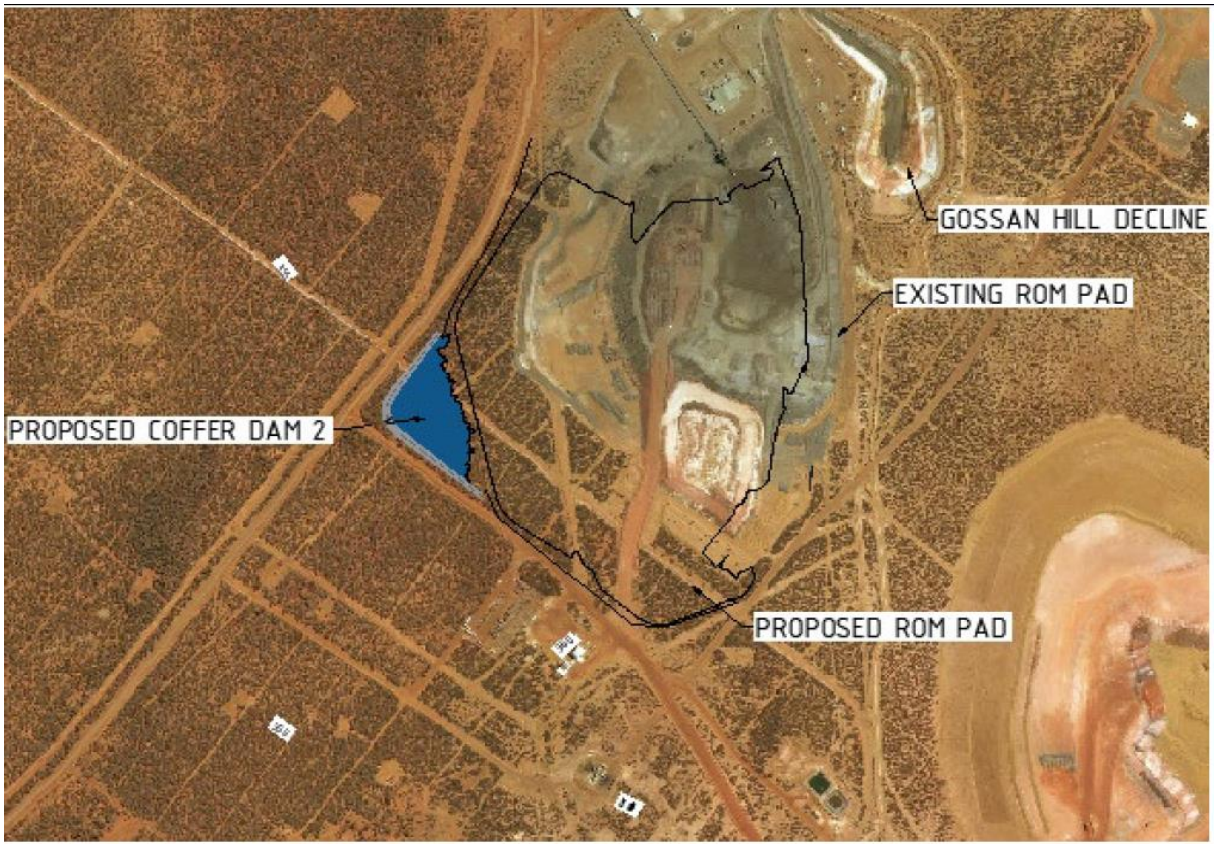
- The water table around the pit is not expected to come within 15 m of ground level, peaking around 344 m AHD in year 6, before declining to 336 m AHD at year 15. The Licence Holder has proposed a minimum freeboard of 6 meters will be maintained to avoid vegetation stress and mortality from water logging or high water tables induced by groundwater mounding around the pit.
- The borrow pit will only have water in it for up to eleven years, and through seasonal redraw, the pit is never expected to reach full capacity.
- A water and salt balance suggests the salinity in the pit would never exceed 9,000 mg/L based on the dewatering discharge salinity of 6,000 mg/L, however this is likely to be higher due to the salinity of the discharge water being as high as 9,680 mg/L as indicated in recent sampling.
- Additional three monitoring bores, constructed to 40 m depth, be installed to supplement the existing monitoring bores.

- Rom Expansion, Construction of Coffer Dam 2 for water and seepage collection

  The Licence Holder proposes to expand the existing ROM Pad for the storage of additional ore and mine waste materials as the existing ROM pad is nearing capacity.

  The ROM pad will be constructed progressively in a number of different stages consisting of a Starter (Basal Pad), Stage 1, Stage 2, Stage 3 and Stage 4 and will be constructed from the ground up. The proposed expanded ROM pad is designed to manage potential AMD by incorporating a drained, low permeable NAF basal starter works with the basal layer consisting of compacted residual silty soils, compacted clay liner and under drainage network. Any seepage is collected and then diverted to the Coffer Dam 2 (Figure 1) which is discussed in more detail below. The department acknowledges the expanded ROM pad will be assessed by the Department of Mines, Industry Regulation and Safety, with only risks to the environment from the use of the Coffer Dam 2 being assessed as part of this Licence amendment.

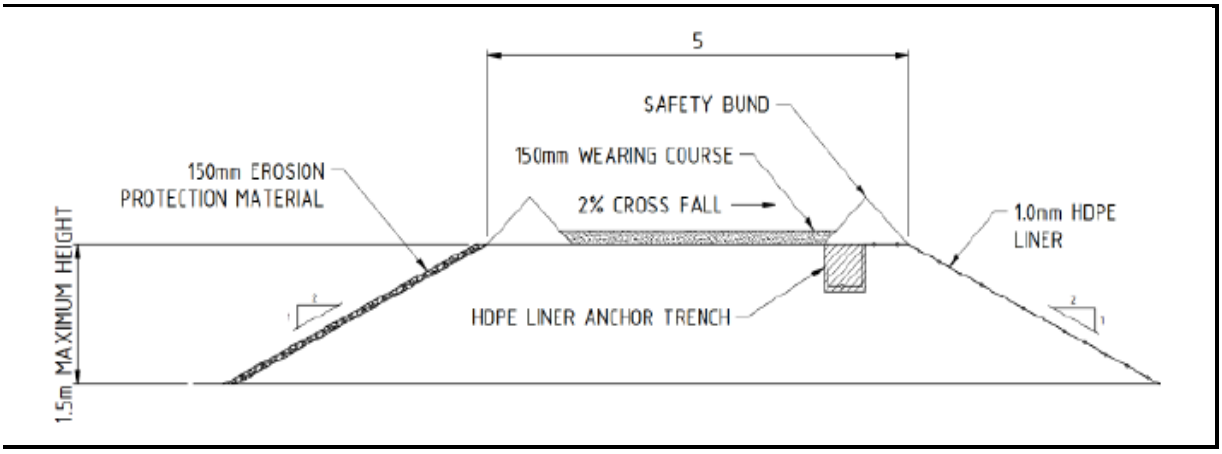
Figure 1: Proposed Coffer Dam 2



As part of the ROM pad expansion, the Licence Holder proposes to construct the Coffer Dam 2 (Dam 2) for the collection and retention of contact water (contaminated stormwater) and seepage from the stored material. Non-contact water is diverted around the ROM pad. Dam 2 will act as a 'hold-all' type facility with no release to the environment. Dam 2 has been designed with a capacity to hold all run-off from a 1 in 100-year 72 hour storm event. If required, any excess water can be pumped to an existing purpose built lined pond known as Evaporation Pond C (refer to L8593/2011/2 for further details).

The Coffer Dam 2 has been designed with a maximum embankment height of 1.5 m and a crest width of 5 m. The dam will be lined with a 1.0 mm HDPE liner which is anchored within a trench at the crest (Figure 2).

Figure 2: Coffer Dam 2 embankment section



- Install ROM pad Monitoring Bores

Several groundwater monitoring bores at the ROM pad will be decommissioned as part of the ROM pad expansion. Two groundwater monitoring bores will be retained with six new replacement groundwater monitoring bores proposed. Table 2 below provides information regarding the new proposed groundwater monitoring bores, with Figure 3 providing the location of all the groundwater monitoring bores at the ROM pad area.

Table 2: Proposed groundwater monitoring bore information

MB ID	Easting	Northing	Current Ground Elevation	Recommended Drilled Depth	Slotting Length
ROM 11 (New-MB1)	495,724	6,817,986	358.2	Average 7.0 m below ground level unless rock encountered.	Average 0.6 to 6 m but will vary depending on the soil strata encountered. Hydrogeologist on-site to make decision.
ROM 12 (New-MB2)	495,582	6,817,800	355.3		
ROM 13 (New-MB3)	495,572	6,817,581	353.9		
ROM 14 (New-MB4)	495,707	6,817,479	355.5		
ROM 15 (New-MB5)	495,863	6,817,358	358.1		
ROM 16 (New-MB6)	495,984	6,817,305	361.1		

Figure 3: ROM pad groundwater monitoring bore locations

Figure 5 – Ground water elevations – December 2018

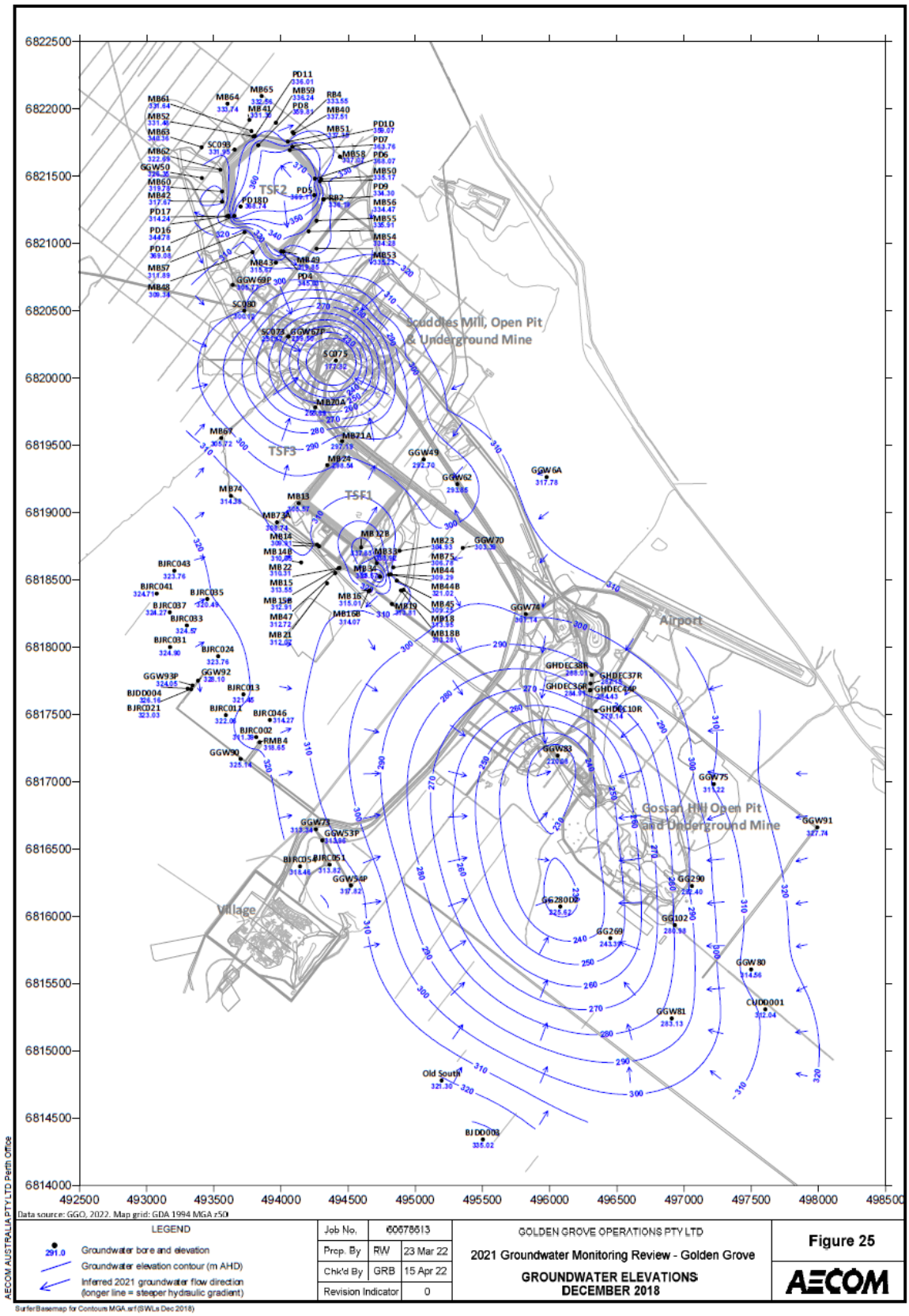


Figure 6 - Ground water elevations – December 2021

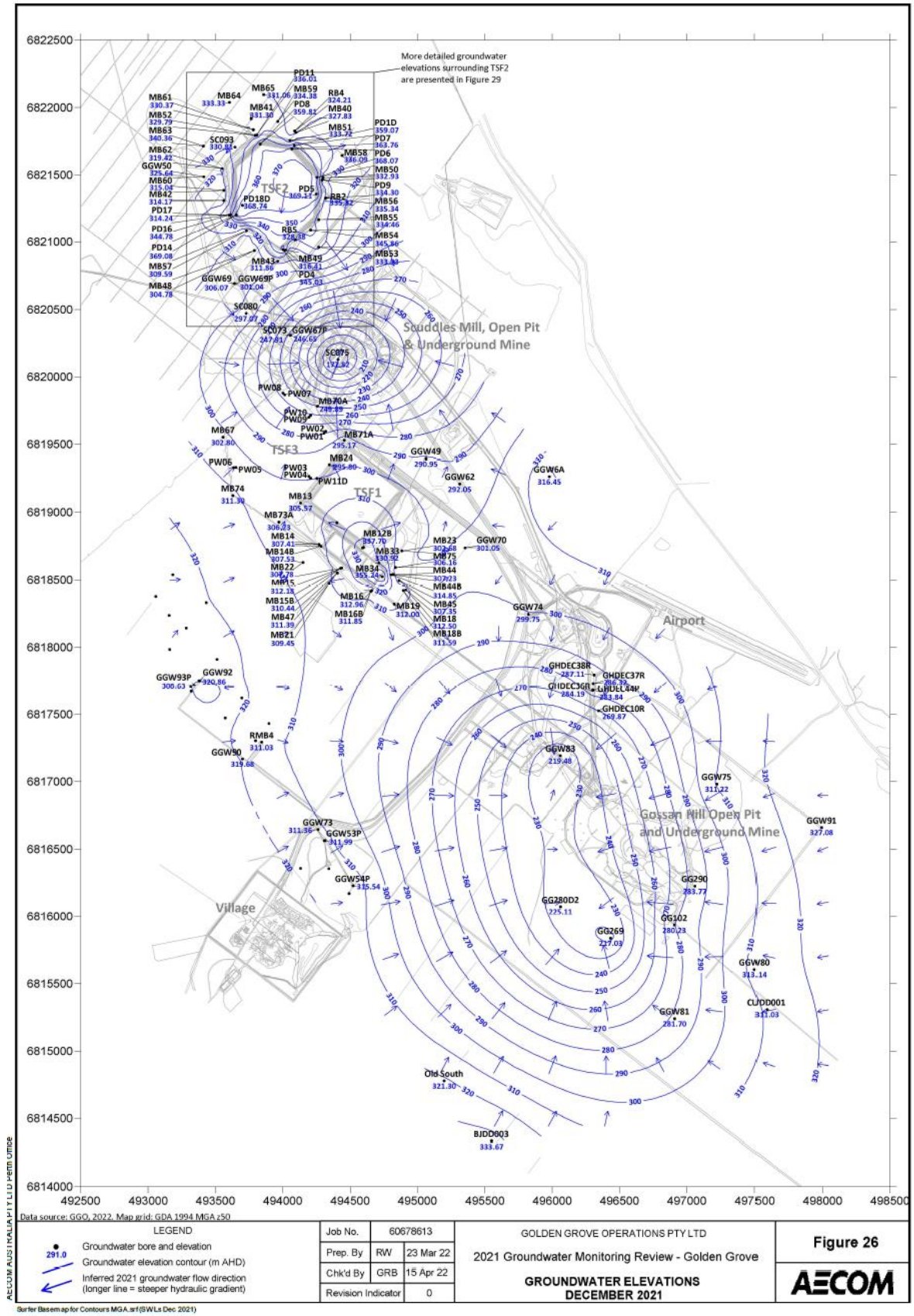


Figure 7 -Groundwater drawdown baseline to December 2021

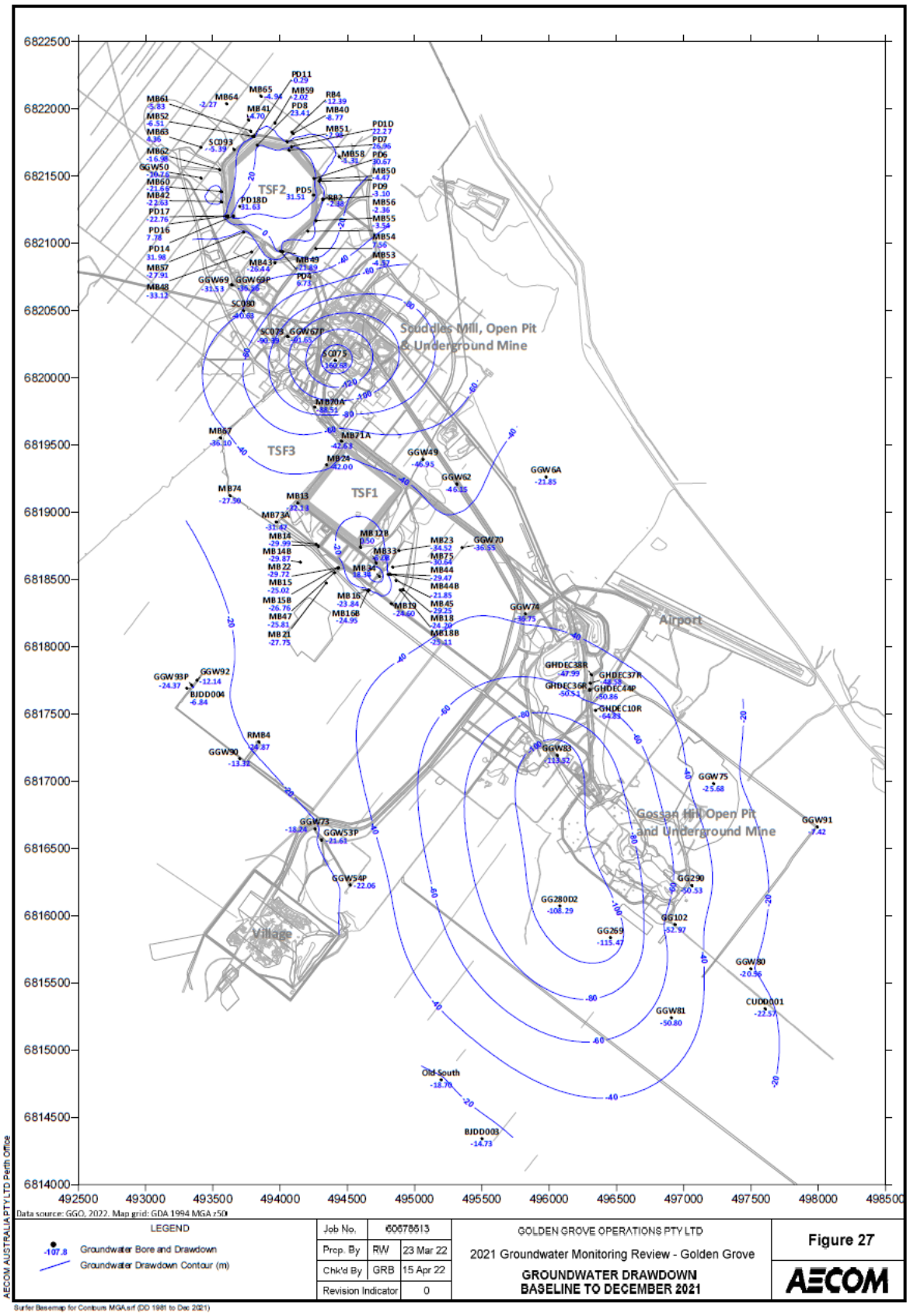
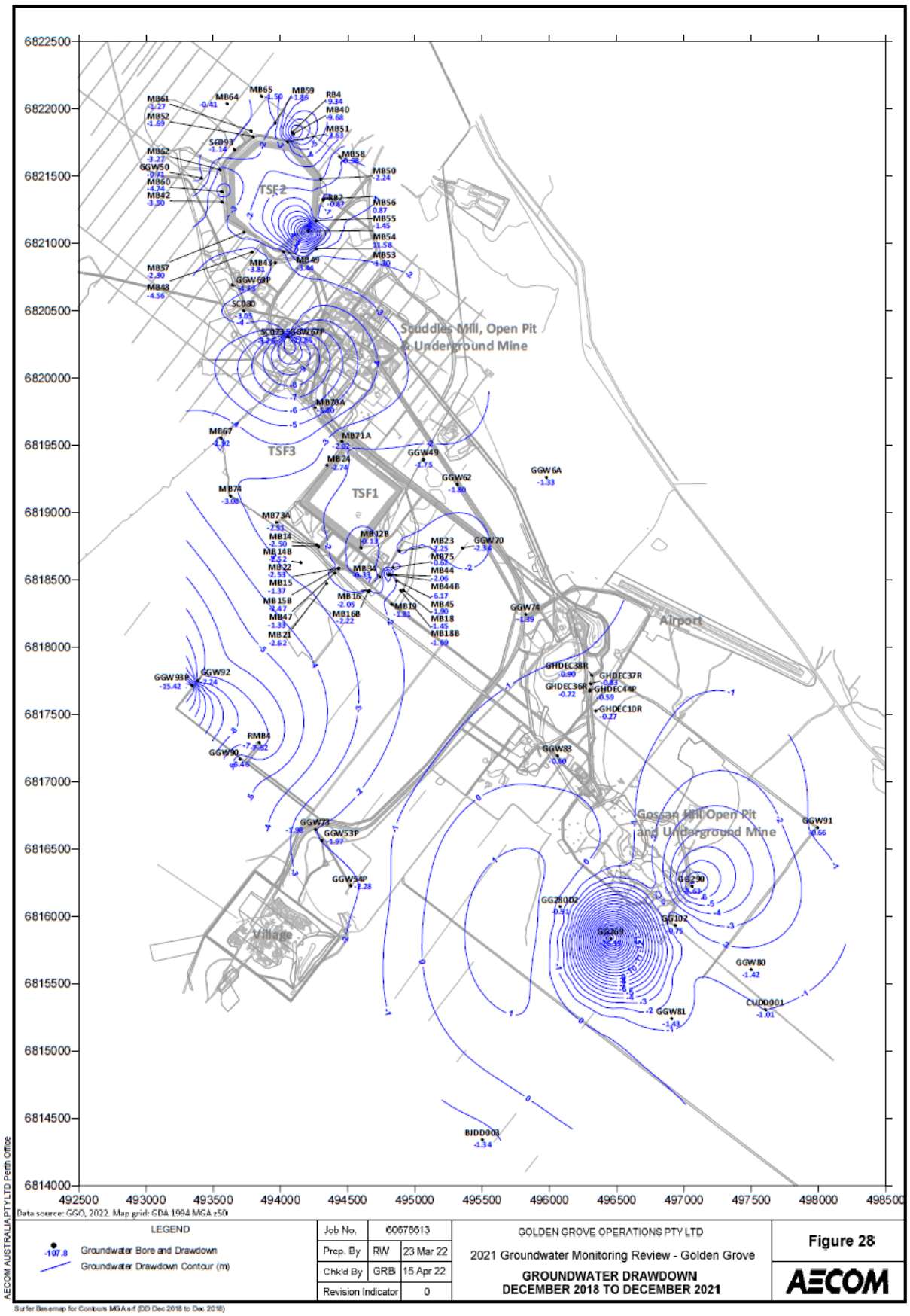

Scuddles Mill, Open Pit & Underground Mine
Gossan Hill Open Pit and Underground Mine
Airport
Village
TSF1
TSF2
TSF3
Old South
Data source: GGO, 2022. Map grid: GDA 1994 MGA z50
LEGEND
Groundwater Bore and Drawdown
Groundwater Drawdown Contour (m)
Surfer Basemap for Contours MGA.srf (DD 1981 to Dec 2021)
AECOM AUSTRALIA PTY LTD Perth Office
Job No. 60678513
Prep. By RW 23 Mar 22
Chk'd By GRB 15 Apr 22
Revision Indicator 0
GOLDEN GROVE OPERATIONS PTY LTD
2021 Groundwater Monitoring Review - Golden Grove
GROUNDWATER DRAWDOWN BASELINE TO DECEMBER 2021
Figure 27
AECOM

Figure 8 – Groundwater drawdown December 2018 to December 2021



- Monitoring Bore PP01

The Licence Holder was originally required to install two groundwater monitoring bores, a Superficial and a Saprockbore, to monitor for seepage from the Tailings Storage Pad and Stormwater Pond. Only the Superficial groundwater monitoring bore (now known as PP01) has been installed. Following discussions with the department in April 2022, it was decided the Saprock groundwater monitoring bore would no longer be required due to a lack of receptors at the proposed 180-meter depth and therefore the requirement to install this groundwater monitoring bore has been removed.

- Monitoring Bore ROM9

Licence Holder requested to remove the limit for Cadmium and Total Dissolved Solids for the ROM9 monitoring bore as it is located within a seepage collection area. As this monitoring bore does not represent the ambient groundwater condition as was installed to monitor for seepage impacts within the superficial aquifer. The department agrees to remove the limit for these parameters for ROM9 but leave a trigger value to understand the seepage and risk of discharge.

- New Production Bore

Approval for the installation of a groundwater bore and the abstraction of water from that bore for use at the Premises is regulated under the *Rights in Water and Irrigation Act 1914* (RIWI Act). The Licence Holder proposes to apply for a licence in accordance with the requirements of the RIWI Act. Therefore, the installation of the production bore and the abstraction of water from that bore will not be considered as part of this licence amendment.

3. Risk assessment

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

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

3.1 Source-pathways and receptors

3.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises construction and operation which have been considered in this Amendment Report are detailed in Table 3 below. Table 3 also details the proposed control measures the Licence Holder has proposed to assist in controlling these emissions, where necessary.

Table 3: Licence Holder controls

Emission	Sources	Potential pathways	Proposed controls
Dust	Earthworks, construction works and vehicle movements	Air/windborne pathway	Watering of unsealed trafficable areas to reduce dust. Vehicle traffic confined to designated roads and tracks.
Tailings slurry water containing dissolved solids and metals and metalloids	Storage of additional tailings associated with the TSF3 embankment lift 5	Seepage of tailings leachate through TSF embankments and through to the embankment toe and surrounds.	Existing TSF underdrainage system and liners including: - underdrainage and pumping system - 1.5mm thick HDPE liner extended up the starter embankments to RL363.5m - Collected seepage reports to a collection sump on the downstream embankment which is then transferred back to the process water system. - Existing 0.5 metre thick layer of compacted saprolitic clay - Existing Paleo-channel interception drain that extends down to the caprock along the south-eastern embankment to intercept potential seepage below the liner. Increase height of the decant recovery system which consists of a submersible pump installed in the decant tower. Two skid-mounted pumps in a duty/standby configuration at the decant hammerhead ramp end. Maintain a minimum separation distance of 150 m from the supernatant pond and the embankment wall. Cut off trench beneath the downstream toe of the embankment. Daily inspections of TSF3 to ensure freeboard is maintained, infrastructure is operating correctly and the supernatant pond is minimised.
Tailings slurry water containing dissolved solids and metals and metalloids	Storage of additional tailings associated with the TSF3 embankment lift 5	Direct discharge caused from overtopping TSF3 embankment	The TSF3 embankment raise has been designed to meet the requirement (DMIRS 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, while maintaining a minimum 500 mm total freeboard (300 mm operational freeboard and 200 mm beach freeboard). Operation of the decant water recovery system to minimise supernatant pond.

Emission	Sources	Potential pathways	Proposed controls
			Daily inspections to ensure the required freeboard is being maintained and supernatant pond is minimised.
Dewatering effluent	Storage of dewatering effluent in a clay borrow pit	Seepage through the pit floor and walls	No controls proposed The clay-rich borrow pit has a horizontal conductivity of approximately 5 x 10^{-7} m/s (low permeability).
Dewatering effluent	Storage of dewatering effluent within clay borrow pit	Direct discharge due to overtopping of the pit crest	A minimum separation distance of 6 m will be maintained between the top of the pit wall (crest) and the highest pond surface water level. Routine inspections will be conducted to ensure the minimum freeboard of 6 m is being maintained.
Dewatering effluent	Dewatering pipeline to Clay Borrow Pit and return pipeline to the processing plant	Direct discharge due to pipeline failure	Pipelines will be laid within a v-drain and will be fitted with an automatic shutoff valve. A daily integrity inspection of the pipeline will be conducted.
Contaminated water (assumed acidic) collected at the ROM pad	Stored contaminated water within the Coffer Dam 2	Direct discharge due to overtopping of the dam wall	The Coffer Dam 2 is sized to capture run-off, seepage, and direct rainfall for a 1-in-100-year rainfall event while maintaining a 300 mm freeboard. The capacity of the dam is approximately 15,000 m^3. Routine daily inspections to identify sediment build up reducing storage capacity and to assess the required freeboard is being maintained. Excess water will be pumped to the lined Evaporation Pond C if required to maintain the required freeboard.
Contaminated water (assumed acidic) collected at the ROM pad	Stored contaminated water within the Coffer Dam 2	Seepage through the walls and base of the dam.	The dam will be lined with a 1.0 mm thick HDPE liner which will be anchored within a trench at the crest.
Contaminated water (assumed acidic) collected at the ROM pad	Pipeline from the Coffer Dam 2 to Evaporation Pond C	Direct discharge due to pipeline failure	Pipeline will be laid within a v-drain to retain spills and will be fitted with an automatic shutoff valve. A daily integrity inspection of the pipeline will be conducted.

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

Environmental receptors	Distance from prescribed activity
Underlying groundwater (stockwatering purposes)	Groundwater occurs in permeable zones in the weathered bedrock, and in fractures in the underlying fresh bedrock. Depth to groundwater at the Premises is greater than **55 metres below ground level** (mbgl) with some locations up to 125 mbgl (March 2023 field sampling). There are no known ecological dependencies on groundwater at the Premises, mainly because the water table is too deep to support even deep-rooted vegetation (AECOM, 2021). The pre-mining total dissolved solids (TDS) typically ranged from about 600 mg/L to 4000 mg/L at the Premises. Pre-mining sulfate levels were about 30 to 60 mg/L. The water quality has changed over time due to mining activity with an increase in sulfate (now >1,000 mg/L) and TDS has increased to around 6,000 mg/L (EMR Golden Grove, 2020). Seepage from TSF1, TSF2 and other water storages at Golden Grove has accumulated within surficial alluvium overlying the caprock forming hydraulic seepage mounds. These mounds have grown and dissipated as facilities have operated and closer since 1990. Seepage is captured by interception trenches or recovery bores. Seepage reaching the saprock is contained within the site through hydraulic gradients and the cones of depression around the Scuddles and Gossan Hill mine area and/or recovery bores (AECOM, 2021).
Surface water	There are no permanent surface water features at the Premises. Drainage at the Premises is dominated by sheet flow, which concentrates into several unnamed ephemeral watercourses scattered throughout the landscape. These watercourses are dry throughout the year and only flow after extreme rainfall events. The nearest creekline to the TSF3 is approximately 2.1km away in a north-east direction.
Priority 3 fauna (bird) *Masked owl*	Sighting 1.25km north-east
Priority Ecological Communities (buffer areas) *Minjar and Chulaar Hills vegetation complexes (banded ironstone formation)*	Buffer area is adjacent to and incurs into the existing TSF3 area.
Soils	Soils beneath TSF3. Soils in the vicinity of TSF3 and associated infrastructure.

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 5.

The Revised Licence L8593/2011/2 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 5. 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
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Licence Holder's controls**				
Construction								
Earthworks, construction works and vehicle movements	Dust	Air/windborne pathway causing impacts on vegetation health	Surrounding vegetation	Refer to Section 3.1	C = Slight L = Unlikely **Low Risk**	Y	Condition **1**, 4, 5, 16, 34, 35, 36, and 37	Existing conditions in the Licence along with the Licence Holder's controls are sufficient to manage this emission. The construction of the TSF3 Raise 5, Clay Borrow Pit Water Storage Dam and Coffer Dam 2 are to be located as described in the Application. Standard recording and reporting requirements. The general provisions of the EP Act regarding pollution and environmental harm apply.
Operation								
TSF3 Discharge and storage of tailings in TSF3 (additional tailings and seepage associated with the embankment lift)	Contaminated seepage water	Migration of tailings leachate through TSF3 embankments and through to the embankment toe and surrounds causing soil contamination and water logging impacting vegetation health	Soils and vegetation in the vicinity of TSF3	Refer to Section 3.1	C = Moderate L = Possible **Medium Risk**	Y	Condition **1**, 4, 5, 7, **11,** 12, 18, 19, 20, 25, 26, 27, **29**, 31, 32, 34, 35, **37**, 38, 39	As part of the starter embankment works, the entire TSF3 basin floor area was lined with a 1.5 mm thick HDPE liner (extended up to RL 363.5 m) with an underdrainage and seepage collection system installed over the liner. All collected seepage and toe drainage water reports to lined ponds for reuse at the process plant. Existing standpipe piezometers located within the TSF3 embankment remain dry indicating the liner is functioning as intended. The existing groundwater mounting bores do not show any evidence of hydraulic mounding due to seepage from TSF3. Many of the bores are dry, supporting this conclusion. The Licence Holder proposed infrastructure and equipment design

Risk Event					Risk rating[1] C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions[2] of licence	Justification for additional regulatory controls
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Licence Holder's controls**				
								and construction requirements are included as additional conditions within the licence. Existing conditions in the Licence relating to TSF3 operational requirements (i.e. discharge, freeboard), inspections, monitoring, and reporting and management actions are sufficient to manage these emissions.
	Tailings and contaminated water	Overtopping of the TSF3 embankment causing contamination of the surrounding soils and impacting vegetation health	Soils and vegetation in the vicinity of TSF3	Refer to Section 3.1	C = Moderate L = Unlikely **Medium Risk**	Y	Condition **1**, 4, 5, 7, 11, 12, 14, 18, 19, 20, 25, 26, 27, 31, 34, 35, 37, 38, 39	Existing conditions in the Licence along with the Licence Holder's controls are sufficient to manage this emission. The Licence Holder controls are included as additional conditions within the licence. Standard recording and reporting conditions apply in the licence. The general provisions of the EP Act regarding pollution and environmental harm apply.
Clay Borrow Pit Water Storage Dam Discharge and storage of dewatering effluent in a clay borrow pit	Seepage of dewatering effluent	Seepage through the pit floor and walls causing contamination of the surrounding soils and impacting vegetation health	Soils and vegetation in the vicinity of Clay Borrow Pit Water Storage Dam Livestock	Refer to Section 3.1	C = Minor L = Possible **Medium Risk**	Y	Condition **1**, **3**, 4, 5, 6, 7, **11**, **12**, 19, 20, **23**, 25, 26, 27, **29**, **30**, **31**, 32, 34, 35, **37**, **38**, 39	Currently dewatering effluent is discharged to surface water (Lake Wownaminya) following a clarification process. Diverting this discharge water to an onsite clay borrow pit for reuse reduces the overall risk to the environment from this discharge as the depth to groundwater is greater than 55 mbgl, the clay pit has a very low hydraulic conductivity (5×10^{-7} m/s), and there are no known ecological dependencies on groundwater because the water table is too deep. The Licence Holder proposes to install groundwater monitoring bores and will routinely monitor the

Risk Event					Risk rating[1] C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions[2] of licence	Justification for additional regulatory controls
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls				
								ambient groundwater quality. The Licence Holder proposes a minimum 6 m freeboard is maintained at the dam. The dewatering discharge water will continue to be clarified prior to discharge to the dam. The Licence Holder proposes to maintain the same discharge water quality as is currently discharged to Lake Wownaminya. Existing conditions in the Licence along with the Licence Holder's controls are sufficient to manage this emission. The Licence Holder controls are included as additional conditions within the licence. Standard recording and reporting conditions apply in the licence.
	Direct discharge of dewatering effluent	Direct discharge from overtopping of the pit crest causing contamination of the surrounding soils and impacting vegetation health	Soils and vegetation in the vicinity of Clay Borrow Pit Water Storage Dam	Refer to Section 3.1	C = Minor L = Rare **Low Risk**	Y	Condition **1**, 4, 5, 7, **11, 12**, **14**,19, 20, **23**, 26, 27, **29**, **30**, 32, 34, 35, **37**, **38**, 39	The Licence Holder proposes to maintain a minimum freeboard of 6 m at the dam. Existing conditions in the Licence along with the Licence Holder's controls are sufficient to manage this emission. The Licence Holder controls are included as additional conditions within the licence. Standard recording and reporting conditions apply in the licence. The general provisions of the EP Act regarding pollution and environmental harm apply.

Risk Event					Risk rating[1] C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions[2] of licence	Justification for additional regulatory controls
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Licence Holder's controls**				
	Accidental loss of dewatering effluent due to pipeline failure	Direct discharge to land causing contamination of soils and impacting vegetation health	Soils and vegetation in the vicinity of TSF3	Refer to Section 3.1	C = Slight L = Possible **Low Risk**	Y	Condition **1**, 4, 5, 7, 14,15, 34, 35 and 37	Existing conditions in the Licence along with the Licence Holder's controls are sufficient to manage this emission. The Licence Holder controls are included as additional conditions within the licence. Standard recording and reporting conditions apply in the licence. The general provisions of the EP Act regarding pollution and environmental harm apply.
Coffer Dam 2 Collection and storage of seepage water and rainfall run-off water from the ROM Pad expansion area	Discharge of contaminated water	Direct discharge from overtopping of the dam wall causing contamination of the surrounding soils and impacting vegetation health	Soils and vegetation in the vicinity of the Coffer Dam 2	Refer to Section 3.1	C = Moderate L = Unlikely **Medium Risk**	Y	Condition **1**, 4, 5, 7, 11, **12**, **14**, 20, 34, 35, and 37	Existing conditions in the Licence along with the Licence Holder's controls are sufficient to manage this emission. The Licence Holder controls are included as additional conditions within the licence. Standard recording and reporting conditions apply in the licence. The general provisions of the EP Act regarding pollution and environmental harm apply.
	Accidental loss of contaminated water due to liner failure	Seepage of contaminated water through damaged liner causing contamination of the surrounding soils and impacting vegetation health	Soils and vegetation in the vicinity of the Coffer Dam 2	Refer to Section 3.1	C = Minor L = Rare **Low Risk**	Y	Condition **1**, **3**, 4, 5, 6, 7, **11,** 20, 25, 26, 27, **31**, 32, 34, 35, 37 and 39	Saturation of the superficial formation at the ROM pad present the greatest risk to the local vegetation. The Licence holder currently monitors groundwater bores in this area and proposes to increase the number of monitoring bores as part of the proposed expanded ROM pad. The bores will be screened in the superficial formation. The bores will be routinely monitored for SWL and quality. An existing seepage recovery and monitoring system exists around the ROM catchment dams (Coffer Dams) to monitor and intercept

Risk Event					Risk rating[1] C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions[2] of licence	Justification for additional regulatory controls
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls				
								seepage. All recovered seepage is then pumped to the HDPE lined Evaporation Pond C and on to the MWC for treatment. The Licence Holder proposed additional monitoring bores and sampling program are included as additional conditions within the licence. Liner material and construction method determined from guidance set out in the departments *Water quality protection note 26, Liner for containing pollutants, using synthetic membranes (August 2013)* is included as licence conditions. Standard sampling methods, recording and reporting conditions apply in the licence. The general provisions of the EP Act regarding pollution and environmental harm apply.
	Accidental loss of contaminated water due to pipeline failure	Direct discharge to land causing contamination of soils and impacting vegetation health	Soils and vegetation along pipeline route from the Coffer Dam 2 to Evaporation Pond C	Refer to Section 3.1	C = Minor L = Possible **Risk**	Y	Condition **1**, 4, 5, 7, 14,15, 34, 35 and 37	Existing conditions in the Licence along with the Licence Holder's controls are sufficient to manage this emission. The Licence Holder controls are included as additional conditions within the licence. Standard recording and reporting conditions apply in the licence. The general provisions of the EP Act regarding pollution and environmental harm apply.

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. **Bold and underline text** depicts additional regulatory controls imposed by department.

4. Consultation

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

Table 6: Consultation

Consultation method	Comments received	Department response
Department of Mines, Industry Regulation and Safety (DMIRS) advised of proposal (17 January 2023)	DMIRS replied on 14 February 2023 stating/advising that: Golden Grove Operation submitted the following two mining proposals: 1. **Reg ID 114827** TSF 3 Embankment Raise 5 Mining Proposal, received by DMIRS on the 7th November 2022; and 2. **Reg ID 112160** Golden Grove ROM Pad Extension Mining Proposal received by DMIRS on the 23rd June 2022. Both proposals are still being assessed. **Mining Proposal Reg ID 114827** proposes to raise TSF 3 by 3m from the current Raise 4 crest RL 381.0m to the new Raise 5 crest RL 384.0 m using the upstream construction method. A geotechnical review was completed for the submission. DMIRS geotechnical engineer noted that TSF4 was planned following TSF 1 however tailings to the TSF is at much greater rate than anticipated. DMIRS has seen no submission related to a new TSF recognising that the lead time for new facilities is substantial which indicates a lack of planning and organisation on the part of 29 Metals. The geotechnical engineer also concerns that 29 Metals will not be adequately considering life of mine works and as such short term changes in the infrastructure required for operations may lead to higher risk hence the importance of regulatory inspections and reviews of the facilities. Additional information regarding the schedule for the construction works that include the diversion bunds, TSF 3 Raise 5 lift and commencement of water storage in the clay borrow pit was requested from 29 Metals. DMIRS Mine Safety Directorate (MSD) is of the view that the design and third party review appear applicable to meeting requirements for TSF management in Western Australia, however the following conditions should apply to TSF 3: • The construction of any tailings storage embankment shall be supervised by an engineering or geotechnical specialist. • The construction details of any tailings storage embankment shall be documented by an engineering or geotechnical specialist and confirm that the construction satisfies the design intent. The construction document shall include the records of all construction quality	DWER notes the comments provided regarding the construction and operational requirements for the TSF3 Raise 5. DWER also notes the comments made regarding the potential for the expanded ROM pad to generate acid mine drainage, and has taken those comments into consideration when assessing the proposed Coffer Dam 2.

	control testing, the basis of any method specification adopted, and any significant modifications to the original design together with the reasons why the modifications were necessary. The construction document shall also present as-built drawings for the embankment earthworks and pipework. A copy of the construction document shall be submitted to DMIRS for its records. • The tailings storage facility shall be checked on a routine daily basis by site personnel during periods of deposition to ensure that the facility is functioning as per the design intent. • An engineering or geotechnical specialist shall audit and review the active tailings storage facility on a biennial basis. The specialist shall review past performance, validate the design, examine tailings management, and review the results of monitoring. Any deficiencies noted in the audit and review report shall be suitably addressed and improved. The audit and review report shall be submitted to DMIRS and should be accompanied by a recent survey pick-up of the facility and an updated tailings storage data sheet. • At the time of decommissioning of the tailings storage facility and prior to rehabilitation, a further review report by a geotechnical or engineering specialist shall be submitted to DMIRS. This report should review the status of the structure and its contained tailings, examine and address the implications of the physical and chemical characteristics of the materials, and present and review the results of all monitoring. The rehabilitation stabilisation works proposed and any on-going remedial requirements should also be addressed. **Reg ID 112160** has been submitted to DMIRS for the Golden Grove ROM Pad Extension. This mining proposal is for the extension of a PAF cell. DMIRS has concerns about the cell design and the potential to generate acid mine drainage. The PAF cell leachate will be collected and disposed into the cofferdam. To evaporate /direct to the settling ponds located by TSF 3. The design concept does not follow leading Practice to manage and prevent AMD. Consequently, the PAF cell design and suitability of the cofferdam is questionable. A request to further information was sent on 6/02/2023 requesting clarification/modification of the design and how AMD will be mitigated.	
Licence Holder was provided with draft amendment on (21 April 2023)	Licence Holder requested to remove the limits of specific parameters for ROM9 as it is located in a seepage capture area and is already above the assigned limits.	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 7 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 7: Summary of licence amendments

Condition no.	Proposed amendments
1-Table 1	Infrastructure and equipment requirements for Addition of: (a) Clay Borrow Pit Water Storage Dam (b) Coffer Dam 2 including discharge pipelines (c) TSD3 embankment raise 5 Removal of: (a) TSF3 embankment raise 4
3- Table 2	Infrastructure requirements – groundwater monitoring wells Addition of: ROM groundwater monitoring wells, Clay Borrow Pit Water Storage Dam monitoring bores. Removal of: Saprock and superficial well monitoring. Monitoring well location changed from Figure 6 to 5 Timeframe condition for ROM groundwater monitoring wells changed to include the ROM pad expansion area. Addition of: Timeframe for Clay Borrow Pit Water Storage Dam monitoring.
5	Sub-condition g – TSF changed for Coffer Dam 2
11 – Table 6	Containment point reference added: Coffee Dam 2 and Clay Borrow Pit Water Storage Dam. Addition of TSF 3 - Infrastructure requirements
12	(a) Increase the freeboard specification from 300mm to a minimum of 500 mm Addition of: (i) minimum top of pit embarkment freeboard for the Clay Borrow Pit Water Storage Dam (j) minimum top of pit embarkment freeboard for the Coffer Dam 2
14 – Table 7	Addition of inspection of infrastructure for: (a) Clay Borrow Pit Water Storage Dam (b) Coffer Dam 2 (c) Coffer Dam 2 pipeline to Evaporation Pond C (when in use) (d) TSF1 and TSF3 embankment freeboard and decant pond
23 - Table 11	Addition of emission point reference on Map of emission point L2
29 – Table 13	Addition of emission point reference L2 and corresponding parameters, units, averaging period and frequency
30 – Table 14	Addition of Input/Output – Recovery of stored dewatering effluent
31 – Table 15	Addition of emission points reference

	(a) PP01, MB76, MB77 and MB78 (b) ROM9, ROM11, ROM12, ROM13, ROM14, ROM15 and ROM16
32	Changed Table16 for Table 15
37 – Table 17	Table 13, addition of format or form LR2
38	Addition of reporting condition: (d) to be extended to the Clay Borrow Pit Water Storage Dam (e) minimum record of the monthly water balance for the Clay Borrow Pit Water Storage Dam
39 - Table 18	Condition 38 changed for 31
40	Redundant reporting condition for TSF1 removed
Definitions – Table 19	Addition of ASTM D638, ASTM1238, ASTM D1505 and ASTM1603
Figure 2	Updated Site plan map
Figure4A	Addition of Emission point to land (L2) map, monitoring location L2
Figure 5	Updated Ambient groundwater quality monitoring points
Figure 6	Updated ROM seepage monitoring points (wells).
Figure 7	Figure 7 – Locations of proposed ROM monitoring bores
Figure 8	Updated Table number – Ambient groundwater monitoring point for paste plant
Figure 9	Containment infrastructure
Figure 13	TSF1 new pipeline corridor
Figure 14	Updated Figure reference – Existing TSF2 seepage recovery infrastructure
Figure 15	Updated Figure reference – paste plant and associated infrastructure
Form LR2	Addition of LR2 form for monitoring of emission point L2.
Form GR1	Addition of emission point MB76, MB77, MB78 and PP01. Removal of Saprock and Superficial
Form GR2	Addition of monitoring of groundwater points for ROM9, ROM11, ROM12, ROM13, ROM14, ROM15 AND ROM16.
Schedule 3	Change of number of TSF raise from 4 to 5. Figures from raise 4 deleted.
Schedule 10	Addition of Coffer Dam 2 design drawings

References

1. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
2. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
3. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.
4. Department of Mines, Industry Regulation and Safety, *Water Quality Protection Guidelines No.3, Mining and Mineral Processing, Liner for waste containment*, 2000
5. Scuddles & Gossan Hill Mine, Golden Grove Operations Pty Ltd, *Licence L8593/2011/2 Annual Environmental Report 2022*, 20 March 2023 (REF: DWERDT585356)
6. Wood 2022, *29 Metals Golden Grove Mine, ROM Pad Expansion Design*, September 2022
7. 29 M Golden Grove Pty Ltd, *Borrow Pit Water Storage Feasibility, Golden Grove Operations,* Pennington Scott, 22 October 2021 (REF: A2141626)
8. 29 Metals Golden Grove, *Environmental Protection Act 1986 Licence L8593/2011/2, TSF 3 Embankment Raise 5 Licence Amendment Application Supporting Information,* 24 November 2022 (REF: DWERDT692270)
9. 29 Metals Golden Grove, *DWER Water Annual Groundwater Monitoring Summary 1 January 2022 – 31 December 2022, Project Name: DWER Licence to Take Water AER - GWL 103574(9)* (REF: DWERDT760658)
10. AECOM 2021, *Groundwater Monitoring Review. Golden Grove Mine*

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

Condition	Summary of Licence Holder's comment	Department's response
Condition 31 – Table 15	ROM 9 monitoring bore is superficial and monitors seepage within the superficial aquifer. It is located withing the seepage capture area. Licence holder requested to remove concentration limit for this monitoring bore regarding Cadmium and Total Dissolved Solids, to can comply with the licence as historical concentration of these parameters are higher than limit.	The departments agreed and removed limit of Cadmium and Total Dissolved Solids for ROM9.

Appendix 2: Application validation summary

<table>
<tr><th colspan="7">SECTION 1: APPLICATION SUMMARY</th></tr>
<tr><td colspan="7">Application type</td></tr>
<tr><td>Works approval</td><td>☐</td><td colspan="5"></td></tr>
<tr><td rowspan="4">Licence</td><td rowspan="4">☐</td><td>Relevant works approval number:</td><td></td><td>None</td><td>☒</td></tr>
<tr><td colspan="3">Has the works approval been complied with?</td><td colspan="2">Yes ☐ No ☐</td></tr>
<tr><td colspan="3">Has time limited operations under the works approval demonstrated acceptable operations?</td><td colspan="2">Yes ☐ No ☐ N/A ☐</td></tr>
<tr><td colspan="3">Environmental Compliance Report / Critical Containment Infrastructure Report submitted?</td><td colspan="2">Yes ☐ No ☐</td></tr>
<tr><td colspan="5">Date Report received:</td></tr>
<tr><td>Renewal</td><td>☐</td><td>Current licence number:</td><td colspan="3"></td></tr>
<tr><td>Amendment to works approval</td><td>☐</td><td>Current works approval number:</td><td colspan="3"></td></tr>
<tr><td rowspan="2">Amendment to licence</td><td rowspan="2">☒</td><td>Current licence number:</td><td colspan="3">L8593/2011/2</td></tr>
<tr><td>Relevant works approval number:</td><td></td><td>N/A</td><td>☐</td></tr>
<tr><td>Registration</td><td>☐</td><td>Current works approval number:</td><td></td><td>None</td><td>☐</td></tr>
<tr><td colspan="2">Date application received</td><td colspan="5">25 November 2022</td></tr>
<tr><td colspan="7">Applicant and Premises details</td></tr>
<tr><td colspan="2">Applicant name/s (full legal name/s)</td><td colspan="5">Golden Grove Operations Pty Ltd</td></tr>
<tr><td colspan="2">Premises name</td><td colspan="5">Golden Grove Mine</td></tr>
<tr><td colspan="2">Premises location</td><td colspan="5">Mining Tenements M59/227, M59/3, M59/362, M59/195 and M59/90 YALGOO</td></tr>
<tr><td colspan="2">Local Government Authority</td><td colspan="5">Shire of Yalgoo</td></tr>
<tr><td colspan="7">Application documents</td></tr>
<tr><td colspan="2">HPCM file reference number:</td><td colspan="5">DWERDT692265</td></tr>
<tr><td colspan="2">Key application documents (additional to application form):</td><td colspan="5">29 Metals, Golden Grove, TSF3 Embankment Raise 5 Licence Amendment Application Supporting Information, 24 November 2022</td></tr>
</table>

	Including Attachments: - 29 Metal, Golden Grove Mine, *ROM Pad Expansion Design – Design Report,* September 2022 - 29 Metals Golden Grove, *Golden Grove Operations TSF3 Raise 5 – Design Report,* 26 October 2022 - 29 M Golden Grove Pty Ltd, *Borrow Pit Water Storage Feasibility – Golden Grove Operations*, 22 October 2021 - 29 Metals Golden Grove, *Operator Manual – Tailings Storage Facility (TSF3),* 25 October 2022
Scope of application/assessment	
Summary of proposed activities or changes to existing operations.	Golden Grove Operations Pty Ltd (a wholly owned subsidiary of 29 Metals Ltd) propose to construct a fifth embankment raise on TSF3 to allow additional storage of tailings generated from the Scuddles Processing Plant. The TSF3 raise 5 will consist of a 3m upstream embankment raise. In addition to the construction of a fifth embankment raise the Applicant also proposes to undertake the following works: - Construct a Clay Borrow Pit Water Storage Dam including monitoring bores and pipelines; - Install Clay Borrow Pit Water Storage Dam Monitoring Bores; and - Alter the Coffer Dam 2 to allow for future expansion of the ROM pad. This will include additional sizing to hold seepage water and rainfall run-off water from the re-sized ROM pad. - Additional bores installed.

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

Table 1: Prescribed premises categories

Prescribed premises category and description	**Assessed production or design capacity**	**Proposed changes to the production or design capacity (amendments only)**
Category 5: Processing or beneficiation of metallic or non-metallic ore	2,100,000 tonnes per annual period	No change

Legislative context and other approvals		
Has the applicant referred, or do they intend to refer, their proposal to the EPA under Part IV of the EP Act as a significant proposal?	Yes ☐ No ☒	Referral decision No: Managed under Part V ☐ Assessed under Part IV ☐

Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?	Yes ☐ No ☒	Ministerial statement No: EPA Report No:
Has the proposal been referred and/or assessed under the EPBC Act?	Yes ☐ No ☒	Reference No:
Has the applicant demonstrated occupancy (proof of occupier status)?	Yes ☒ No ☐	Certificate of title ☐ General lease ☐ Expiry: Mining lease / tenement ☐ Expiry: Other evidence ☐ Expiry:
Has the applicant obtained all relevant planning approvals?	Yes ☐ No ☐ N/A ☒	Approval: Expiry date: If N/A explain why?
Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes ☒ No ☐	CPS No: CPS9888/1
Has the applicant applied for, or have an existing CAWS Act clearing licence in relation to this proposal?	Yes ☐ No ☒	Application reference No: N/A Licence/permit No: N/A
Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes ☐ No ☒	Application reference No: Licence/permit No: Applicant states an application for a RIWI 26D licence for the production bore will be submitted. The production bore will not be assessed as part of this Part V assessment.
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes ☐ No ☒	Name: Gascoyne groundwater area Type: Proclaimed Groundwater Area Has Regulatory Services (Water) been consulted? Yes ☐ No ☒ N/A ☐ Regional office: Mid-West Gascoyne

Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes ☐ No ☒	Name: N/A Priority: P1 / P2 / P3 / N/A Are the proposed activities/ landuse compatible with the PDWSA (refer to WQPN 25)? Yes ☐ No ☐ N/A ☐
Is the Premises subject to any other Acts or subsidiary regulations (e.g. *Dangerous Goods Safety Act 2004, Environmental Protection (Controlled Waste) Regulations 2004, State Agreement Act xxxx*)	Yes ☒ No ☐	Dangerous Goods Safety Act 2004,
Is the Premises within an Environmental Protection Policy (EPP) Area?	Yes ☐ No ☒	
Is the Premises subject to any EPP requirements?	Yes ☐ No ☒	
Is the Premises a known or suspected contaminated site under the *Contaminated Sites Act 2003*?	Yes ☒ No ☐	Classification: possibly contaminated – investigation required (PC–IR) Golden Grove Mine Yalgoo, within Badja and Muralgarra Pastoral Stations and Lake Wownaminya. Mining tenements M59/3, M59/90, M59/195, M59/227, M59/361, M59/362, L59/41 & E59/1322 Yalgoo Ninghan Road. Form 1 Date 27 Mar 2009 CSS Site ID 3505 / CSS ID 18690 Date of classification: N/A