



## Application to amend works approval

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

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<b>Works approval number</b>	W5995/2016/1
<b>Applicant</b>	Habrok (Battler Pit) Pty Ltd
<b>ACN</b>	632 755 438
<b>DWER File Number</b>	DER2016/000903-1
<b>Premises</b>	Battler Gold Project Southern Cross-Marvel Loch Road SOUTHERN CROSS WA 6426  Part of Mining Tenement M77/1285 As defined by the coordinates in Schedule 1 of the works approval
<b>Date of Report</b>	3 February 2020
<b>Status of Report</b>	Final

## 1. Definitions

Key terms relevant to this decision report and their associated definitions are listed in Table 1.

**Table 1: Definitions**

Term	Definition
ACN	Australian Company Number
applicant	Habrok (Battler Pit) Pty Ltd
BOM	Bureau of Meteorology
Category / categories	categories of prescribed premises as set out in Schedule 1 of the EP Regulations.
decision report	refers to this document.
Delegated Officer	an officer delegated under section 20 of the EP Act.
department	the department established under section 35 of the <i>Public Sector Management Act 1994</i> and designated as responsible for the administration of Part V Division 3 of the EP Act.
DMIRS	Department of Mines, Industry Regulation and Safety
DWER	Department of Water and Environmental Regulation As of 1 July 2017, the Department of Environment Regulation (DER), the Office of the Environmental Protection Authority (OEPA) and the Department of Water (DoW) amalgamated to form the Department of Water and Environmental Regulation (DWER). DWER was established under section 35 of the <i>Public Sector Management Act 1994</i> and is responsible for the administration of the <i>Environmental Protection Act 1986</i> along with other legislation.
emission	has the same meaning given to that term under the EP Act.
EP Act	<i>Environmental Protection Act 1986 (WA)</i>
EP Regulations	<i>Environmental Protection Regulations 1987 (WA)</i>
existing works approval	the works approval issued under Part V, Division 3 of the EP Act and in force prior to the commencement of, and during this review
freeboard	means the distance between the maximum water surface elevations and the top of retaining banks or structures at their lowest point.
ha	hectare
IMD	IMD Gold Mines Ltd
kL	kilolitres
km	kilometres
m	metres
mbgl	metres below ground level.
mg/L	milligrams per litre
prescribed premises	this has the same meaning given to that term under the EP Act.
premises	refers to the premises to which this decision report applies, as

Term	Definition
	specified at the front of this decision report
Priority 1	<p>Priority 1: Poorly-known species</p> <p>Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey (Conservation Codes for Western Australian Flora and Fauna, Department of Biodiversity, Conservation and Attractions, published 3 January 2019).</p>
Priority 3	<p>Priority 3: Poorly-known species</p> <p>Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey (Conservation Codes for Western Australian Flora and Fauna, Department of Biodiversity, Conservation and Attractions, published 3 January 2019).</p>
risk event	as described in <i>Guidance Statement: Risk Assessment</i>
ROM	Run of Mine
significant rainfall event	a significant rainfall event is defined based on the Bureau of Meteorology website for the location of Southern Cross ( <a href="http://www.bom.gov.au/water/designRainfalls/revised-ifd/?year=2016">http://www.bom.gov.au/water/designRainfalls/revised-ifd/?year=2016</a> ). A significant rainfall event has been based on Intensity Frequency Duration (IFD), being 24 hours rainfall duration at 20% Annual Exceedance Probability (AEP). Note that a 20% AEP is equivalent to a 4.48 Annual Recurrence Interval (ARI).
specified ecosystem	areas of high conservation value and special significance
tpa	tonnes per annum
TDS	total dissolved solids
UDR	<i>Environmental Protection (Unauthorised Discharges) Regulations 2004 (WA)</i>
works approval	refers to this document, which evidences the grant of the works approval by the CEO under s.54 of the EP Act, subject to the conditions.

## 2. Purpose and scope of assessment

Habrok (Battler Pit) Pty Ltd (applicant) submitted an application on 19 September 2019 to the Department of Water and Environmental Regulation (DWER) for a works approval amendment under the *Environmental Protection Act 1986* (EP Act).

The applicant intends to re-open and further develop the Battler Gold Project (premises), located approximately 14km southeast of Southern Cross, Western Australia. It is proposed that open pit mining, beneficiation and associated activities will last an 11 month period. Dewatering of the groundwater surrounding the open pit is required in order to make the mining activities safe and the mine dewater is proposed to be discharged to an evaporation pond. No processing of the gold ore will be conducted on site, the beneficiated gold ore will be transferred to a third party for processing. No tailings disposal will occur at the premises.

This decision report assesses emissions and discharges associated with:

- Construction of dewatering infrastructure;
- Transfer of mine dewater from the open pit to the evaporation pond; and
- Beneficiation and associated activities.

The Delegated Officer recommends that any future applications or reviews of the works approval should consider a comprehensive review of the mine dewater monitoring requirements.

## 3. Overview of premises

### 3.1 Change in ownership

The Battler Gold Project has recently changed ownership from IMD Gold Mines Ltd (IMD) to Habrok (Battler Pit) Pty Ltd (the applicant). While the tenement transfer is in process, IMD provided authorisation for Habrok (Battler Pit) Pty Ltd to submit the works approval amendment.

On 30 January 2020, Habrok (Battler Pit) Pty Ltd provided a completed application form to transfer the works approval. Works approval W5995/2016/1 has been transferred from IMD to Habrok (Battler Pit) Pty Ltd as part of this amendment.

### 3.2 Classification of Premises

The application is for a Category 5 and Category 6 prescribed premises as defined in Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) and listed in Table 2.

**Table 2: Classification of premises and assessed production**

Category	Description	Assessed production
Category 5	Processing or beneficiation of metallic or non-metallic ore: premises on which —  (a) metallic or non-metallic ore is crushed, ground, milled or otherwise processed; or  (b) tailings from metallic or non-metallic ore are reprocessed; or  (c) tailings or residue from metallic or non-metallic ore are discharged into a containment cell or dam.	420,000 tonnes per annum

Category 6	Mine dewatering: premises on which water is extracted and discharged into the environment to allow mining of ore.	145,000 tonnes per annum
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### 3.3 Category 5 – Processing or beneficiation of metallic or non-metallic ore

Beneficiation of the ore mined will be conducted using a mobile crusher (Striker JM1180 Jaw Crusher or equivalent) located on the Run of Mine (ROM) pad (as shown in Figure 1). The maximum design capacity of the crusher is 420,000 tonnes per annual period. The expected production is 165,000 – 200,000 tonnes of gold ore. No ore processing will take place on-site and there will be no tailings deposition (IMD Gold Mines, 2016).

### 3.4 Category 6 – Mine dewatering

On 19 September 2019, the applicant submitted an amendment to the existing works approval W5995/2016/1 for Category 6 – Mine dewatering only. The approved evaporation pond design, as described in the existing works approval, required a significant amount of material to be cut out of the existing landscape due to the topography of the area. A revised design has been developed to reduce the amount of material required to be cut out, while still minimising the risk of lateral seepage. Figure 2 displays the new design as it relates to the topography of the area.

The revised design extends the evaporation pond to enable the adequate storage of mine dewater. The evaporation pond area for cells 1 and 2, as approved in the existing works approval does not change; however a third cell is planned to be added to the north-west.

The applicant has supplied an updated site water balance which calculates that approximately 160,000kL of groundwater will be abstracted from in-pit dewatering methods. The onsite water usage has been reduced to approximately 28,000kL. Given the abstraction volume is 160,000kL, this means there is requirement to discharge up to 132,000kL. The existing works approval allows for 120,000 tonnes per annum of mine dewater to be discharged to the evaporation pond. The applicant has therefore requested for the approved throughput to be increased to 145,000 tonnes per annum (this includes an additional 10% capacity contingency).

The applicant also requested for time limited operations to be approved for Category 6 to allow mine dewatering to the evaporation ponds to begin as soon as the construction compliance report has been completed and approved by DWER.

### 3.5 Infrastructure

The premises infrastructure, as it relates to Category 5 and Category 6 activities, is detailed in Table 3 below and with reference to the site layout (as shown in Figure 1).

**Table 3: Category 5 and Category 6 infrastructure and Equipment**

Ref	Infrastructure and Equipment	Site layout reference (Figure 1)
1	<p>Evaporation Pond consisting of three discrete cells:</p> <ul style="list-style-type: none"> <li>• Cell 1 (4.58ha; 48,091kL)</li> <li>• Cell 2 (3.60ha; 55,239kL)</li> <li>• Cell 3 (4.19ha; 39,107kL)</li> </ul> <p>Total (12.37ha; 142,437kL)</p> <p>Aquifer recharge will be managed through the evaporation pond's unlined base. The base of the pond will be ripped with earth moving machinery to allow vertical seepage through the clay layer and back into the water table.</p> <p>A 1m deep impermeable 'key-way' will be installed into the natural terrain at the base of the evaporation pond walls to prevent lateral seepage.</p> <p>A sub-surface interceptor drain system will be dug around the perimeter of the evaporation pond to intercept any lateral seepage, with provision to install sump pumping at locations of preferred pathways.</p> <p>Each evaporation pond cell has been designed to maintain a 1m freeboard.</p>	Evaporation pond
2	Dewatering pipeline(s) from open pit to evaporation pond	-
3	Dewatering pipeline bunding	-
4	Five shallow piezometers will be drilled to depths most likely to be affected by seepage outside of the subsurface interceptor drain system.	Evaporation pond shallow piezometers (BAMB001 – 005)
5	Mobile crusher (Striker JM1180 Jaw Crusher or equivalent)	ROM pad



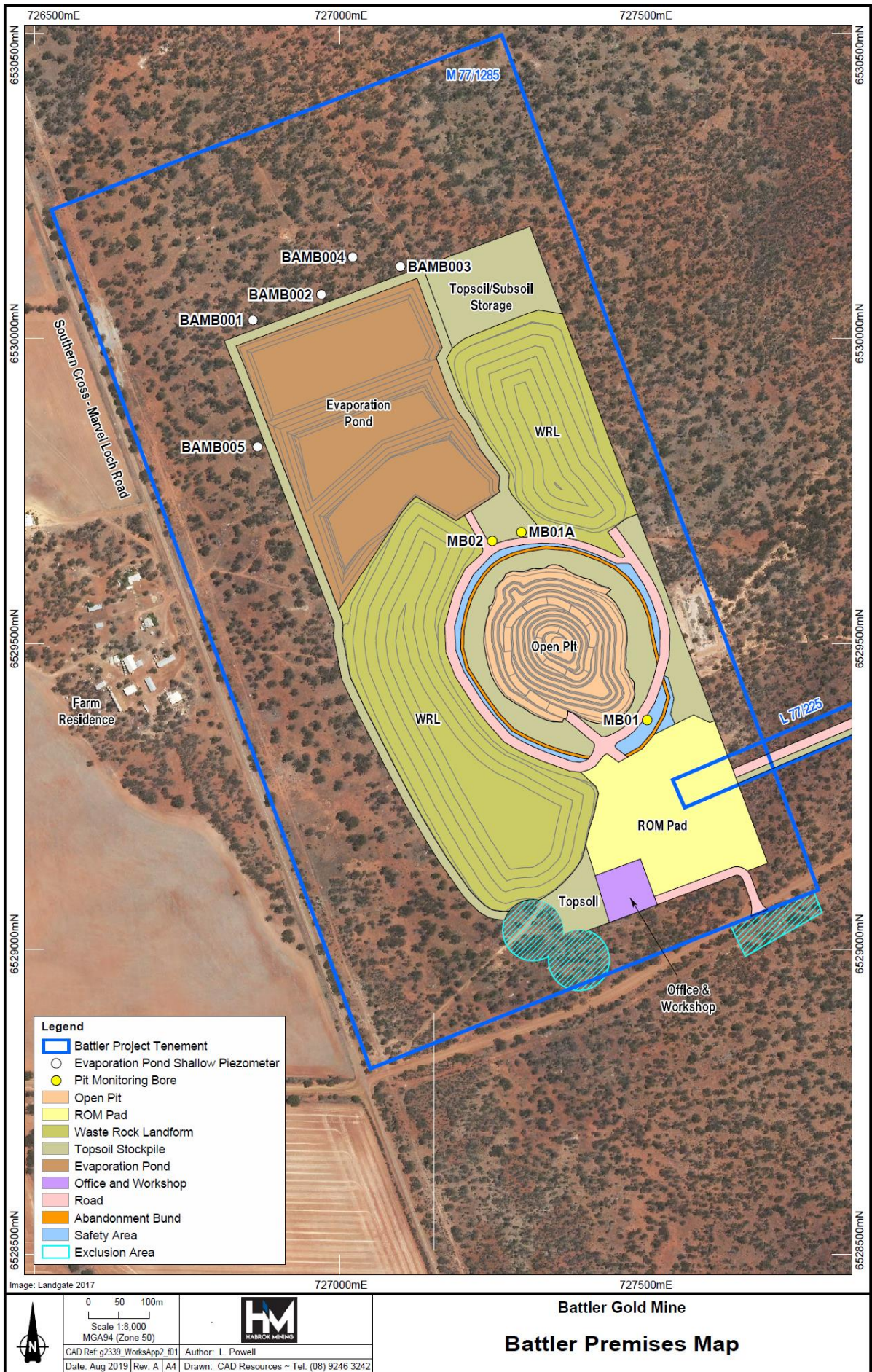
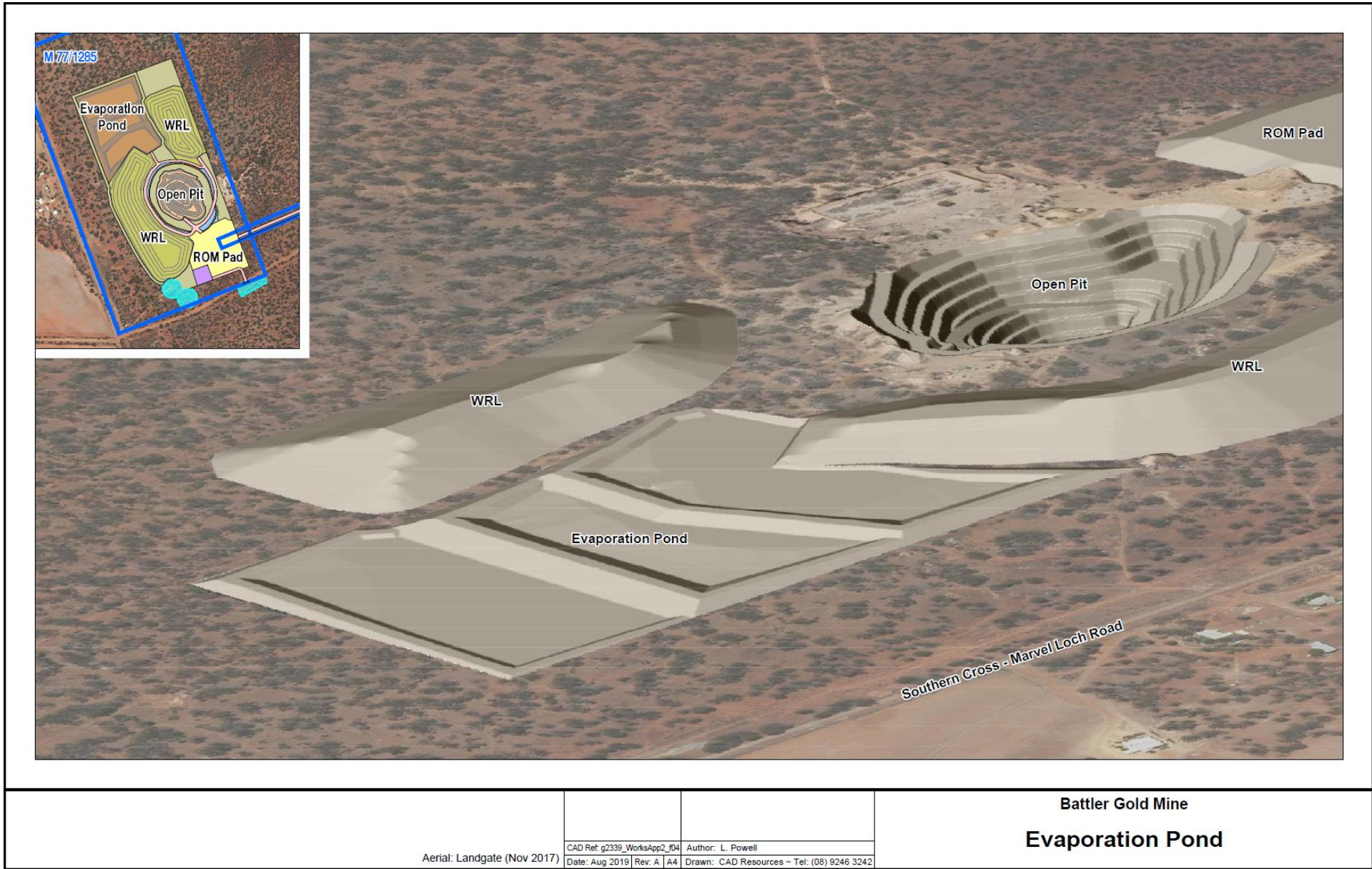


Figure 1: Site layout





**Figure 2: Evaporation pond relative to topography**



## 4. Legislative context and other approvals

The legislative framework for this assessment is the EP Act and the EP Regulations.

Relevant guidance documents are outlined in Appendix 1: Key documents.

Approvals relevant to the premises are outlined in Table 4 below.

**Table 4: Relevant approvals**

Legislation	Number	Approval
<i>Mining Act 1978</i>	Reg ID 59819	A Mining Proposal for the project submitted under the <i>Mining Act 1978</i> is currently being assessed by the Department of Mines, Industry Regulation and Safety (DMIRS).
<i>Environmental Protection Act 1986</i>	CPS 7056-1	A clearing permit, CPS 7056-1, to clear native vegetation has been granted under the EP Act. Conditions have been set in relation to requiring further authorisation to clear priority species <i>Hydrocotyle corynophora</i> and species of interest <i>Lepidosperma aff. Fimbriatum</i> .
<i>Rights in Water and Irrigation Act 1914</i>	GWL 183149	GWL 183149 authorises the extraction of 160,000kL from Goldfields, combined fractured rock west and is granted to IMD.
<i>Country Areas Water Supply Act 1947</i>	CAW 182842	Allowance for well construction or alteration.

## 5. Part IV of the EP Act

In 2016, the works approval holder referred the proposal to the Environmental Protection Authority under section 38 of the EP Act. The proposal was examined and a determination was made that the proposal did not require assessment under part IV of the Ep Act (CMS16104).

## 6. Location and siting

### 6.1 Siting Context

The premises is located approximately 14km south-southwest of Southern Cross.

### 6.2 Wind observations

The Bureau of Meteorology (BOM) meteorology information was accessed on 29 January 2020 for Southern Cross Airfield (Site number: 012320), which is the nearest weather station to the premises and is located 11.80km north-north-west of the premises.

BOM historical wind observations demonstrate morning (9am) winds (Figure 3) that primarily originate from the south and average between 10-30km/hr followed by wind originating from the west and south-west averaging between 20-30km/hr. Afternoon (3pm) winds (Figure 4) primarily originate from the east and average between 20-30km/hr.

**Rose of Wind direction versus Wind speed in km/h (22 Oct 1996 to 11 Aug 2019)**

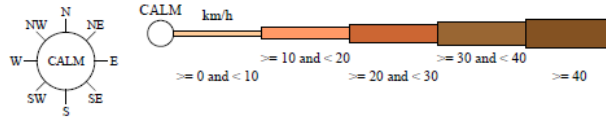
Custom times selected, refer to attached note for details

**SOUTHERN CROSS AIRFIELD**

Site No: 012320 • Opened Oct 1996 • Still Open • Latitude: -31.2353° • Longitude: 119.3564° • Elevation 347.m

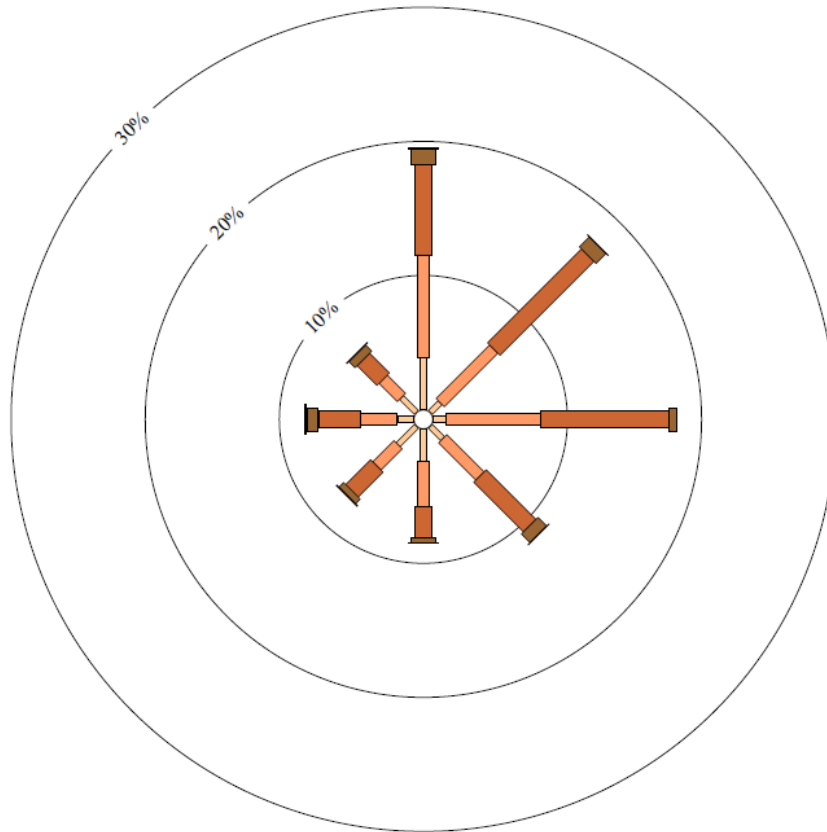
An asterisk (\*) indicates that calm is less than 0.5%.

Other important info about this analysis is available in the accompanying notes.



9 am  
8194 Total Observations

Calm 4%



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**Figure 3: Southern Cross Airfield - 9am Rose of Wind - 22 October 1996 to 11 August 2019**

**Rose of Wind direction versus Wind speed in km/h (22 Oct 1996 to 11 Aug 2019)**

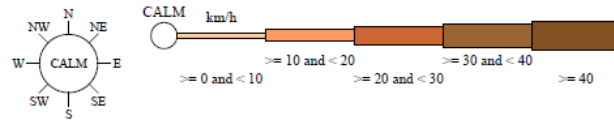
Custom times selected, refer to attached note for details

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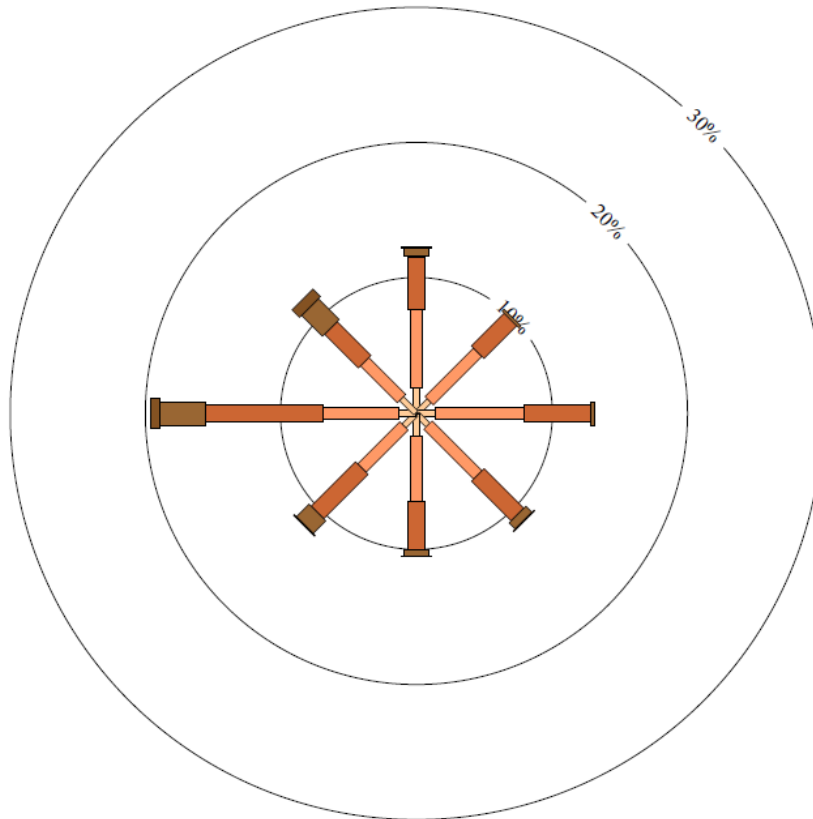
An asterisk (\*) indicates that calm is less than 0.5%.

Other important info about this analysis is available in the accompanying notes.



3 pm  
8193 Total Observations

Calm \*



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**Figure 4: Southern Cross Airfield – 3pm Rose of Wind - 22 October 1996 to 11 August 2019**



## 6.3 Sensitive receptors

The distances to residential and environmental receptors are detailed in Table 5. Figure 5 depicts the below-mentioned human and environmental receptors in proximity to the premises.

**Table 5: Receptors and distance from activity boundary**

Sensitive receptors	Distance from prescribed activity
<b>Human receptors</b>	
Farm residence (three residences on an adjacent farm)	<p>Located immediately west of the premises at approximately 200m from the operation.</p> <p>Since the works approval W5995/2016/1 was applied for in 2015, the adjacent farm residence has changed ownership. IMD have an agreement with the new owner to keep the residence vacant and allow access to one of the buildings to IMD during mining operations.</p> <p>In light of the above, the Delegated Officer does not consider the farm residence to be a sensitive receptor and has therefore been screened out of the risk assessment undertaken in Table 9.</p>
People driving vehicles along Southern Cross-Marvel Loch Road	Runs parallel to the premises and is located approximately 150m west from the operation.
<b>Environmental receptors</b>	
<p>Two native vegetation types:</p> <ul style="list-style-type: none"> <li><i>Eucalyptus longicornis</i> (dominated woodland)</li> <li><i>Eucalyptus salubris</i> (dominated woodland)</li> </ul>	<p>Two native vegetation types occur in the vicinity of the proposed evaporation pond location.</p> <p>The Flora Survey (Western Botanical, 2015) advises that both of these plant communities are common and well presented in the broader area.</p>
<p>Five priority species (three Priority 1 species and two Priority 3 species) and one species of interest were identified within the mining tenement during the Flora Survey (Western Botanical, 2015):</p> <ul style="list-style-type: none"> <li><i>Hemigenia</i> sp. Newdegate (Priority 1)</li> <li><i>Hydrocotyle corynophora</i> (Priority 1)</li> <li><i>Goonedia heatheriana</i> (Priority 1)</li> <li><i>Phlegmaspermum eremaeum</i> (Priority 3)</li> <li><i>Gnephosis intonsa</i> (Priority 3)</li> <li><i>Lepidosperma</i> aff. <i>fimbriatum</i> (species of interest)</li> </ul>	<p>A number of priority flora species were identified in the Flora Survey (Western Botanical, 2015), however none were identified within the evaporation pond area.</p> <p>The nearest population of Priority 1 flora was recorded more than 500m southwest of the closest corner of the evaporation pond.</p> <p>Given the presence of conservation significant flora within the premises, according to the DWER <i>Guidance Statement: Environmental Siting, November 2016</i> the premises is classed as a specified ecosystem, which influences the risk rating for potential impacts to vegetation arising from the premises' works as authorised by this works approval. A Native Vegetation Clearing Permit has been issued by DMIRS with conditions in respect to <i>Hydrocotyle corynophora</i> and <i>Lepidosperma</i> aff. <i>fimbriatum</i>.</p>
Groundwater	Groundwater is located approximately 45mbgl.

Sensitive receptors	Distance from prescribed activity
	<p>Groundwater quality samples collected from mineral exploration holes in 2016 indicate sodium-chloride type, brackish to hypersaline groundwater, with a concentration of Total Dissolved Solids (TDS) between 4,560 and 62,400mg/L.</p> <p>Sampling from historical pumping of the Battler Mine Shaft in 1988 provided TDS of 53,200mg/L.</p> <p>This data is considered most representative of actual groundwater quality that would be abstracted during pit dewatering activities.</p> <p>The concentration of copper, manganese and nickel in dewater is above the ANZECC 2000 trigger value guideline for 95% protection of freshwater ecosystems (refer to Table 6).</p>

### 6.3.1 Groundwater quality

Groundwater quality estimated to be discharged to the evaporation pond is shown in Table 6 below. BGRC142 is an exploration hole and compared against the ANZECC, 2000 guidelines for 95% protection of freshwater ecosystems. Data from groundwater analysed from the Battler Mine Shaft in 1988 is also included in Table 6 for reference (Pells Sullivan Meynick, 2016).

**Table 6: Groundwater quality**

Parameter	Units	BGRC142 (Feb 2016)	Battler Mine Shaft (Sept 1988)	ANZECC, 2000
pH	-	7.28	6.62	6.5 – 8.5
Total Dissolved Solids	mg/L	62,400	53,200	
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	73		
Sulfate	mg/L	1,160		
Chloride	mg/L	29,600		
Calcium	mg/L	6,790		
Magnesium	mg/L	79		
Sodium	mg/L	11,300		
Potassium	mg/L	112		
Arsenic (As III)	mg/L	0.024		0.024
Beryllium	mg/L	<0.01		
Barium	mg/L	0.521		
Cadmium <sup>1</sup>	mg/L	<0.001		0.0002
Chromium (Cr III)	mg/L	0.038		
Cobalt	mg/L	0.011		
Copper	mg/L	0.042	0.06	0.0014

Lead <sup>1</sup>	mg/L	<0.01		0.0034
Manganese	mg/L	2.61		1.9
Nickel	mg/L	0.026		0.011
Selenium (Total) <sup>1</sup>	mg/L	<0.01		0.011
Vanadium	mg/L	<0.01		
Zinc <sup>1</sup>	mg/L	<0.050	0.27	0.008
Boron	mg/L	1.58		0.37
Mercury	mg/L	<0.0001		0.0006

Note 1: Not analysed at a level of detection sufficient to allow comparison with ANZECC, 2000 guidelines



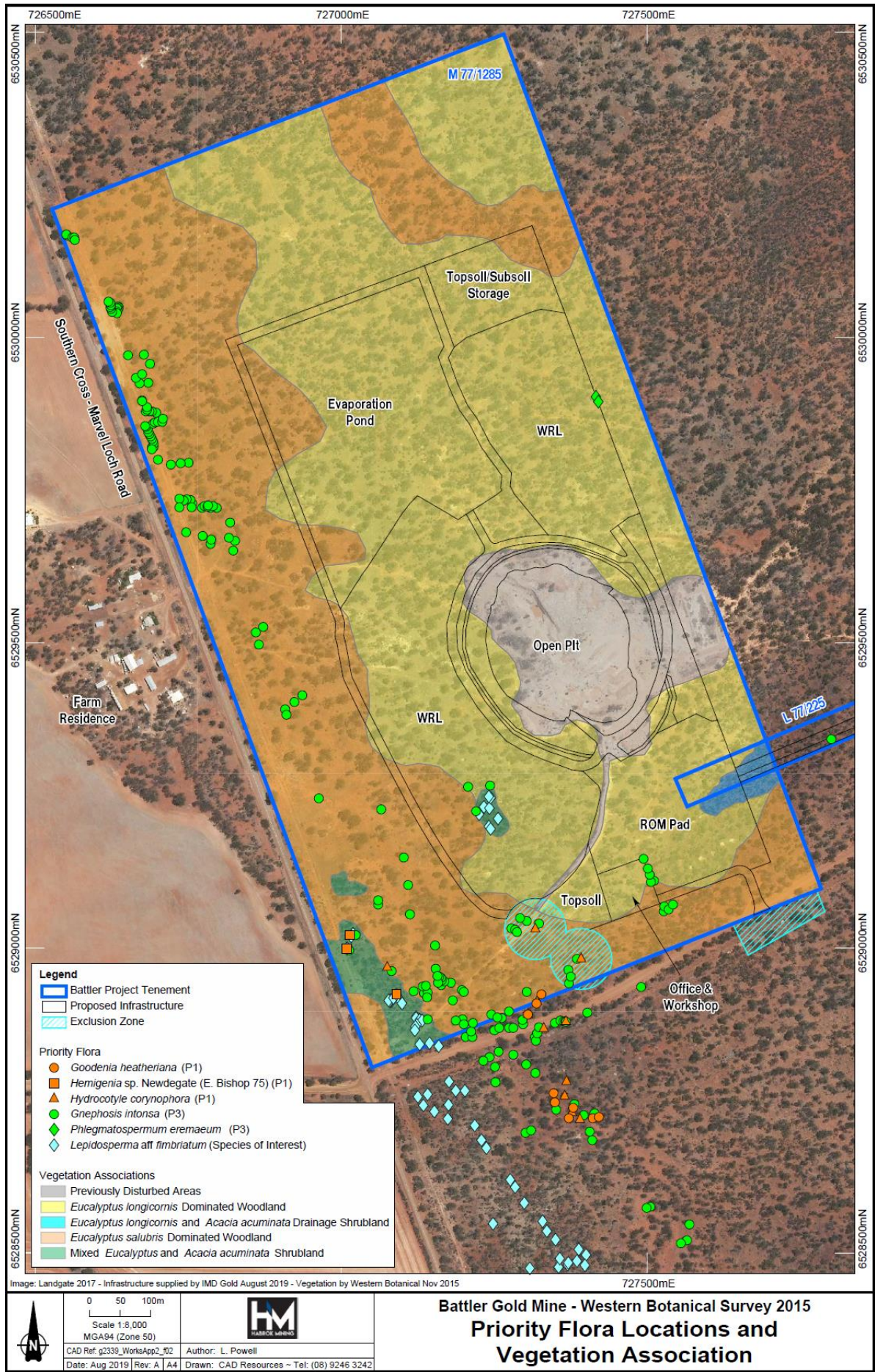


Figure 5: Sensitive receptors

## 7. Risk assessment

The identification of the sources, pathways and receptors to determine risk events are set out in Table 7 and Table 8 below, consistent with the *Guidance Statement: Risk Assessments*. Risk ratings have been assessed for each key emission source and take into account potential source-pathway-receptor linkages.

The mitigation measures/controls proposed by the applicant have been considered in determining the risk rating. Emissions during construction and operation activities have been assessed separately to allow clear delineation of activity phases.

The works approval that accompanies this report authorises construction and time-limited operations. A licence is required to operate the premises following the time-limited operational phase authorised under the works approval.

The conditions in the issued works approval, as outlined in Table 7 and Table 8, have been determined in accordance with the *Guidance Statement: Setting Conditions*.



## 7.1 Risk assessment – construction

Table 7: Identification of emissions, pathway, receptors and controls

Risk Events							Residual Risk			Continue to detailed risk assessment	Reasoning
Sources	Activities	Potential emissions	Potential pathway	Potential receptors	Potential adverse impacts	Applicant Controls	Consequence rating*	Likelihood rating*	Risk*		
Evaporation pond and pipeline transporting dewater	Construction of evaporation pond and installation of dewatering pipeline	Dust	Via wind	Native vegetation	Dust deposition to native vegetation species can potential lead to poor vegetation health. Conservation significant flora are located adjacent to the ROM pad where the mobile crusher will be located.	Dust suppression will be implemented around the site during both construction and operation.  Dust suppression techniques involve using a water cart to service all open areas and the mobile crusher will have dust suppression controls installed on transfer points.	Minor	Unlikely	Medium	No	<p>The mining project is located in an area where the majority of wind speeds are gentle to moderate, at less than 30km/hr (BOM, 2019).</p> <p>BOM historical wind observations (BOM, 2019) indicate wind travelling in a primarily northerly direction followed by easterly and north-easterly directions in the mornings. Winds are therefore predominantly directed away from the Southern Cross-Marvel Loch Road and conservation significant flora during the mornings.</p> <p>Wind speeds change in the afternoons to a primarily westerly direction (towards Southern Cross-Marvel Loch Road) averaging between 20-30km/hr. The applicant is likely able to control potential dust emissions with the moderate westerly afternoon winds through on-site dust suppression activities.</p> <p><u>Regulatory Controls</u></p> <ul style="list-style-type: none"> <li>Schedule 3 of the works approval condition 3 requires that the mobile crusher have dust suppression system(s) installed.</li> </ul> <p>The Delegated Officer determines that the applicant and regulatory controls are likely to be sufficient at mitigating potential dust emissions during construction activities.</p> <p>The Delegated Officer notes that Section 49 of the EP Act is sufficient to regulate dust emissions during construction activities.</p>
				People driving vehicles along Southern Cross-Marvel Loch Road	Reduced visibility for drivers, which could potentially lead to injury or death.	Periodic visual inspections around site will be undertaken to ensure impacts from dust, surface water flows and any other site activities are not having an adverse impact on the health of the surrounding vegetation.	Severe	Rare	High	No	
Mine dewater	Mine de-water will be used for onsite dust suppression	Overspray or runoff of hypersaline water into native vegetation	Through dust suppression operations (e.g. action of spraying hypersaline water with a water cart)	Native vegetation	Death or damage of conservation significant flora by inundation of hypersaline water.	Monitoring to be conducted by works approval holder will include periodic visual inspection around site to ensure impacts from dust, surface water flows and any other site activities are not having an adverse impact on the health of the surrounding vegetation.	Major	Unlikely	Medium	No	<p><u>Regulatory Controls</u></p> <ul style="list-style-type: none"> <li>Condition 2 of the works approval requires that saline water used for dust suppression during both construction and time limited operational phase activities must be applied so as to avoid damage to native vegetation (such as from overspraying or runoff).</li> </ul> <p>The Delegated Officer determines that the regulatory controls are likely to be sufficient at mitigating potential overspray or runoff of hypersaline water into native vegetation.</p>



Risk Events							Residual Risk			Continue to detailed risk assessment	Reasoning
Sources	Activities	Potential emissions	Potential pathway	Potential receptors	Potential adverse impacts	Applicant Controls	Consequence rating*	Likelihood rating*	Risk*		
<b>Mobile equipment (e.g. vehicles, heavy equipment, generators and dewatering pumps)</b>	Maintenance and servicing activities Storage and use of hydrocarbons and chemicals	Leaks, spills and breach of containment	Spills to ground or leaks, overflow during filling, infiltration through soil	Ecosystems adjacent to the area of spill or breach	Soil and/or groundwater contamination as well as biota impacts.	No specific applicant controls have been proposed.	Minor	Possible	Medium	No	<p><u>Regulatory Controls</u></p> <ul style="list-style-type: none"> <li>• Schedule 3 of the works approval condition 3 requires the works approval holder to undertake the following: <ul style="list-style-type: none"> <li>○ Store environmentally harmful materials in secured, covered, impervious and bunded areas.</li> <li>○ Maintain all mobile equipment as per manufacturer's specifications.</li> <li>○ Keep suitably stocked spill response equipment close to where spills may occur.</li> <li>○ Ensure all staff are trained to use the spill response equipment.</li> <li>○ Contain and clean-up spills as soon as they occur.</li> </ul> </li> </ul> <p>The Delegated Officer notes that the general provisions of the EP Act, UDRs, the <i>Dangerous Goods Safety Act 2004</i> and associated regulations are sufficient to regulate hydrocarbon and chemical emissions during construction and operation.</p>

\*Consequence ratings, likelihood ratings and risk descriptions are detailed in the Department's Guidance Statement: Risk Assessments (February 2017)

## 7.2 Risk assessment – operation (time limited operational phase)

Table 8: Identification of emissions, pathway, receptors and controls

Risk Events							Residual Risk			Continue to detailed risk assessment	Reasoning
Sources	Activities	Potential emissions	Potential pathway	Potential receptors	Potential adverse impacts	Applicant Controls	Consequence rating*	Likelihood rating*	Risk*		
Evaporation pond and pipeline transporting dewater	Dewatering activities and storage of hypersaline water	Evaporation pond bund wall failure and/or overflow of hypersaline water during a significant rainfall event. Discharges of hypersaline water through leaks, pipeline rupture or failure Seepage of hypersaline water through base or walls of evaporation pond	Direct discharges to land and infiltration to groundwater The applicant has identified that the base of the evaporation pond is clay, however there is also the possibility that lateral seepage may occur via lateritic and iron-staining flow paths (Pells Sullivan Meynink, 2016)	Native vegetation surrounding the evaporation pond and groundwater The hypersaline water may enter the root zones of surrounding vegetation	The evaporation pond is surrounded by intact native vegetation. A number of priority flora species listed under the <i>Wildlife Conservation Act 1950</i> and a species of interest have been located to the west and south of the premises (refer to Figure 5). <i>Gnephosis intosa</i> (Priority 3) is located adjacent to the western boundary of the premises and western embankment of the evaporation pond. This Priority 3 species may be impacted (potentially resulting in death of plants) in the event of lateral seepage. An overflow of hypersaline water would likely damage and cause death of native vegetation to the north of the evaporation pond and potentially also to the west. Mine dewater is hypersaline with elevated metals and metalloids concentrations. Once released to native vegetation, the water may cause damage or death of vegetation from saline water inundation.	The applicant has stated that the evaporation pond will be operated with a 1m freeboard. The applicant proposed to install four shallow piezometers at depths between 0.2 and 4 m, to the north of the evaporation pond in order to be able to provide data on perched seepage wetting fronts in the shallow soil profile. In the event that lateral flow paths are present, the applicant plans to install toe (interceptor) drains downstream of the embankment to capture the seepage and also sump- pumping on the pond perimeter of the pond in locations of preferred pathways. The dewatering pipeline(s) will be located within cleared areas (run along access roads surrounding the pit to the evaporation pond) and located such that spills will be captured within the pit or prevented from impacting vegetation by surrounding waste rock landforms. Daily visual inspections are planned during operation to check for leaks. Monitoring to be conducted by works approval holder will include close	Major	Rare	Medium	No	Annual average rainfall in the Southern Cross area is approximately 305mm. The rainfall for a 1% AEP (annual exceedance probability) event over 72 hours at Southern Cross is 140mm (BOM, 2016). <u>Regulatory Controls</u> <ul style="list-style-type: none"> <li>Condition 4 of the works approval requires an Environmental Compliance Report to be submitted within 30 days of completion of an item of infrastructure or equipment being constructed and/or installed.</li> <li>Schedule 3 of the works approval condition 3 requires: <ul style="list-style-type: none"> <li>The evaporation pond base to be ripped and the embankment walls to be compacted to reduce the risk of lateral seepage.</li> <li>The construction of a sub-surface interceptor drain system around the perimeter of the evaporation pond to intercept any lateral seepage as well as the installation of sump pumping at locations of preferred pathways.</li> <li>Freeboard markers to be installed within each of the three cells to allow visual measurement of the freeboard heights.</li> <li>Five shallow piezometers (BAMB001 – 005) to be drilled to depths most likely to be affected by seepage and designed and constructed in accordance with ASTM D5092/D5092M-16 <i>Standard practice for design and installation of groundwater monitoring wells.</i></li> <li>Dewatering pipeline(s) to be located within cleared areas (run along access roads surrounding the open pit to the evaporation pond) and located such that spills will be captured within the open pit or prevented from impacting vegetation by surrounding waste rock landforms. Where the</li> </ul> </li> </ul>

Risk Events							Residual Risk			Continue to detailed risk assessment	Reasoning
Sources	Activities	Potential emissions	Potential pathway	Potential receptors	Potential adverse impacts	Applicant Controls	Consequence rating*	Likelihood rating*	Risk*		
					Elevated salinity in underlying soils and groundwater.	<p>management of the mine's water balance through measurement of groundwater disposal volumes and evaporation pond levels. In addition, there would be reconciliation of pond storage volumes, use of groundwater salinity to estimate evaporative losses and use of mass balance to calculate seepage loss volumes.</p> <p>Monitoring to be conducted by works approval holder will include collection of observation and photographic evidence of any seepage through embankments.</p> <p>Monitoring to be conducted by works approval holder will include visual monitoring of vegetation condition adjacent to the evaporation pond. It is recognised that a buffer of around 20m from vegetation stands will be in place.</p>					<p>pipeline gradient is such that spills may flow into vegetation, the pipeline must be located within a bund of sufficient capacity to completely contain any spills from pipeline leakage or breach for a period equal to the time between routine inspections.</p> <ul style="list-style-type: none"> <li>Table 1 of the works approval condition 8 requires that the evaporation pond is inspected at least weekly (whilst operating) for freeboard capacity and any visible seepage through embankments. A written log is required to be maintained for each inspection, with the record of each inspection signed by the responsible person.</li> <li>Conditions 10, 11, 12, 13 and 14 require regular monitoring of the emissions and discharge (mine dewater) and groundwater during time limited operations to monitor for the presence of lateral seepage (both north and west of the evaporation pond) and to ensure the evaporation pond continues to have sufficient capacity to store all pumped mine dewater.</li> </ul> <p>The Delegated Officer determines that the applicant and regulatory controls are likely to be sufficient at mitigating potential discharges of hypersaline water.</p> <p>Additional vegetation monitoring requirements may be required under the Licence.</p>
<b>Evaporation pond</b>	Storage of hypersaline water	Not applicable	Livestock, birds and other fauna (ingestion)	Access to evaporation pond	<p>Entrapment and potential drowning in evaporation pond.</p> <p>Ingestion of ingesting mine dewater containing elevated metals and metalloids concentrations.</p> <p>The concentration of copper, manganese and nickel in dewater is above the ANZECC, 2000 trigger value</p>	No specific controls have been proposed.	Minor	Rare	Low	No	<p>Ingestion of water is not likely – related studies of birds accessing mine storage dams has determined that wildlife will not drink hypersaline water greater than 50,000 milligram per litre (mg/L) (TDS) (MERIWA, 2008).</p> <p>The evaporation pond's boundary embankment height varies between 2-5m.</p> <p>Due to risks being mitigated through wildlife not drinking hypersaline water and the embankment walls of the evaporation pond ranging from 2-5m in height (Local Geotechnics, 2019), therefore restricting access, the Delegated Officer determines</p>

Risk Events							Residual Risk			Continue to detailed risk assessment	Reasoning
Sources	Activities	Potential emissions	Potential pathway	Potential receptors	Potential adverse impacts	Applicant Controls	Consequence rating*	Likelihood rating*	Risk*		
					guideline for 95% protection of freshwater ecosystems.						that no additional regulatory controls are required to mitigate the risk.
<b>Mine dewater</b>	Mine de-water will be used for onsite dust suppression	Overspray or runoff of hypersaline water into native vegetation	Through dust suppression operations (e.g. action of spraying hypersaline water with a water cart)	Native vegetation	Death or damage of conservation significant flora by inundation of hypersaline water.	Monitoring to be conducted by works approval holder will include periodic visual inspection around site to ensure impacts from dust, surface water flows and any other site activities are not having an adverse impact on the health of the surrounding vegetation.	Major	Unlikely	Medium	No	<u>Regulatory Controls</u> <ul style="list-style-type: none"> <li>Condition 2 of the works approval requires that saline water used for dust suppression during both works approval and time limited operational phase activities must be applied so as to avoid damage to native vegetation (such as from overspraying or runoff).</li> </ul> <p>The Delegated Officer determines that the regulatory controls are likely to be sufficient at mitigating potential overspray or runoff of hypersaline water into native vegetation.</p> <p>Additional vegetation monitoring requirements may be required under the Licence.</p>

\*Consequence ratings, likelihood ratings and risk descriptions are detailed in the Department's Guidance Statement: Risk Assessments (February 2017)

### 7.3 Consequence and likelihood of risk events

A risk rating will be determined for risk events in accordance with the risk rating matrix set out in Table 9 below.

**Table 9: Risk rating matrix**

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

DWER will undertake an assessment of the consequence and likelihood of the Risk event in accordance with Table 10 below.

**Table 10: Risk criteria table**

Likelihood		Consequence		
The following criteria has been used to determine the likelihood of the Risk Event occurring.		The following criteria has been used to determine the consequences of a Risk Event occurring:		
			Environment	Public health* and amenity (such as air and water quality, noise, and odour)
Almost Certain	The risk event is expected to occur in most circumstances	Severe	<ul style="list-style-type: none"> <li>onsite impacts: catastrophic</li> <li>offsite impacts local scale: high level or above</li> <li>offsite impacts wider scale: mid-level or above</li> <li>Mid to long-term or permanent impact to an area of high conservation value or special significance^</li> <li>Specific Consequence Criteria (for environment) are significantly exceeded</li> </ul>	<ul style="list-style-type: none"> <li>Loss of life</li> <li>Adverse health effects: high level or ongoing medical treatment</li> <li>Specific Consequence Criteria (for public health) are significantly exceeded</li> <li>Local scale impacts: permanent loss of amenity</li> </ul>
Likely	The risk event will probably occur in most circumstances	Major	<ul style="list-style-type: none"> <li>onsite impacts: high level</li> <li>offsite impacts local scale: mid-level</li> <li>offsite impacts wider scale: low level</li> <li>Short-term impact to an area of high conservation value or special significance^</li> <li>Specific Consequence Criteria (for environment) are exceeded</li> </ul>	<ul style="list-style-type: none"> <li>Adverse health effects: mid-level or frequent medical treatment</li> <li>Specific Consequence Criteria (for public health) are exceeded</li> <li>Local scale impacts: high level impact to amenity</li> </ul>
Possible	The risk event could occur at some time	Moderate	<ul style="list-style-type: none"> <li>onsite impacts: mid-level</li> <li>offsite impacts local scale: low level</li> <li>offsite impacts wider scale: minimal</li> <li>Specific Consequence Criteria (for environment) are at risk of not being met</li> </ul>	<ul style="list-style-type: none"> <li>Adverse health effects: low level or occasional medical treatment</li> <li>Specific Consequence Criteria (for public health) are at risk of not being met</li> <li>Local scale impacts: mid-level impact to amenity</li> </ul>
Unlikely	The risk event will probably not occur in most circumstances	Minor	<ul style="list-style-type: none"> <li>onsite impacts: low level</li> <li>offsite impacts local scale: minimal</li> <li>offsite impacts wider scale: not detectable</li> <li>Specific Consequence Criteria (for environment) likely to be met</li> </ul>	<ul style="list-style-type: none"> <li>Specific Consequence Criteria (for public health) are likely to be met</li> <li>Local scale impacts: low level impact to amenity</li> </ul>
Rare	The risk event may only occur in exceptional circumstances	Slight	<ul style="list-style-type: none"> <li>onsite impact: minimal</li> <li>Specific Consequence Criteria (for environment) met</li> </ul>	<ul style="list-style-type: none"> <li>Local scale: minimal to amenity</li> <li>Specific Consequence Criteria (for public health) met</li> </ul>

^ Determination of areas of high conservation value or special significance should be informed by the *Guidance Statement: Environmental Siting*.

\* In applying public health criteria, DWER may have regard to the Department of Health’s *Health Risk Assessment (Scoping) Guidelines*.

“onsite” means within the Prescribed Premises boundary



## 7.4 Acceptability and treatment of Risk event

DWER will determine the acceptability and treatment of Risk events in accordance with Risk treatment Table 11 below:

**Table 11: Risk treatment table**

Rating of Risk Event	Acceptability	Treatment
<b>Extreme</b>	Unacceptable.	Risk event will not be tolerated. DWER may refuse application.
<b>High</b>	May be acceptable. Subject to multiple regulatory controls.	Risk event may be tolerated and may be subject to multiple regulatory controls. This may include both outcome-based and management conditions.
<b>Medium</b>	Acceptable, generally subject to regulatory controls.	Risk event is tolerable and is likely to be subject to some regulatory controls. A preference for outcome-based conditions where practical and appropriate will be applied.
<b>Low</b>	Acceptable, generally not controlled.	Risk event is acceptable and will generally not be subject to regulatory controls.

## 8. Consultation

Stakeholder consultation undertaken at the works approval amendment assessment stage is detailed in Table 12.

**Table 12: Stakeholder consultation**

Method	Comments received	DWER response
Amendment application advertised on DWER website (30/10/2019)	None received	N/A
Shire of Yilgarn advised of proposal (29/10/2019)	The Shire of Yilgarn provided comments on the amendment to works approval W5995/2016/1 on 22 November 2019 which are summarised, along with DWER's response, in Appendix 2: DWER response to Shire of Yilgarn comments on the proposed amendment to works approval W5995/2016/1.	Appendix 2: DWER response to Shire of Yilgarn comments on the proposed amendment to works approval W5995/2016/1
DMIRS advised of proposal (29/10/2019)	None received	N/A
John Nicoletti (Apache Investments Australia)	None received	N/A

Pty Ltd) advised of proposal (29/10/2019)		
Applicant referred draft documents (06 December 2019)	The applicant provided comments which are summarised, along with DWER's response, in Appendix 3: Summary of applicant's comments on risk assessment and draft conditions.	Appendix 3: Summary of applicant's comments on risk assessment and draft conditions.
Applicant advised of minor updates to draft documents (30 January 2020)	N/A	DWER published a new works approval template (v4.0) on 17 December 2019. In light of this, the draft amendment to works approval W5995/2016/1 provided to the works approval holder on 6 December 2019 was updated to align with the latest DWER approved template and to address the applicant comments provided on 17 January 2020.

## 9. Conclusion

This assessment of the risks of activities on the premises has been undertaken with due consideration of a number of factors, including the documents and policies specified in this decision report (summarised in Appendix 1: Key documents).

Based on this assessment, it has been determined that the revised works approval will be granted subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

**Lauren Fox**

**A/MANAGER, RESOURCE INDUSTRIES**

*Officer delegated under section 20 of the Environmental Protection Act 1986*

3 February 2020

## Appendix 1: Key documents

Document title	In text reference	Availability
Minerals and Energy Research Institute of Western Australia (MERIWA) <i>Cyanide Ecotoxicity at Hypersaline Gold Operations, Report No. 273 (Executive Summary, Volume II – Phase II (Definitive Investigation))</i> , August 2008	MERIWA, 2008	Accessed at: <a href="http://www.cyanidecode.org">http://www.cyanidecode.org</a>
Bureau of Meteorology (BOM) 2016 Rainfall Intensity – Frequency – Duration (IFD)	BOM, 2016	Accessed at: <a href="http://www.bom.gov.au/water/designRainfalls/revise-ifd/?coordinate_type=dd&amp;latitude=-31.2323+&amp;longitude=119.331&amp;sdmin=true&amp;sdhr=true&amp;sdday=true&amp;user_label=&amp;year=2016">http://www.bom.gov.au/water/designRainfalls/revise-ifd/?coordinate_type=dd&amp;latitude=-31.2323+&amp;longitude=119.331&amp;sdmin=true&amp;sdhr=true&amp;sdday=true&amp;user_label=&amp;year=2016</a>
Bureau of Meteorology (BOM) meteorology information for Southern Cross Airfield (Site number: 012320)	BOM, 2019	Accessed at: <a href="http://www.bom.gov.au/wa/">http://www.bom.gov.au/wa/</a>
Pells Sullivan Myenink Memorandum PSM2869-008M: <i>IMD Gold Mines Limited - Battler Works Approval Water Resources Assessment – Technical Advice Note</i> , Unpublished memorandum to Bioscope Environmental, 3 October 2016	Pells Sullivan Myenink, 2016	DWER records (A1828839)
ANZECC & ARMCANZ (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality	ANZECC, 2000	Accessed at <a href="https://www.waterquality.gov.au/sites/default/files/documents/anzecc-armcanz-2000-guidelines-vol1.pdf">https://www.waterquality.gov.au/sites/default/files/documents/anzecc-armcanz-2000-guidelines-vol1.pdf</a>
IMD Gold Mines Ltd <i>Application for Works Approval and licence</i> , submitted 31 May 2016	IMD Gold Mines, 2016	DWER records (A1107866)
Habrok (Battler Pit) Pty Ltd <i>IR-F09_Battler Works Approval W5995-2016-1 Amendment</i> , submitted 3 October 2019	Habrok, 2019	DWER records (A1828839)
Environmental Protection Authority <i>Flora Survey of Battler Tenement M77/166 &amp; P77/3645 (Level 1 Flora Assessment and Targeted Searches) – 14 December 2018</i> , submitted 3	Environmental Protection Authority, 2018	DWER records (A1828839)

Document title	In text reference	Availability
October 2019		
Western Botanical <i>Flora Survey of Battler Tenements M77/166 &amp; P77/3645 (Level 1 Flora Assessment and Targeted Searches) – November 2015</i> , submitted 3 October 2019	Western Botanical, 2015	DWER records (A1828839)
Local Geotechnics <i>Design Report - Battler Evaporation Pond – 30 September 2019</i> , submitted 8 October 2019	Local Geotechnics, 2019	DWER records (A1829978)
DER, July 2015. <i>Guidance Statement: Regulatory principles</i> . Department of Environment Regulation, Perth.	-	<p>Accessed at <a href="http://www.dwer.wa.gov.au">www.dwer.wa.gov.au</a></p>
DER, October 2015. <i>Guidance Statement: Setting conditions</i> . Department of Environment Regulation, Perth.	-	
DER, November 2016. <i>Guidance Statement: Environmental Siting</i> . Department of Environment Regulation, Perth.	DER Environmental Siting, 2016	
DER, February 2017 <i>Guidance Statement: Risk Assessments</i> . Department of Environment Regulation, Perth.	-	
DWER, June 2019 <i>Guideline: Decision Making</i> Department of Water and Environmental Regulation	-	
DWER, June 2019. <i>Guideline: Industry Regulation Guide to Licensing</i>	-	

## Appendix 2: DWER response to Shire of Yilgarn comments on the proposed amendment to works approval W5995/2016/1

Item	Shire of Yilgarn comments	DWER response
1	That DWER require assumptions made within the desk top analysis, undertaken to form the submission, to be confirmed by suitable site investigations;	<p>In forming its works approval amendment application, Habrok referenced information from the following native vegetation site investigations that have been undertaken at the premises to date:</p> <ul style="list-style-type: none"> <li>• Botanica Consulting Pty Ltd conducted a Level 1 flora and vegetation survey of the Battler site in 2010 (Botanica Consulting <i>Level 1 Flora and Vegetation Survey: Battler</i>, 2011).</li> <li>• Bioscope Environmental Consulting Pty Ltd initially contracted Western Botanical to conduct a Level 1 flora and vegetation survey of the premises, conducted 29 September to 1 October 2015, in accordance with Guidance Statement 51 (EPA 2004). An additional focus of the survey was to map, quantify, and assess the regional distribution of the Priority 2 species <i>Acacia concolorans</i> previously recorded at the premises. Identification of collected specimens from this initial survey revealed the existence of additional priority species at the premises. A second field survey was performed 21 – 23 October 2015 to map and quantify these additional priority species.</li> </ul> <p>During the time limited operational phase, works approval W5995/2016/1 requires the works approval holder to regularly monitor the ambient groundwater and mine dewater for the presence of lateral seepage (both north and west of the evaporation pond) and to ensure the evaporation pond continues to have sufficient capacity to store all pumped mine dewater.</p>
2	That DWER require the proponent to minimise visual impacts from Marvel Loch Road, through a vegetation buffer, and indiscriminate tracks are not to be used for site access;	DWER administers part V of the EP Act to regulate emissions and discharges from prescribed premises. Prescribed premises are defined in Schedule 1 of the <i>Environmental Protection Regulations 1987</i> (the EP



Item	Shire of Yilgarn comments	DWER response
		<p>Regulations) and consist of activities with the potential to cause emissions and discharges which may impact upon public health or the environment. Issues pertaining to the visual impacts of an operation and the use of indiscriminate tracks do not fall within DWER's jurisdiction as they are not deemed to be prescribed activities.</p> <p>The mining project is likely to be subject to a Mining Proposal, regulated by the Department of Mines, Industry Regulation and Safety (DMIRS) and this would be the relevant approval process in which to recommend these controls be applied to the project. The Shire of Yilgarn is recommended to seek advice from DMIRS in this instance.</p>
3	That DWER confirm the risk classification given to the storage facility from a public hazard viewpoint, given the possible effects on Marvel Loch Road in the event of dam failure;	Health and safety risks fall within the jurisdiction of DMIRS, the Shire of Yilgarn is recommended to seek advice from DMIRS for item 3.
4	That DWER ensure the recommendation from the design engineer to have the construction supervised by a geo-technical engineer is required in the approval;	<p>Works approval W5995/2016/1 requires the works approval holder to provide certification by a suitably qualified geotechnical engineer within 30 days of an item of infrastructure being constructed.</p> <p>Health and safety risks fall within the jurisdiction of DMIRS, the Shire of Yilgarn is recommended to seek advice from DMIRS for item 4.</p>
5	That DWER ensure the recommendation from the design engineer for various monitoring requirements, is required in the approval; &	Health and safety risks fall within the jurisdiction of DMIRS, the Shire of Yilgarn is recommended to seek advice from DMIRS for item 5.
6	DWER seek from the proponent a closure plan or include criteria for post closure.	Mine closure activities fall within the jurisdiction of DMIRS, the Shire of Yilgarn is recommended to seek advice from DMIRS for item 6.

## Appendix 3: Summary of applicant's comments on risk assessment and draft conditions

Condition	Summary of works approval holder comment	DWER response
Section 6.2, Table 8 of this decision document	For Source: Evaporation pond and pipeline transporting dewater: the third point under Applicant Controls to conduct an infiltration test was not proposed in the Works Approval Amendment application. Other controls such as compaction of the embankment walls and installation of the interceptor drainage system is considered adequate to prevent lateral seepage.	<p>The Delegated Officer notes that the listed applicant control was provided to DWER on 3 October 2019 in the supporting information submitted as part of the works approval amendment application as attachment 8A: PSM Memorandum – Battler Works Approval Water Resources Assessment – Technical Advice Note.</p> <p>The Delegated Officer agrees with the works approval holder in that the regulatory controls for compaction of the embankment walls and installation of the interceptor drainage system are considered adequate to prevent lateral seepage. Therefore the below applicant control has been removed from the Decision Report:</p> <p>“The applicant proposed to conduct an infiltration test on a test small impoundment to characterise the lateral and vertical infiltration flow paths.”</p>
Condition 9, Table 4	For Column 1: Dewatering pipelines and bunding - Point 1 requires an inspection be undertaken every 8 hours. Battler Gold Mine is run on 12 hour shifts and it is requested the frequency of this inspection be every 12 hours. The pipeline runs north-west from the pit to the evaporation pond between roads and waste rock dumps and therefore any spills will not travel off-site and will most likely be quickly identified regardless of inspection frequency.	The Delegated Officer agrees with the works approval holder's reasoning for the proposed amendment to the listed inspection frequency and the works approval has been updated accordingly (now No. 2 of Table 1, condition 8).
Table 2, Column 1 and 2	Evaporation pond cell areas and capacities provided from an old design. Areas and capacities to be updated to be in line with the design provided in the Works Approval Amendment application as provided to DWER on 17/01/2020.	The evaporation pond cell areas and capacities have been updated in both the works approval and decision report to reflect the information supplied by the works approval holder on 17 January 2020.