



## Application for Licence Amendment

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

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<b>Licence Number</b>	L9013/2016/1
<b>Licence Holder</b>	Spartan Resources Limited
<b>ACN</b>	139 522 900
<b>File Number</b>	DER2016/002214-1
<b>Premises</b>	Dalgaranga Gold Project Mining Lease M59/749 and Miscellaneous Licence L59/151 DAGGAR HILLS WA 6638  As defined by the Premises maps attached to the Revised Licence
<b>Date of Report</b>	19 November 2024 (FINAL)
<b>Decision</b>	Revised licence granted

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## 1. Decision summary

Licence L9013/2016/1 (L9013) is held by Spartan Resources Limited (Licence Holder) for the Dalgaranga Gold Project (the Premises), located at Mining Lease M59/749 and Miscellaneous Licence L59/151, DAGGAR HILLS WA 6638.

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 L9013 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 Applicant summary

On 26 June 2024, the Licence Holder applied to the department to amend L9013 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The following amendments are being sought:

#### Construction/installation of a ball mill and pre-leach thickener at the existing processing plant (plant)

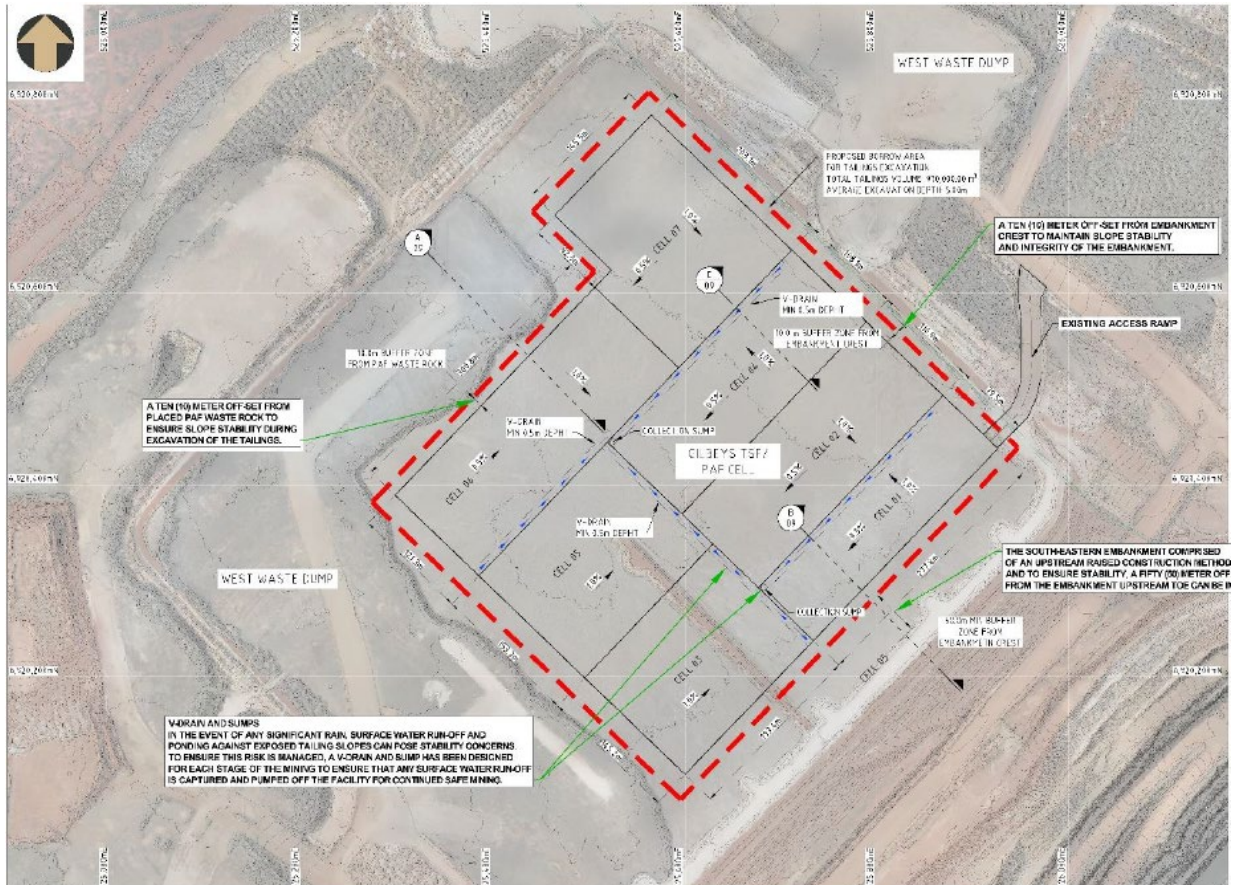
The current plant consists of a single stage jaw crusher which supplies crushed ore to a Semi-autogenous (SAG) mill. The Licence Holder proposes to upgrade the plant with an additional ball mill to produce a finer grind material before transferring to the processing circuit.

The Licence Holder also proposes to install a pre-leach thickener which will receive underflow from the existing trash screen. The thickener will be fed by gravity flow from a re-designed trash screen and will consist of flocculant as part of the thickening process. The thickened slurry will then be pumped back to the head of the leach circuit. The proposed pre-leach thickener will allow a density increase to 55-60% allowing an increase in the potential leach/adsorption time resulting in better gold recovery. The Licence Holder does not expect there will be any change to the geochemistry of the tailings produced at the Premises as a result of the change in grind size (GCA, 2024).

Any potential increase in dust levels produced from the finer grind material will be managed through the use of existing water sprays within the plant area. Daily inspections are already undertaken at the processing plant area and will be expanded to include observing the effectiveness of dust mitigation measures at the new ball mill.

The existing plant layout including the proposed ball mill and pre-thickener are shown in Figure 1 below.





**Figure 2: Tailings reclamation cell design**

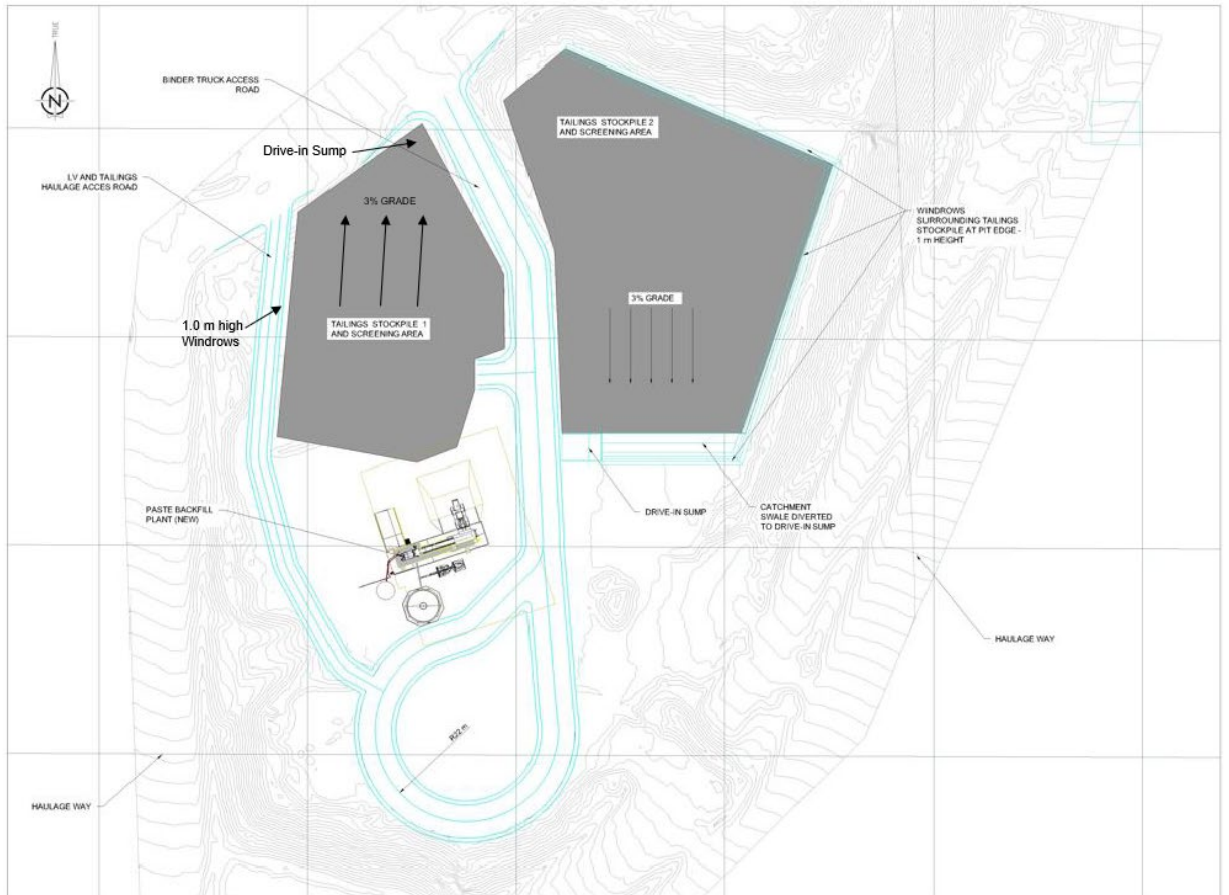
**Reclaimed tailings stockpile area**

Reclaimed dry tailings from the TSF will be trucked to and then unloaded at purpose-built stockpile areas near the location of the Never-Never underground surface supporting infrastructure area. The area will consist of two separate stockpiles for use as feed stock at a proposed paste plant which will also be located adjacent to this area.

Construction details for the stockpile and screening area are described below and also illustrated in Figure 3.

- A clay lining layer will be installed, conditioned and then roller compacted.
- The lining layer will be covered with a 0.5 metre thick free draining oxide waste rock for protection;
- A 3% gradient will be achieved on the laydown areas towards drive-in collection sumps; and
- A 1.0 meter high earthen windrow will be installed around the perimeter of the laydown area.



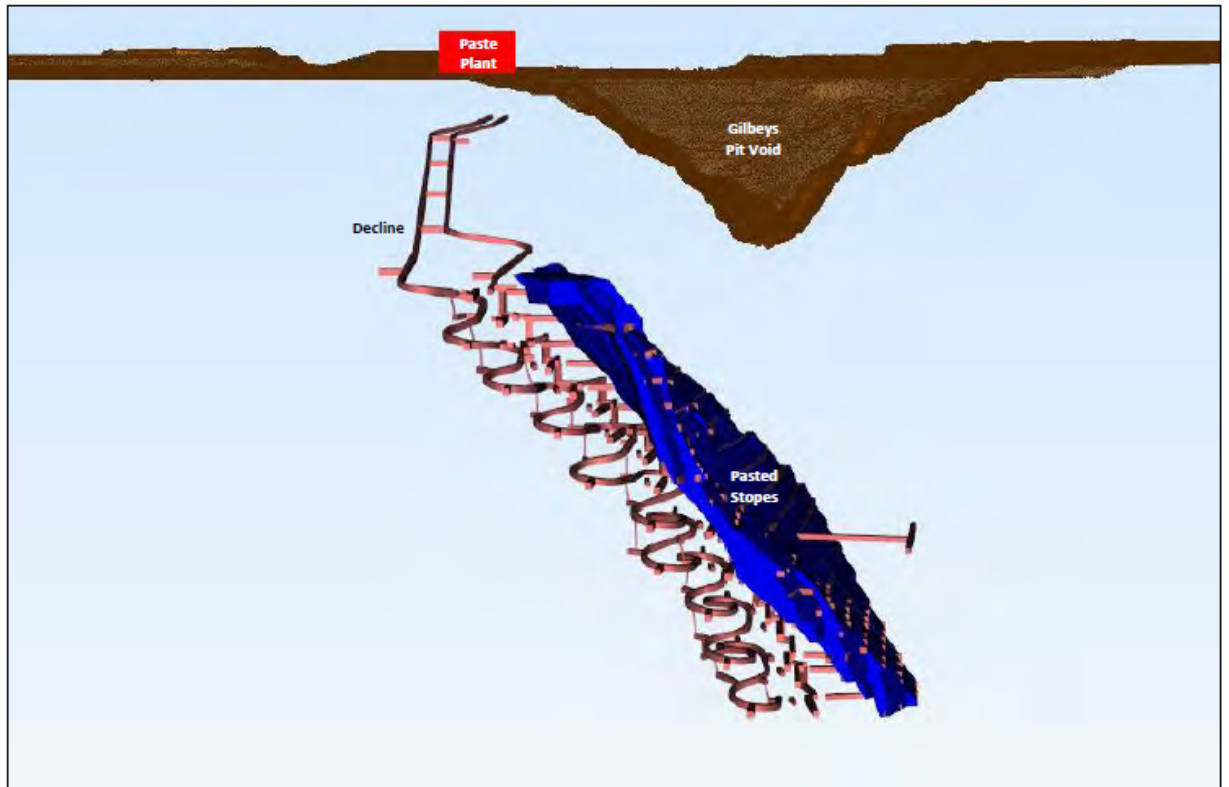


**Figure 3: Paste Plant and Stockpile layout**

#### Never-Never operation and use of the paste plant

The Licence Holder plans to operate an open pit mine at Never-Never which will extend to around the base of the known fractured rock aquifer (approximately 150 m below the surface). The Never-Never operation will then transition into an underground development which will extend to around 530 m below surface over approximately six years. The proposed paste plant will be used to create paste fill by combining low heat cement binder, water and reclaimed tailings from the historic Gilbeys West TSF before being gravity feed underground (via a borehole at this location) to stabilise hanging walls within the underground development (see Figure 4 below). All pasted stopes will occur within the bedrock aquitard. The Licence Holder expects a void filling requirement of up to 30,000 m<sup>3</sup> of paste fill per month.

The Licence Holder plans to mix the cement binder with tailings at a dry mass range of between 4 and 9 percent. The amount of binder will depend on the flow characteristics required for paste to fill the different locations and geometries of the mined stopes, as well as the longer-term strength requirements of the cured paste backfill.



**Figure 4: Cross section of paste plant, decline, and pasted stopes**

#### Class II putrescible landfill at the Gilbey's West Waste Rock Dump (WRD)

Two existing Class II landfills operate at the Premises which consist of the following:

- Gilbeys East WRD for the disposal of Clean Fill, Inert Waste Type 1 and Inert Waste Type 2 (excluding tyres); and
- Golden Wings for the disposal of Clean Fill, Putrescible Waste, Inert Waste Type 1 and Inert Waste Type 2.

The Golden Wings landfill is nearing capacity, and the Licence Holder is proposing to construct a new Class II landfill at the Gilbey's West WRD.

The new landfill will operate in the same manner as the Golden Wings landfill with a series of trenches used for the disposal of waste which will be progressively backfilled as waste is deposited. Each trench will consist of an earthen bund on three sides which will be constructed from the trench excavation materials. The bunds will be 2 meters high to assist in minimising wind-blown waste and also to prevent stormwater entering the trench. The landfill area will be stock proof fenced.

The Licence Holder also proposes the disposal of putrescible type wastes at the Gilbeys East WRD to replace the current disposal of putrescible waste at the Golden Wings WRD. Separate trenches will be constructed for the putrescible type wastes.

The Licence Holder has not proposed a change to the quantity of waste disposed at the landfill facilities which is up to 7.5 tonnes per week (approximately 400 tonnes per annum). The Licence Holder also plans to continue to operate the landfill facilities in accordance with existing conditions of L9013 which includes weekly covering of putrescible type wastes and weekly inspections including the collection of windblown waste.

#### Bioremediation pad

A bioremediation facility will be constructed and operated at either the Gilbey's East WRD or Gilbey's West WRD. The facility will initially consist of an approximately 400 m<sup>2</sup> (20 m x 20 m)

prepared pad surrounded by 0.5 m high earthen bunds and divided into two cells. Additional cells will be added as required.

Hydrocarbon contaminated soil will be placed into the cells and progressively spread until a final thickness of approximately 300 mm is achieved. The soil will then be scarified and a bioremediation solution containing hydrocarbon-consuming bacteria will be applied. Periodic application of water and additional scarification will be undertaken as required.

Sampling of treated cells will be undertaken at three-monthly intervals with test results compared to Class 1 Landfill criteria as defined in DWER's *Landfill Waste Classification and Waste Definitions 1996 (as amended 2019)*. When the correct levels have been achieved, the material will be removed for disposal within the waste dump.

Table 1 below outlines the proposed changes to the existing Licence

**Table 1: Proposed design or throughput capacity changes**

Category	Current design throughput capacity	Proposed design throughput capacity	Description of proposed amendment
5 (b)	New sub-category	1,000,000 tonnes per annual period	The Licence Holder proposes to reclaim up to 1,000,000 tonnes per annum (tpa) of tailings material from the Gilbeys TSF. The reclaimed material will be combined with cement product at a new paste plant before being pumped underground to support underground mining operations.
89	400 tonnes per annual period	No change	The Licence Holder proposes to construct a new Class II putrescible landfill at the Gilbeys West WRD. The quantity of waste buried annual at the Premises will remain unchanged.

### 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 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
Dust	<p>Construction activities</p> <p>Excavation of dry tailings from the Gilbeys TSF</p> <p>Operation of the paste plant</p> <p>Vehicle movements</p> <p>Loading and unloading of dry tailings material</p> <p>Lift-off from stockpiled tailings at the paste plant</p> <p>Operating ball mill</p>	Air/windborne pathway	<p>Water cart will be used on unsealed roads, in the pit, on the ROM and other open areas to minimise dust generation.</p> <p>Tailings reclamation will be avoided in windy conditions as far as practical.</p> <p>Tailings material will be wet down, covered, or of sufficient moisture content, during handling and transport to minimise dust generation.</p> <p>Size of tailings stockpile will be limited to one weeks feed for the paste fill plant.</p> <p>If paste production is not required for more than seven days, the stockpiled reclaimed tailings will be returned to the Gilbey's TSF.</p> <p>Use of existing water sprays at the processing plant.</p> <p>Vehicle speed restrictions.</p>
Contaminated stormwater containing dissolved solids, metals and metalloids	Recovery of tailings at Gilbeys TSF	Surface water run-off to land resulting in seepage to groundwater	<p>V-drains and collection sumps installed and operated at each cell for the collection and removal of surface water.</p> <p>Collected surface water transferred to the process water pond.</p>
	Reclaimed tailings stockpile and screening area	Surface water run-off to land resulting in seepage to groundwater	<p>A clay lining layer will be installed, conditioned and then roller compacted.</p> <p>The lining layer will be covered with a 0.5 metre thick free draining oxide waste rock for protection.</p> <p>A 3% gradient will be achieved on the laydown areas towards drive-in collection sumps.</p> <p>A 1.0 meter high earthen windrow will be installed around the perimeter of the laydown area.</p>
Tailings seepage containing dissolved solids, metals and metalloids	Increased water storage at Gilbeys TSF caused from the recovery of tailings material	Seepage through TSF embankments and floor to groundwater	<p>Use of v-drains and sumps for the collection of surface water runoff.</p> <p>Collected surface water is pumped back to the process plant for reuse.</p>

Emission	Sources	Potential pathways	Proposed controls
Leachate arising from the degradation of the putrescible waste mass and/or interaction with rainwater ingress	Landfilling putrescible wastes in an unlined trench	Seepage through soils to the underlying groundwater	Putrescible landfill will be located on WRD's with a minimum height of 5 metres above ground level. Approximately 2 m high earthen bunding built around trench perimeter to divert stormwater. Landfill trenches progressively backfilled as waste is deposited.
Contaminated stormwater from landfill operations and fire suppression water	Landfilling of putrescible waste	Surface water run-off to land resulting in seepage to groundwater	Approximately 2 m high earthen bunding built around trench perimeter to divert clean stormwater. Contaminated stormwater retained within the below ground trench. Landfill trenches progressively backfilled as waste is deposited.
Windblown waste	Landfilling of putrescible waste	Air/windborne pathway	Approximately 2 m high earthen bunding built around trench perimeter to minimise windblown waste. Putrescible waste covered weekly. Fencing installed around landfill trenches.
Accidental loss of hydrocarbons due to spills and leaks	Plant and equipment	Seepage through soils to the underlying groundwater	Spill kits located on vehicles and infrastructure. Hydrocarbon contaminated areas removed to the bioremediation area for treatment.
Solute containing salts (sulphate, calcium) and some heavy metals	Pasted tailings material in underground mine voids	Fractured rock aquifer following post mine closure	All pasted tailings will occur within the low permeable bedrock aquitard No other controls proposed

### 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 3 below provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises (*Guideline: Environmental siting* (DWER 2020)).

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

activity

Human receptors	Distance from prescribed activity
Aboriginal Cultural Heritage site – Register (DPLH – 099)	5 km north of the Premises boundary <b>Screened out due to distance – No further assessment required</b>
Environmental receptors	Distance from prescribed activity
Groundwater Quality (at the location of the Gilbeys pit): <ul style="list-style-type: none"> <li>- slightly brackish (total dissolved solids (TDS) around 1,400 mg/L.</li> <li>- pH ranged between 7.7 and 8.2.</li> <li>- Low sulphate concentration (130 to 310 mg/L)</li> </ul> Groundwater is considered suitable for stockwatering purposes.	Distance to groundwater 8.7 to 15 metres below ground level (mBGL) (pre mining). Recovery of aquifer expected 12-16 years post closure
Paddy Well	4.9km northwest of Premises <b>Screened out due to distance – No further assessment required</b>
Yower Tharra Well	5.7km southeast of Premises <b>Screened out due to distance – No further assessment required</b>
Rivers, Lakes, Oceans, and other bodies of surface water, etc.	No permanent drainage lines or surface water bodies at the Premises. Nearest waterway is approximately 12 km away. Drainage at the Premises and the immediate surrounding area is through broad sheet-flow <b>Screened out due to distance – No further assessment required</b>
Threatened and/or priority flora	No Priority or Threatened Ecological Communities have been recorded or known to exist at the Premises. <b>No receptor present – No further assessment required</b>
Native vegetation	Mining Proposal Revision 10 Version 1 was approved for the project in July 2023. A Native Vegetation Clearing Permit has been granted for the project (Permit Number 7240/5), allowing for up to 2008 ha of clearing at the Premises. The permit is valid until December 2031. <b>No further assessment required</b>
Threatened and/or priority fauna	Peregrine Falcon occurs within the area

Threatened Ecological Communities (TEC's)	None within the premises boundary <b>No receptor present – No further assessment required</b>
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## 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 4.

Revised L9013 that accompanies this Amendment Report authorises emissions associated with the operation of the Premises i.e. Category 5(b) and 89 activities.

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 <sup>1</sup> C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions <sup>2</sup> of licence	Justification for additional regulatory controls / DWER comments
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls				
<b>Construction</b>								
Operation of vehicles and earth moving equipment during construction activities	Hydrocarbons from spills and leaks	Direct discharge to land resulting in seepage to groundwater causing contamination	Groundwater (refer to Table 3 for additional details)	Refer to Section 3.1	C = Slight L = Unlikely <b>Low Risk</b>	Y	No conditions imposed	The <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i> apply as do the general provisions of the EP Act (i.e. general offences relating to pollution or unreasonable emissions (section 49), environmental harm (sections 50A, 50B and 50C), and notification of waste (section 72 of the EP Act)).
<b>Operation</b>								
Landfilling of putrescible waste (unlined landfill)	Contaminated stormwater	Surface run-off resulting in seepage to land impacting groundwater quality	Groundwater (refer to Table 3 for additional details)	Refer to Section 3.1	C = Slight L = Unlikely <b>Low Risk</b>	Y	<p><b>Conditions 4 – infrastructure and equipment (operation)</b></p> <p><b>Condition 6 – waste processing requirements</b></p> <p>Condition 7- waste cover requirements</p> <p>Conditions 18 – notification requirements</p> <p>Conditions 20 and 21 – requirement to maintain accurate and auditable</p>	<p>Condition 4 – updated to include Licence Holder (LH) proposed bunding requirements.</p> <p>Condition 6 – updated to include LH proposed controls for separate burial of putrescible waste.</p> <p>The general provisions of the EP Act also apply (see above)</p>

Licence: L9013/2016/1

IR-T15 Amendment report template v3.0 (May 2021)

Risk Event					Risk rating <sup>1</sup> C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions <sup>2</sup> of licence	Justification for additional regulatory controls / DWER comments
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls				
							books Condition 22 – recording and reporting of received complaints Conditions 23 and 24 - auditing and reporting requirements	
	Windblown waste	Air/windborne pathway impacting fauna	Threatened and/or priority fauna	Refer to Section 3.1	C = Slight L = Unlikely <b>Low Risk</b>	Y	<b><u>Conditions 4 – infrastructure and equipment (operation)</u></b>  <u>Condition 6 – waste processing requirements</u> <u>Condition 7- waste cover requirements</u> <u>Condition 18 – notification requirements</u> <u>Conditions 20 and 21 – requirement to maintain accurate and auditable books</u> <u>Condition 22 – recording and reporting of received complaints</u> <u>Conditions 23 and 24 - auditing and reporting requirements</u>	Condition 4 – updated to include Licence Holder (LH) proposed bunding requirements. A minimum 2 m high earthen bund on 3 sides of the trench will assist in reducing windblown waste.  The general provisions of the EP Act also apply (see above)
	Leachate: arising from the degradation of the waste mass and/or interaction with rainwater ingress	Seepage to land impacting groundwater quality.	Groundwater (refer to Table 3 for additional details)	Refer to Section 3.1	C = Minor L = Possible <b>Medium Risk</b>	Y	<b><u>Conditions 4 – infrastructure and equipment (operation)</u></b>  <b><u>Condition 6 – waste processing requirements</u></b>  Condition 7- waste cover	Condition 4 – updated to include Licence Holder (LH) proposed bunding requirements. A minimum 2 m high earthen bund on 3 sides of the trench will assist in diverting stormwater.

Risk Event					Risk rating <sup>1</sup> C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions <sup>2</sup> of licence	Justification for additional regulatory controls / DWER comments
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls				
							requirements Condition 18 – notification requirements Conditions 20 and 21 – requirement to maintain accurate and auditable books Condition 22 – recording and reporting of received complaints Conditions 23 and 24 - auditing and reporting requirements	Condition 6 – updated to include LH proposed controls for separate burial of putrescible waste. The general provisions of the EP Act also apply (see above)
	Fire event: contaminated fire suppression water	Seepage to land impacting groundwater quality	Groundwater (refer to Table 3 for additional details)	Refer to Section 3.1	C = Minor L = Unlikely <b>Medium Risk</b>	Y	Conditions 4 – infrastructure and equipment (operation) Condition 6 – waste processing requirements Condition 7- waste cover requirements Condition 18 – notification requirements Conditions 20 and 21 – requirement to maintain accurate and auditable books Condition 22 – recording and reporting of received complaints Conditions 23 and 24 - auditing and reporting requirements	No additional regulatory controls included. The general provisions of the EP Act also apply (see above)

Risk Event					Risk rating <sup>1</sup>	Licence Holder's controls sufficient?	Conditions <sup>2</sup> of licence	Justification for additional regulatory controls / DWER comments
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls	C = consequence L = likelihood			
Operation of a concrete batching plant utilising recovered dry tailings as feed stock	Contaminated stormwater from stockpiles (feedstock)	Seepage to land impacting groundwater quality	Groundwater (refer to Table 3 for additional details)	Refer to Section 3.1	C = Moderate L = Unlikely <b>Medium Risk</b>	Y	<p><b><u>Condition 1 – General conditions</u></b></p> <p><b><u>Condition 2 – Infrastructure and equipment (construction)</u></b></p> <p><b><u>Condition 3 – commence operations following compliance submission</u></b></p> <p><b><u>Conditions 4 – infrastructure and equipment (operation)</u></b></p> <p>Conditions 18 and 19 – notification requirements</p> <p>Conditions 20 and 21 – requirement to maintain accurate and auditable books</p> <p>Condition 22 – recording and reporting of received complaints</p> <p>Conditions 23 and 24 - auditing and reporting requirements</p>	<p>Condition 1 – updated to include LH proposed limit for reprocessing recovered tailings</p> <p>Condition 2 – updated to include LH proposed construction requirements for the tailings stockpile and screening area</p> <p>Condition 3 – updated to allow operation of the tailings stockpile areas following submission of compliance documentation</p> <p>Condition 4 – updated to include LH proposed controls</p> <p>The general provisions of the EP Act also apply (see above)</p>
Remining (recovery) of tailings material from a historical TSF	Contaminated stormwater	Surface run-off seeping to land impacting groundwater quality	Groundwater (refer to Table 3 for additional details)	Refer to Section 3.1	C = Moderate L = Unlikely <b>Medium Risk</b>	Y	<p><b><u>Conditions 4 – infrastructure and equipment (operation)</u></b></p> <p><b><u>Condition 8 – inspection of infrastructure</u></b></p> <p>Conditions 18 and 19 – notification requirements</p> <p>Conditions 20 and 21 – requirement to maintain</p>	<p>Condition 4 - updated to include LH proposed operational methods and controls to manage surface water runoff</p> <p>Condition 8 – updated to include the requirement to conduct inspections of LH proposed surface water management systems</p>

Risk Event					Risk rating <sup>1</sup> C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions <sup>2</sup> of licence	Justification for additional regulatory controls / DWER comments
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls				
							accurate and auditable books Condition 22 – recording and reporting of received complaints Conditions 23 and 24 - auditing and reporting requirements	The general provisions of the EP Act also apply (see above)
	Increased seepage at the TSF due to surface water ponding within excavated cells	Seepage through embankments and floor impacting groundwater quality	Groundwater (refer to Table 3 for additional details)	Refer to Section 3.1	C = Moderate L = Possible <b>Medium Risk</b>	Y	<b>Conditions 4 – operational requirements</b> <b>Condition 8 – inspection of infrastructure</b> Conditions 18 and 19 – notification requirements Conditions 20 and 21 – requirement to maintain accurate and auditable books Condition 22 – recording and reporting of received complaints Conditions 23 and 24 - auditing and reporting requirements	Condition 4 - updated to include LH proposed controls to manage the collection and removal of surface water Condition 8 – updated to include the requirement to conduct inspections of surface water management systems at Gilbeys TSF reclaim cells The general provisions of the EP Act also apply (see above)
Use of pasted reclaimed tailings material to backfill underground mine voids	Solute from pasted tailings containing salts (sulphate, calcium) and some heavy metals	Solute released from pasted tailings impacting water quality within mined pit lakes	Fauna (Peregrine Falcon) utilising pit lakes as a drinking water source  Groundwater (refer to	Refer to Section 3.1	C = Moderate L = Unlikely <b>Medium Risk</b>	No controls proposed	Refer to Section 3.3	Refer to Section 3.3



Risk Event					Risk rating <sup>1</sup> C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions <sup>2</sup> of licence	Justification for additional regulatory controls / DWER comments
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls				
			Table 3 for additional details)					
Operation of a new ball mill and thickener at the existing Processing Plant	Spills/leaks of process materials due to infrastructure/equipment failure	Direct discharge to land impacting groundwater quality	Groundwater (refer to Table 3 for additional details)	Refer to Section 3.1	C = Slight L = Rare <b>Low Risk</b>	Y	Condition 1 – Production or design capacity limits  <b><u>Condition 2 – Design and construction/installation requirements</u></b>  <b><u>Condition 3 – commence operations following compliance submission</u></b>  Condition 4 – operational requirements  Conditions 18 and 19 – notification requirements  Conditions 20 and 21 – requirement to maintain accurate and auditable books  Condition 22 – recording and reporting of received complaints  Conditions 23 and 24 - auditing and reporting requirements	Condition 2 -updated to include LH proposed installation requirements, including location, for the ball mill and pre-leach thickener  Condition 3 -updated to allow operation of the ball mill and pre-leach thickener following submission of compliance documentation  The general provisions of the EP Act also apply (see above)

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.

### 3.3 Detailed risk assessment

#### 3.3.1 Description of risk event

Discharge of pasted tailings below groundwater level has the potential to reduce pit lake water quality causing secondary impacts on fauna.

#### 3.3.2 Identification and general characterisation of emission

A total of up to 1,000,000 tonnes of historical tailings material stored at the Gilbeys TSF will be excavated (mined) each year and then transported to a purpose built paste plant for combining with water and low heat cement, before being gravity feed approximately 550 m underground to stabilise hanging walls. The Licence Holder expects about 30,000 m<sup>3</sup> of paste fill will be used underground each month.

The Licence Holder employed Environmental Geochemistry International Pty Ltd (EGI) to undertake a geochemical assessment on collected raw (bulk and coarse) tailings and trial pasted tailings samples. The assessment by EGI was undertaken from February 2024 to May 2024 and included:

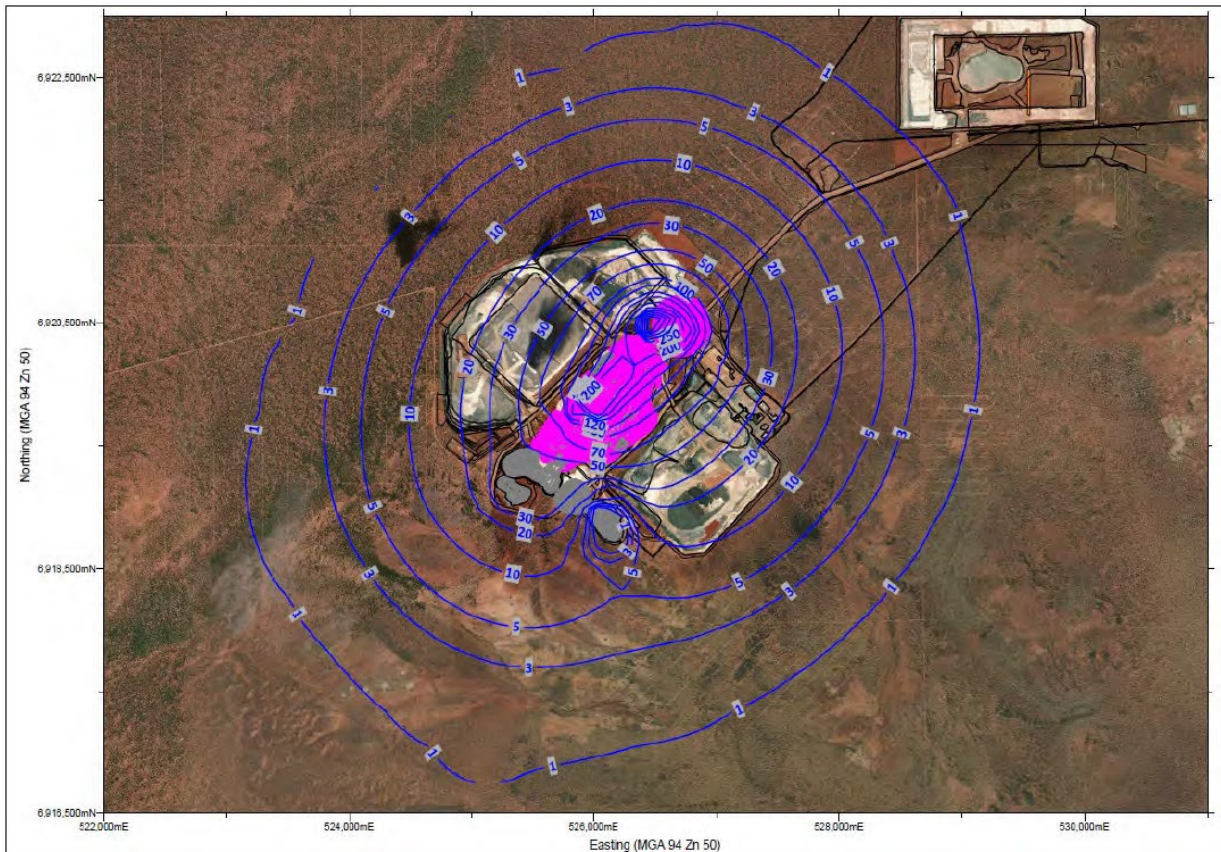
- Acid-base accounting, single addition Net Acid Generation (NAG) test, and multi-element analysis on a raw bulk and coarse reclaimed tailings fraction as well as the associated pasted samples that had been mixed with 2.5%, 4.0%, and 9.0% low heat cement binder.
- Additional geochemical test work on the pasted samples such as Chromium Reducible Sulphur (CRS), Acid-Buffering Characteristic Curve (ABCC), and a 5-stage sequential NAG test, to further understand the acid-forming characteristics.
- Three stage water extraction using both de-ionised water and Gilbeys Pit groundwater at a solid: water ratio of 1:2. Gilbeys Pit groundwater was used as it better represents the chemical composition of water that may come into contact with pasted tailings in the underground. Analysis of the extract liquors was for pH, EC, acidity/alkalinity, major cations and anions and trace metals and metalloids. The intent was to provide an indication of water quality due to contact of Gilbeys Pit groundwater with pasted bulk and coarse pasted tailings materials. The batch extractions were limited to pasted reclaimed tailings samples with 4.0% and 9.0% cement binder as the Licence Holder (following feasibility study cost estimates) determined to implement use of pasted backfill with a minimum of 4.0% cement binder content.

Results from the geochemical test work indicate pasted tailings will be Non-Acid Forming (NAF) and it is expected that caustic characteristics of the paste fill, due to the use of cement binder, will provide added alkalinity to groundwater that comes into contact with the paste fill underground. The results also suggest there could be some release of some metals (Al, Co, Cu, and Mo) from the paste fill.

#### 3.3.3 Pathway from pasted tailings to groundwater

The use of pasted tailings below the groundwater table may result in heavy metals and/or salts being released as groundwater interacts with the pasted tailings. Initially, groundwater will not interact with the underground pasted tailings while mining is occurring due to a dewatering cone of influence. The dewatering effects are expected to extend up to 3km in a radial pattern from the Gilbeys pit (see Figure 5).

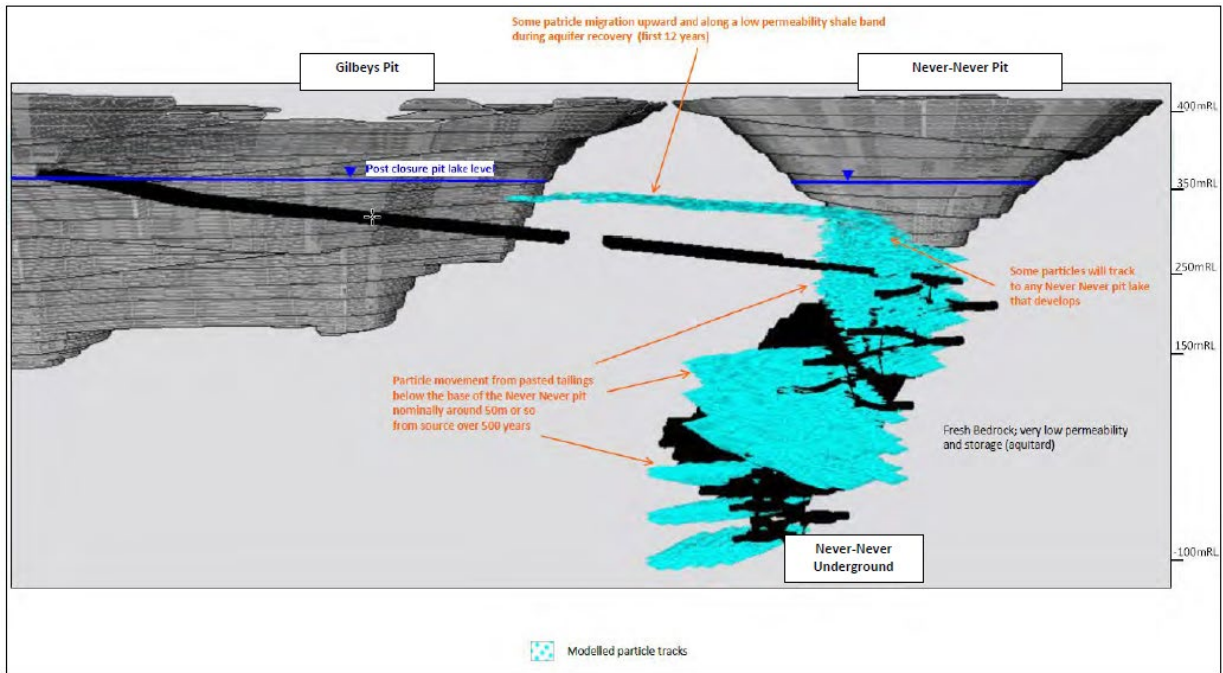
Following mine closure, the underground workings will gradually flood as the aquifer recovers which is expected to take approximately 12 to 16 years and it's at this stage groundwater is likely to start interacting with the paste tailings.



**Figure 5: Predicted drawdown for operation of Never-Never underground**

The Licence Holder modelled groundwater flow in a post closure simulation (500 years) using particle tracking (see Figure 6) and determined the following:

- As the aquifer recovers to the base of the Gilbeys and Never-Never open pits, groundwater will begin to enter the pits and permanent pit lakes will develop.
- Solute potentially released from the pasted backfill below the base of the Never-Never open pit (where pasted backfill will be used) is predicted to move laterally up to approximately 50m away from the underground workings (see Figure 6).
- As the aquifer recovers to a level within the more permeable fracture zone aquifer above the underground workings, the rate of groundwater movement is expected to increase and could transport some solute with it. Any solute brought within the fracture zone aquifer is expected to either report to the Never-Never open pit lake or migrate along a low permeability shale band towards the Gilbeys pit, collecting within a zone adjacent to the pit (see Figure 6).
- The Gilbeys and Never-Never pit lakes will eventually form permanent groundwater sinks inducing local groundwater flow towards them; therefore, any potential solute generated from the pasted tailings will be contained within the pit lake sink.



**Figure 6: Modelled particle tracking results**

### 3.3.4 Description of potential adverse impact from the emission

While underground mining is occurring at the Premises, groundwater is not expected to interact with the pasted tails due to a dewatering cone of influence. Post mining closure, groundwater is expected to recover, and the underground workings will start to flood over an estimated 12 to 16 year period.

Results from geochemical test work suggests sulphate and calcium are expected to be released initially from the pasted tailings as the groundwater comes into contact, and then aluminium, copper, cobalt and molybdenum metals also may be released over time (EGI, 2024). Groundwater modelling suggests the migration of any solute generated by the pasted tailings will be captured within the permanent pit lakes that will develop within the Gilbeys and Never-Never pits as they will act as groundwater sinks inducing local groundwater flow towards them (see Figure 6). As a result, solute from the pasted tails may adversely impact the quality of future pit lake water by increasing salinity levels and also some metals. Consequently, any potential impacts to environmental receptors due to a reduced pit lake water quality could include detrimental health effects on transient fauna (peregrine falcon) that may use the open pit lakes as a drinking water source.

### 3.3.5 Licence Holder controls

The Licence Holder will only discharge pasted tailings within the low permeable bedrock aquitard.

### 3.3.6 Key findings

**The Delegated Officer has reviewed the information regarding discharging pasted tailings below groundwater level and has found:**

1. During mining operations, groundwater is not expected to interact with the pasted tailings due to dewatering occurring at the Premises. Post mine closure (dewatering ceased), the aquifer is expected to recover, and the underground workings will start to flood.



2. A flow connection between groundwater at the Never-Never underground and surface water bodies that will develop in the Gilbeys and Never-Never pits is expected to occur over an estimated 12–16 year period post mine closure.
3. Any solute generated by groundwater contacting the pasted tailings will be captured within the pits as they will act as groundwater sinks inducing local groundwater flow towards them.
4. Test results show there is likely to be some release of cobalt, molybdenum and copper initially from the paste fill (12-16 years post mining), although concentrations are expected to be relatively low for groundwater typically occurring in mineralised rock. The test results also showed the release of these metals decreased with sequential leaching. There was no evidence of significant release of other environmentally important metals due to use of cement binder in paste fill creating an alkaline environment.
5. Water sampling at Gilbeys Pit prior to dewatering occurring indicates water quality within the pit had been impacted from surface and groundwater flows and associated solute loadings originating from the immediate pit surrounds. Results from test work shows any flow of solute originating from the Never-Never underground pasted tailings is expected to be better quality than the original pit lake water (EGI,2024).
6. The main driver for future adverse pit lake water quality will be due to the evapo-concentration effects causing the pit lake water to become more saline (6 to 7 times more saline) and therefore no longer suitable as a drinking water source for fauna.

### 3.3.7 Consequence

If the discharge of pasted tailings material underground results in reduced water quality in post mining Gilbeys and Never-Never pit lakes, then the Delegated Officer has determined that the impacts on fauna drinking the pit lake water would have low level onsite impacts with minimal offsite impacts at a local scale. Therefore, the Delegated Officer considers the consequence of reduced future pit lake water quality to be **Minor**.

### 3.3.8 Likelihood of Risk Event

The Delegated Officer has determined that the likelihood of discharged pasted tailings material underground causing a decline in future pit lake water quality resulting in impacts to fauna will probably not occur in most circumstances. Therefore, the Delegated Officer considers the likelihood of detrimental impacts on fauna to be **Unlikely**.

### 3.3.9 Overall rating of discharging pasted tailings underground

The Delegated Officer has applied the consequence and likelihood ratings described above to the Risk Criteria table in the *Guidance Statement: Risk Assessments* (DWER 2020) and determined, the overall rating for risk of discharging pasted tailings underground resulting in reduced pit lake water quality causing secondary impacts on fauna is **Medium**.

### 3.3.10 Regulatory controls

#### Condition 1, Table 1

Condition amended to include Licence Holder proposed category 5 (b) for the reprocessing of tailings material for use as paste fill. Licence Holder proposed production quantities also included as a limit.



**Condition 2, Table 2**

Condition amended to include the requirement to install Licence Holder proposed infrastructure for the transfer of paste fill underground to the Never-Never underground mine voids.

**Condition 3**

Condition amended to allow operation of the paste plant underground transfer pipeline following submission of compliance documentation.

**Condition 4, Table 3**

Condition amended to include Licence Holder proposed operational requirements for the quantity of pasted tailings produced at the paste plant and then discharged underground. The requirement to record the quantities of pasted tailings discharged underground has also been included as a new requirement.

**Condition 5, Table 4**

Condition amended to include the Licence Holder proposed location for the discharge of pasted tailings to the Never-Never underground mine voids.

The following existing recording and reporting conditions also apply:

- Conditions 18 and 19 – notification requirements
- Conditions 20 and 21 – requirement to maintain accurate and auditable books
- Condition 22 – recording and reporting of received complaints
- Conditions 23 and 24 – auditing and reporting requirements

**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 Energy, Mines, Industry Regulation and Safety (DEMIRS) advised of proposal on 7/08/2024	DEMIRS replied on 15/08/2024 stating/advising that: <ul style="list-style-type: none"> <li>• <i>A mining proposal (Reg ID 127492) was submitted by Spartan Resources Limited on 18 July 2024 and is currently under assessment.</i></li> <li>• <i>The proposed landfill described in Section 2.3 of Attachment 3B has not been detailed in Reg ID 127492.</i></li> <li>• <i>The proposed bioremediation pad as described in Section 3.1 of Attachment 3B has not been detailed in Reg ID 127492.</i></li> <li>• <i>No information regarding the overlap of the proposed landfill with Gilbey’s West WRD has been provided within the key mine activity tables.</i></li> <li>• <i>The indicative site layout provided in Reg ID 127492 does not include</i></li> </ul>	Noted.

Consultation method	Comments received	Department response
	<p><i>the proposed landfill and bioremediation area.</i></p> <p>DEMIRS also advised the above comments would not normally trigger the requirement for a revised mining proposal to be submitted. However, because the proponent currently has a proposal under assessment, revisions of the MP should be made to ensure DEMIRS comments are addressed.</p> <p>DEMIRS advised they will be in contact with the Proponent regarding the above comments and have requested if DWER could reiterate that the mining proposal must reflect all existing and proposed activities, such as those proposed in this amendment.</p>	
<p>DPLH advised of proposal on 07/08/2024</p>	<p>DPLH replied on 15/08/2024 stating/advising that:</p> <ul style="list-style-type: none"> <li>• <i>review of the Register of Places and Objects, as well as the DPLH Aboriginal Heritage Database, concludes that the subject area does not intersect with any known or recorded Aboriginal heritage places or registered sites.</i></li> <li>• <i>DPLH noted that limited Aboriginal heritage surveys have been completed over the subject land, as such it is unknown if there is Aboriginal heritage present.</i></li> </ul>	<p>Noted.</p>
<p>Email to Licence Holder dated 17/10/2024 seeking details on the proposed Gilbeys pit lake sampling program.</p>	<p>Licence Holder replied on 22/10/2024 providing an updated Premises map indicating the sampling location, and details of the proposed sampling program.</p>	<p>Noted. Licence updated.</p>
<p>Phone call to Licence Holder dated 24/10/2024 requesting further details/clarification on stormwater management at the reclaimed tailings stockpile area</p>	<p>Licence Holder replied on 24/10/2024 advising:</p> <p><i>Tailings Paste Plant Laydown Pad Construction and Surface Water Management details (as illustrated in the design drawing above):</i></p> <p><i>- Lining layer will be constructed using a clay, conditioned and roller compacted</i></p>	<p>Noted. Licence updated.</p>

Consultation method	Comments received	Department response
	<p>- Lining layer will be covered with 0.5m of free draining oxide waste rock</p> <p>- A 3% gradient will be achieved on the laydown towards a collection sump</p> <p>-1m high windrows will surround the laydown</p>	
Licence Holder was provided with draft amendment on 6/11/2024	<p>Licence Holder replied 11/11/2024 providing a DWER requested updated infrastructure map.</p> <p>Licence Holder replied 12/11/2024:</p> <p><i>To confirm, the Paste Plant production capacity and the design throughput capacity is 1,000,000 tonnes per annual period of reclaimed tailings from Gilbey's processed through the plant.</i></p> <p><i>If the tables 1 and 2 in the draft license can be updated to reflect this, we would like to waive the remainder of the 21 day referral period and have the license finalised and issued.</i></p>	Changes supported. Documents updated and prepared for final signing.

## 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
N/A	Prescribed premises category description table updated to include remaining 1,000,000 tpa of tailings material for use (reprocessing) in the manufacturing of paste fill.
1, Table 1	Table updated to include proposed production limit for reprocessing of reclaimed tailings material.
2, Table 2	Table updated to include proposed design and construction requirements for the additional processing plant equipment, Gilbeys TSF reclaim cells, tailings stockpile and screening areas and paste plant.
3	Condition updated authorising the use of newly constructed equipment following the submission of compliance documentation.

Condition no.	Proposed amendments
4, Table 3	<p>Condition updated to include proposed operational requirements for the Gilbeys TSF reclaim cells, tailings stockpile and screening areas and paste plant.</p> <p>Condition also updated to include the acceptance of Gilbeys TSF reclaim cell water at the process water pond and operational requirements for the putrescible landfill trenches.</p>
5, Table 4	Condition updated to authorise discharge of tailings paste fill to the Never-Never underground voids.
6, Table 5	Waste processing condition updated requiring putrescible waste is buried separately to other waste types.
8, Table 7	Condition updated to include the requirement to undertake inspections of stormwater management systems at the Gilbeys TSF reclaim cells, and of Paste Plant discharge infrastructure.
20	Condition updated to include the requirement to record the quantities of tailings recovered from the Gilbeys TSF, and the quantities of paste fill discharged to Never-Never underground voids.
24, Table 14	Condition updated to include the requirement to provide in the Annual Environmental Report the quantities of tailings recovered from the Gilbeys TSF, and the quantities of paste fill discharged to Never-Never underground voids.
Figure 1	Premises map updated to include the tailings stockpile and screening areas, paste plant and transfer borehole location.
Figure 3	Processing plant infrastructure map updated to show the proposed new ball mill and pre-leach thickener.
Figure 11	New map to indicate the Reclaimed Tailings Stockpile and Paste Plant Layout.
Figure 12	New map to indicate the Gilbeys TSF reclaim cell design (plan view) and description of earthworks sequencing.
Figure 13	New map detailing Gilbeys TSF reclaim cell design requirements.
Figure 14	New map detailing v drain and sump designs at the Gilbeys TSF reclaim cells.

## 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. DWER 2019, *Guideline: Industry Regulation Guide to Licensing*, Perth, Western Australia.
5. Graeme Campbell and Associates Pty Ltd (GCA, 2024). *Never Never Project: Geochemical Characterisation of Tailings Samples Derived from Oxide/Fresh-Ores for the Open-Pit Operation, and Fresh-Ores for the Underground Operation – Implications for Tailings Management*. Report in preparation for Spartan Resources, 2024.
6. Environmental Geochemistry International Pty Ltd (EGI, 2024). *Geochemical Characterisation of Never-Never Pasted Tailings*. Spartan Resources – Dalgaranga Gold Mine, May 2024.
7. Spartan Resources Ltd, *Dalgaranga Gold Project Licence Amendment Application*, Attachment 3B Activity Detail, May 2024
8. Spartan Resource Ltd, *Dalgaranga Gold Project Licence Amendment Application*, Attachment 7 Siting and Location, July 2024