



Application for licence

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

Licence number	L9229/2019/1
Applicant	BHP Billiton Nickel West Pty Ltd
ACN	004 184 598
DWER file number	DER2019/000640
Premises	Cliffs Mine Site M36/9, M36/618, M36/676 and M53/489 SHIRE OF LEONORA SHIRE OF WILUNA WA
Date of report	17 August 2020
Proposed decision	Grant

1. Definitions

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

Table 1 Definitions

Term	Definition
Applicant	BHP Billiton Nickel West Pty Ltd
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.
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>
Occupier	has the same meaning given to that term under the EP Act.
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 specified at the front of this Decision Report
Risk Event	As described in <i>Guidance Statement: Risk Assessment</i>

2. Overview of premises

BHP Billiton Nickel West Pty Ltd (applicant) operates the Cliffs Mine Site (premises) which is located in the Shires of Leonora and Wiluna, Western Australia.

The mine commenced operations in 2005 and is managed in accordance with multiple mining proposals approved under the *Mining Act 1978* by the Department of Mines, Industry Regulation and Safety (DMIRS). Ore from the premises is delivered to Nickel West's Mt Keith (5 km north) and Leinster operations (80 km south) for processing.

An application for a works approval was submitted to former Department of Environment and Conservation on 2007, which was returned, as paste fill plants were not subject of regulation under Part V of the *Environmental Protection Act 1986* (EP Act). Paste fill plants since have been recognised as prescribed activity, and therefore require an instrument issued under Part V of the EP Act.

The premises is also undertaking dewatering activities which are managed under groundwater licence GWL173900, issued under the *Rights in Water and Irrigation Act 1914* (RIWI Act). Dewatered water is processed through two settling ponds before entering the dewatering dam.

A portion of the dewatered water is transferred to Nickel West Mt Keith Operations via pipeline, and the remaining volume stored in portal water tanks and reused at the premises including for paste fill activities. All dewatered water is utilised, and no discharges into the environment occur, therefore dewatering activities are not classified as prescribed activity category 6 and not regulated under Part V of the EP Act.

2.1 Description of proposed activity

A licence application was submitted by the applicant to the department on 26 November 2019 for paste fill and crushing and screening activities at the premises (Figure 1, Figure 2).

2.1.1 Category 5

The premises operates an underground mine which uses paste filling methods to avoid surface subsidence since 2007. Tailings from the Nickel West's Leinster Operations (approximately 80 km south of premises) are mixed with sand at the Leinster mine and delivered to the paste fill plant via road train, and unloaded via conveyor. The blend is then combined with a binder (cement, blast furnace slag, and cement kiln dust), and the paste is then pumped into completed underground sections. The transportable paste plant has a capacity of 125 m³/hr, and is processing 260 000 tonnes per year.

The assessment only includes the operation of the paste fill plant as underground paste fill activities are not regulated under category 5.

2.1.2 Category 12

Pre-crushed ore is supplied to multiple locations, including Mt Keith and Leinster. Alternatively the crushing plant is also employed to crush mine waste material which is used for maintenance and construction across different Nickel West sites. A throughput of 1.5 million tonnes per year of crushing ore and mine waste material is anticipated.

An overview of the categories proposed by the applicant, and assessed by the department are listed in Table 2.

Table 2 Classification of premises and assessed design capacity

Category	Description	Assessed production or design capacity or throughput
5	Processing or beneficiation of metallic or non-metallic ore	260 000 tonnes/year
12	Screening etc. of material: premises (other than premises within category 5 or 8) on which material extracted from the ground is screened, washed, crushed, ground, milled, sized or separated.	1.5 million tonnes/year

The infrastructure and equipment are outlined in Table 3 below and the site layout is shown in Figure 1 and Figure 2.

Table 3 Infrastructure and equipment at the premises

Ref	Infrastructure or Equipment	Site Layout Plan reference
Category 12		
1	Mobile crushing and screening plant	Figure 2
Category 5		
2	Paste fill batch plant Capacity 70 – 130 m ³ /hr	Figure 1, Figure 5 Paste fill plant and laydown
3	Binder Silo	
4	Spillage settling sumps	
5	Sedimentation pond	
6	Stormwater collection sump	
7	Paste mixer feed conveyor	
8	Tailings/sand feed hopper	
9	Plant feed stockpile area	

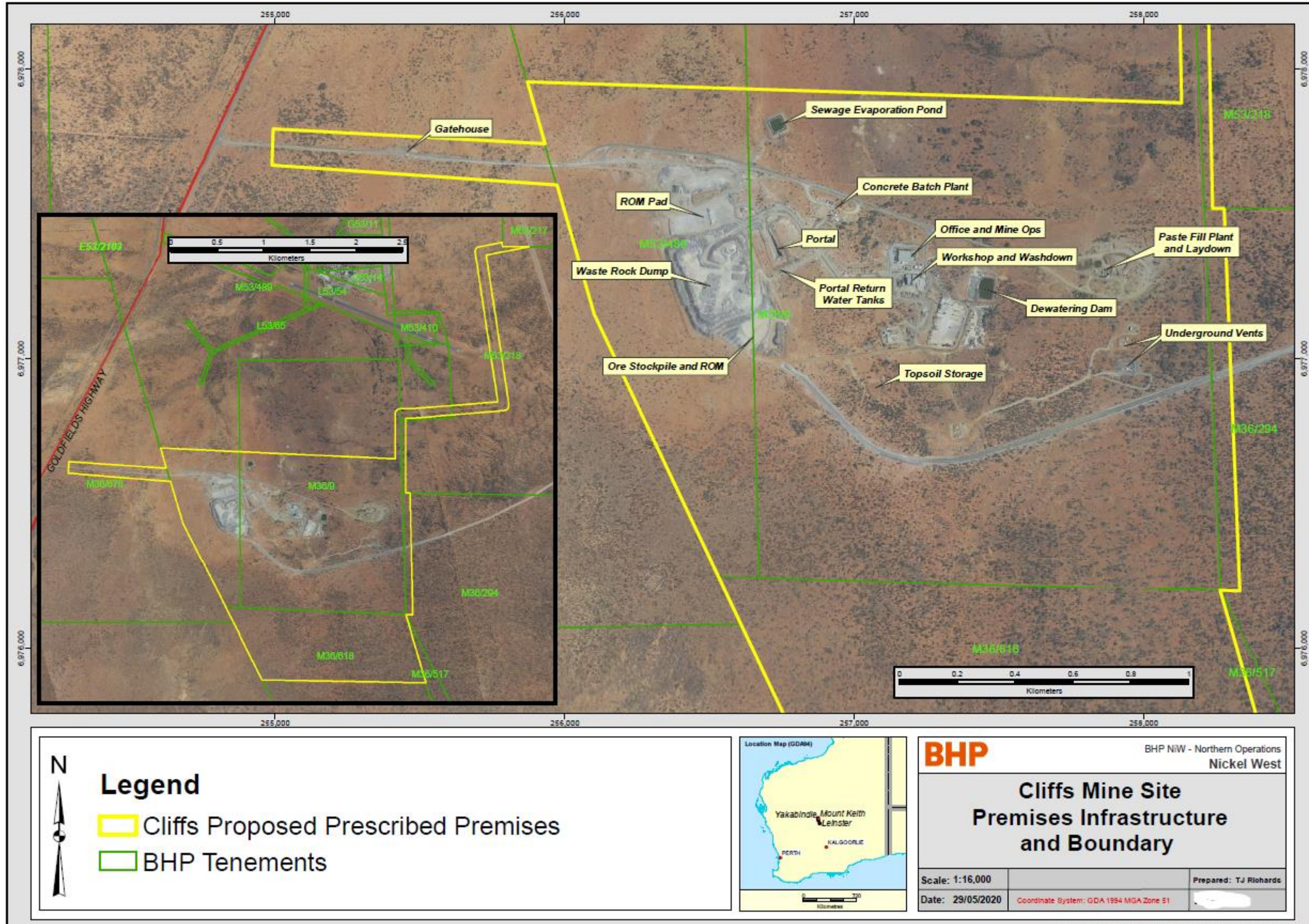


Figure 1 Site layout plan

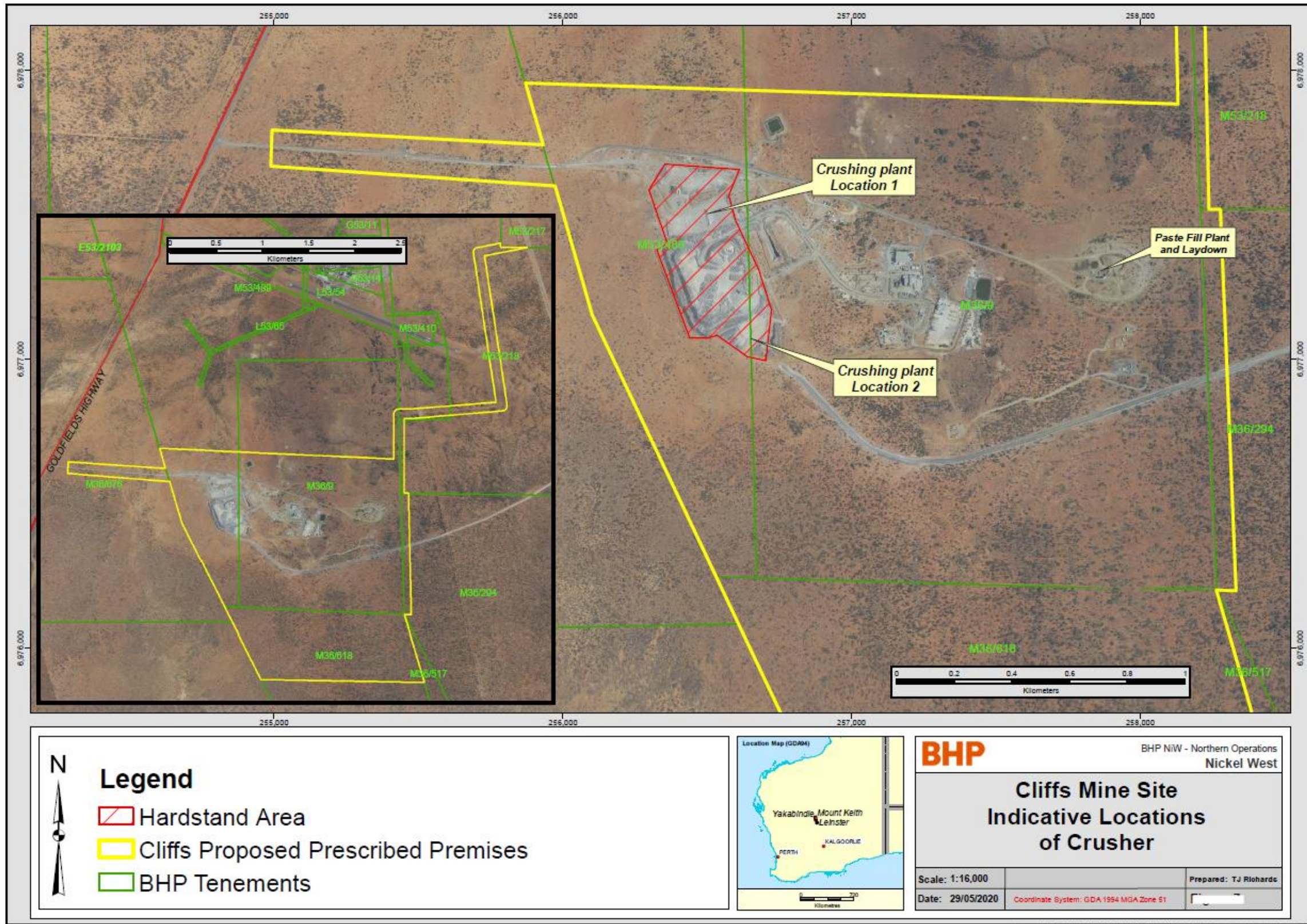


Figure 2 Crushing plant location

3. Legislative context and other approvals

The legislative framework for this assessment is the *Environmental Protection Act 1986* (EP Act) and *Environmental Protection Regulations 1987* (EP Regulations).

Relevant guidance documents are outlined in Appendix 1.

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

Table 4 Premises approvals

Legislation	Number	Approval
<i>Mining Act 1978</i>	MP 5771 approved 2007 19135	M36/9, M53/489 and M36/676 Approval for underground nickel operations
	MP 28058 approved 2010	M36/9 and M53/489 Increased volume of existing waste rock dump.
	MP 43584 approved 2013	M53/489 Modifications waste rock dump and ROM pad.
	MP 54863 approved 2015	Extending approved activities to mining tenement M36/618
	MP 80404 approved 2019	M53/489 and M36/9 Expansion of the Cliffs Waste Rock Landform
	MP 78428 approved 2019	M53/489, M36/9, M36/294, M53/218, M53/217 and M53/166 Haul road between Cliffs mine site and Mt Keith mine site
<i>Rights in Water and Irrigation Act 1914</i>	GWL173900(2) Valid until 2027	Annual water entitlement 500 000 kL. Authorised to take water for dewatering purposes on M36/9 Cliffs Nickel Mine and mineral ore processing and other mining purposes on M53/57 Mt Keith Operations
<i>Environmental Protection Act 1986</i>	CPS 8348/1 valid until 2021	M53/489, M36/9, M36/294, M53/218, M53/217 and M53/166 Permit to clear 55.6 ha.

4. Emission sources, pathways, receptors and controls

4.1 Emissions

The potential for emissions to impact on sensitive receptors has been assessed in accordance with the Department's Risk Framework. The key emissions during premises operation which have been considered in this report are dust, spills/leaks and runoff from plant and equipment and hydrocarbons from category 12 and 5 activities.

The applicant has proposed measures to assist in controlling these emissions, where

necessary. The control measures are outlined in section 4.4 below and have been considered when undertaking the risk assessment detailed in section 5.

4.2 Pathways

Potential emissions associated with proposed activities include spills, leaks and contaminated stormwater runoff from equipment. The paste fill plant combines tailings with a blender to produce a paste. Characteristics and origin of the tailings are unknown, and can consist of toxic compounds such as heavy metals. Paste fill plants can operate under high pressure and can result in various leaks and spills. Additionally, the paste is delivered underground and rupture of the pipeline can further contaminate the subsurface and potentially reach groundwater.

The crushing of ore and mine waste can result in contaminated stormwater runoff. Pollutants can contaminate surrounding soil, vegetation and infiltrate the groundwater, adversely affecting water quality.

These pathways have been considered in the risk assessment table in section 5.

4.3 Receptors

Risk is assessed as a combination of emission sources, the proximity and sensitivity of receptors to those emission sources and any pathways that can allow the emission to reach and potentially harm the receptor. Table 5 below provides a summary of human and environmental receptors in proximity to the premises which have a potential to be impacted from site activities, and the risk assessment in section 5 considers these receptors in the context of emissions and potential pathways.

Table 5 Classification of premises and assessed design capacity

Human receptors	Distance from activity or prescribed premises
Albion Station homestead	14 km west from the premises The Delegated Officer considers it unlikely a risk event for dust or noise emissions will occur given the distance between the premises boundary and the closest residential receptor. As such the Delegated Officer does not consider the risk to be significant enough to warrant further assessment.
Environmental receptors	Distance from activity / prescribed premises
Goldfields Groundwater Area	Premises is located within the Goldfields Groundwater Area. The applicant states groundwater beneath the site to occur at approx. 30 – 50 m below ground level (bgl). Monitoring bores on site have shown a decline in groundwater levels due to dewatering activities. The depth to water has increased from about 21.4 mbgl (2004) to approx. 50 mbgl (2018).

As part of the applicants licence for dewatering activities (GWL173900(2)) issued under the RIWI Act, groundwater monitoring is required. This includes abstraction levels, water levels, field water quality (EC, pH) and major ion analysis of discharge. The location of the monitoring bores at the premises licensed under GWL173900(2) are shown in Figure 3.

Water levels recorded in the monitoring bores from previous years are shown in Figure 4. A steady decline of groundwater levels has been reported since 2004.



Figure 3 Monitoring bore locations at the premises

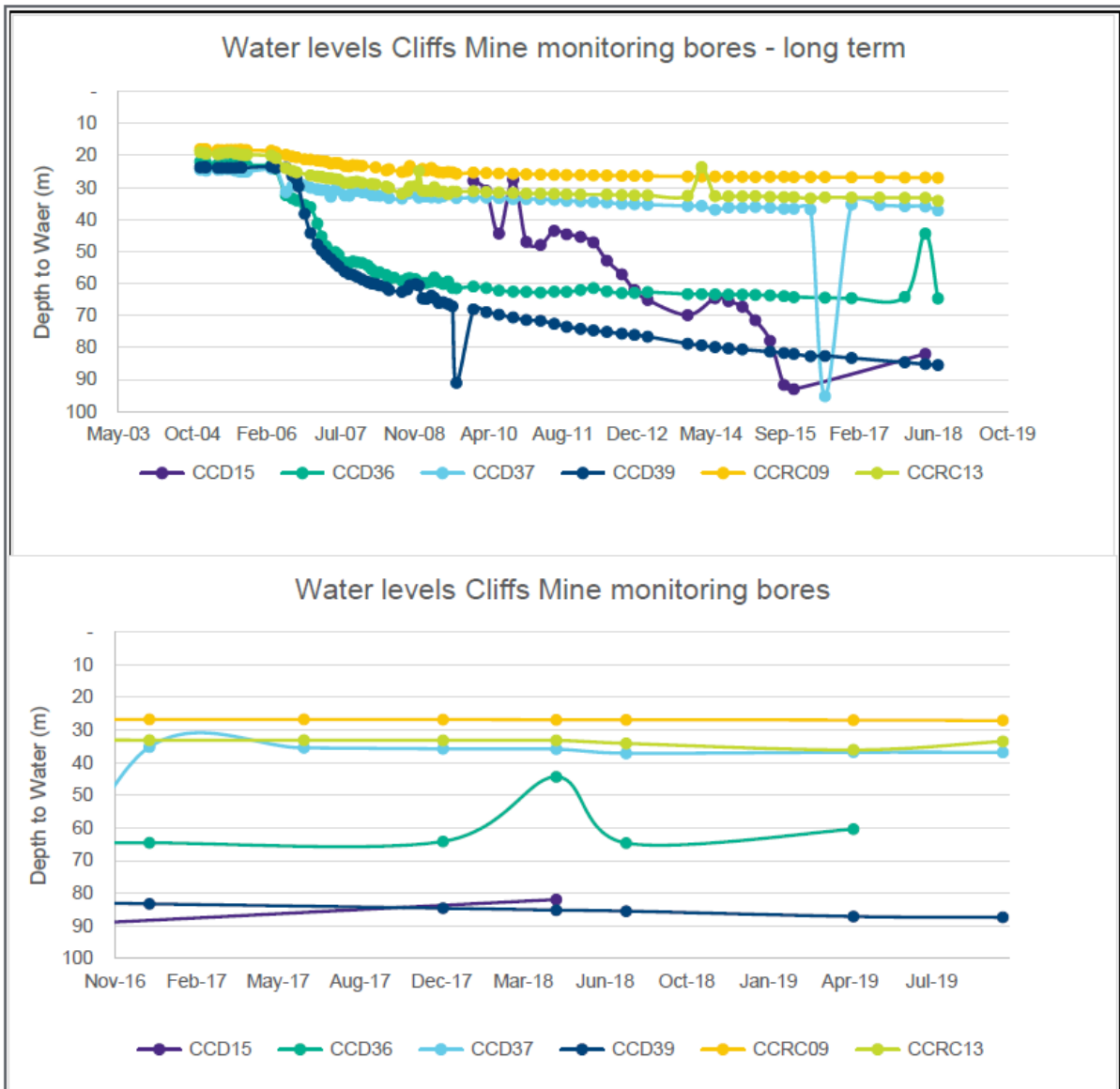


Figure 4 Water level recorded in monitoring bores

4.4 Applicant controls

The applicant has proposed the management measures/controls outlined in Table 6 as part of the application and further information requests.

Table 6 Applicant's proposed controls for emissions and discharges

Emission	Source	Proposed controls
Dust	Crushing activities, unsealed trafficked areas, paste fill activities	<ul style="list-style-type: none"> Dust suppression water sprays Water carts Crusher located at ground level adjacent to Waste Rock Landform which acts as wind barrier Crusher plant fitted with spray nozzles on head drum, discharge point of main conveyor and at the feed point Binder stored in cement silo which directly discharges into fully enclosed mixing pan Binder silo equipped with reverse pulse dust collector, process water added to mix at the chute where binder is added to mixer Site water truck for additional dust suppression of material
Stormwater runoff	Crushing plant	<ul style="list-style-type: none"> Locations are slightly raised above surrounding ground level and bunded Stockpiles located within the hard stand area
	Paste fill plant	<ul style="list-style-type: none"> Paste plant, binder silo and paste mixer located on 700 mm concrete hard stand with internal interceptors to capture spills and to divert to spillage settling sumps Sumps are located within the hardstand area and are concrete lined and bunded with concrete walls Sumps have an approximate capacity of 45 m³ Excess water pumped from sumps to sedimentation pond with water returned to process Sumps are routinely excavated and potentially contaminated sediment is disposed of at licensed offsite facility Water is diverted around the facility to minimise ingress into operational areas and stormwater from the greater paste fill site is channeled to stormwater collection sump

		<ul style="list-style-type: none"> • Process water is pumped from dewatering dam, and excess is pumped into sedimentation pond • Sedimentation pond is HDPE lined and has a capacity of approximately 840 m³
Hydrocarbons	Spills from plant and equipment	<ul style="list-style-type: none"> • Immediate removal of spilled material, contaminated material disposed in approved location • Spill kits kept on site

5. Risk assessment

The identification of the sources, pathways and receptors to determine Risk Events are set out in Table 7 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 have been assessed separately to allow clear delineation of activity phases.

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

Table 7 Identification of emissions, pathway and receptors during operation

Risk Event				Consequence rating*	Likelihood rating*	Risk*	Reasoning	Regulatory controls (refer to conditions of the granted instrument)
Source/Activities	Potential emissions	Potential receptors, pathway and impact	Applicant controls					
Category 12 Screening etc. of material: premises	Leaks from equipment, contaminated stormwater runoff and sediment.	Contamination of surrounding soil, vegetation and groundwater by direct discharge.	Refer to section 4.4	Slight	Unlikely	Low	The proposed controls are expected to be sufficient at mitigating runoff.	Applicant controls (as outlined in Table 4.4) will be conditioned in the Licence to ensure contaminated stormwater runoff is adequately managed.
Category 5 Processing or beneficiation of metallic or non-metallic ore Blending of dry tailings, stockpiling, handling of tailings/sand mix	Dust	Adverse impacts on surrounding vegetation and fauna by contaminated dust	Refer to section 4.4	Slight	Unlikely	Low	The proposed controls are expected to be sufficient at mitigating dust emissions.	Applicant controls (as outlined in Table 4.4) will be conditioned in the Licence to ensure dust is adequately managed.
Paste plant operations	Spills and leaks of tailings paste and contaminated stormwater runoff from tailings stockpiles	Contamination of surrounding soil, vegetation and groundwater by direct discharge.	Refer to section 4.4	Moderate	Possible	Medium	Refer to section 5.1	Condition 1 Applicant controls (as outlined in Table 4.4) will be conditioned in the Licence to ensure spills and leaks of tailings paste and contaminated stormwater is adequately managed.
Delivery pipeline	Rupture of pipeline causing discharge of paste to land and groundwater	Contamination of surrounding soil and vegetation by direct discharge, as well as potential adverse impacts on groundwater by pipelines rupturing underground.	N/A	Slight	Unlikely	Low	Impacts from failure and rupture of pipelines containing paste are considered to be low, due to paste containing binder and likely setting quickly when in contact with air.	N/A
Category 12 and Category 5 Operations	Hydrocarbons and reagent chemicals	Surface water, Goldfields Groundwater Area (<i>RIWI Act 1914</i>) Surrounding soil and vegetation	Refer to section 4.4	Slight	Unlikely	Low	The proposed controls are expected to be sufficient at mitigating hydrocarbon/process fluid emissions. In addition, the provisions of the <i>Dangerous Goods Safety Act 2004</i> apply to the storage and handling of dangerous goods on the premises.	N/A

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

5.1 Risk assessment – Paste plant runoff

The tailings/sand mix is delivered to the premises via road trains, and stockpiled. The tailings/sand mix is loaded via conveyor to the transportable plant where binder is added. The resulting paste is delivered underground by gravity.

5.1.1 Description of risk event and emission characterisation

The paste plant combines tailings/sand blends with a binder to form a paste. Tailings characteristics are unknown, and can contain traces of contaminants, adversely impacting surrounding soil and groundwater.

Tailings used for paste fill activities are uncharacterised and can contain pollutants contaminating soil and groundwater by seepage and runoff. This can lead to contamination of surrounding soil and groundwater.

5.1.2 Applicant controls

The applicant proposes the following infrastructure to be located on a 700 mm bunded concrete hard stand: paste plant, binder silo, paste mixer (section 4.4). The bunding is proposed to be 25 cm.

The hardstand is equipped with internal interceptors which capture spills and diverts them to spillage settling sumps. These sumps are concrete lined and are located directly adjacent to the concrete hardstand. Excess water from the sumps is pumped to a HDPE lined sedimentation pond. The sumps are routinely excavated and potentially contaminated sediment disposed of to a licensed facility offsite. Water collected in the sedimentation pond is pumped back to the paste fill plant for reuse (Figure 5).

Stormwater from the greater paste fill site is channeled to a stormwater collection sump to the northeast (Figure 5).

5.1.3 Rating of this risk event

Taking into consideration that tailings used for paste fill are of unknown character and can result in contamination of soil and groundwater, the Delegated Officer has considered the consequence to be **Moderate**.

The paste fill plant operates under high pressure, and spills of paste are expected. The Delegated Officer has considered the likelihood to be as **Possible**.

The Delegated Officer has compared the consequence and likelihood of this risk event and determined the overall rating as **Medium**. Based on this rating, the risk event is subject to subject to regulatory controls.

5.1.4 Regulatory controls

Contaminated runoff will occur at some time, and is collected in the premises sedimentation pond. Contaminants captured in the sedimentation pond can infiltrate the ground at the base, or overflow and contaminate surrounding environment with pollutants of the tailings used for the paste production.

The paste fill plant is mixing tailings of unknown characteristics, and to ensure no impact by spillages, bunding with sufficient capacity is required.

To avoid overtopping of the pond, a pump is required to be installed to divert collected water back into the process water circuit. Sufficient freeboard is to be maintained at all times to accommodate the volume of water from a 1:100 year 72 hour Average Recurrence Interval (ARI) rainfall event.

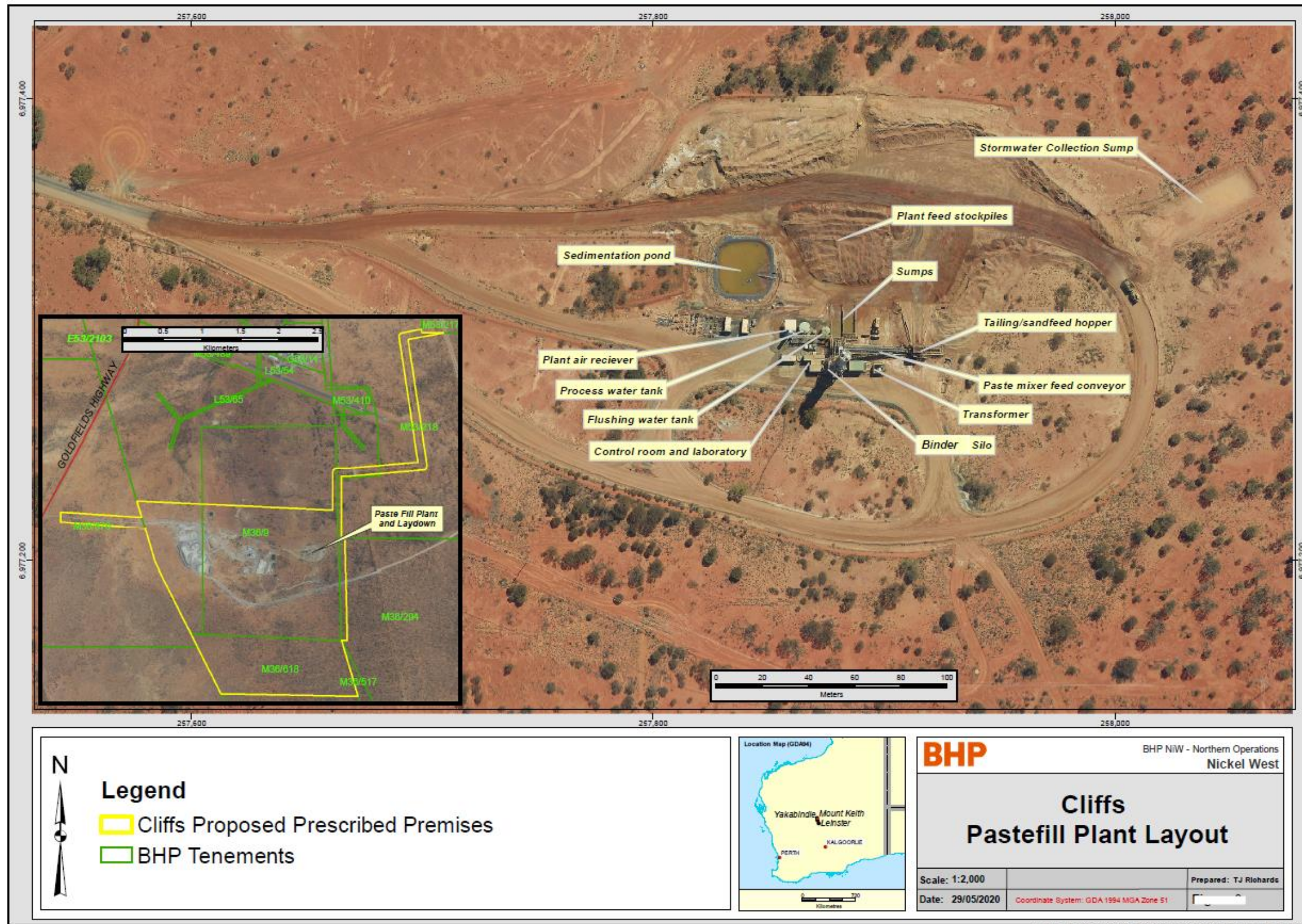


Figure 5 Paste fill plant layout

6. Consultation

The draft decision report and draft licence were referred to the Applicant on 8 July 2020 for comment. Appendix 2 outlines comments received and DWER's response.

7. Conclusion

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

**A/MANAGER, RESOURCE INDUSTRIES
REGULATORY SERVICES**

An officer delegated by the CEO under section 20 of the EP Act

Appendix 1: Key documents

Document title	Availability
Licence (L9229/2019/1) application form and supporting documentation (November, 2020)	DWER records (DWERDT227935)
Supplementary information for licence application – provided 29 May 2020 (L9229/2019/1)	DWER records (A1898919)
Supplementary information for licence application – Provided 24 June 2020 (L9229/2019/1)	DWER records (DWERDT299049)
DER, July 2015. <i>Guidance Statement: Regulatory principles</i> . Department of Environment Regulation, Perth.	accessed at www.dwer.wa.gov.au/
DER, October 2015. <i>Guidance Statement: Setting conditions</i> . Department of Environment Regulation, Perth.	
DER, August 2016. <i>Guidance Statement: Licence duration</i> . Department of Environment Regulation, Perth.	
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	

Appendix 2: Summary of applicant's comments on risk assessment and draft conditions

Condition/ Section	Summary of applicant's comment	Department's response
1	Request to change requirement of tailings/sand stockpiles to be located on hardstand to be located on 700 mm compacted and bunded oxide pad	Approved and condition 1 changed to reflect the infrastructure requirement of the stockpile.
Schedule 2, Table 3 Figure 9	Adjusting premises boundary coordinates to remove administrative error,	Approved, Table 3 and Figure 9 updated to reflect correct premises boundary.
Decision report: Appendix 1:	Inclusion of 'Supplementary information' provided to DWER under Key documents	Approved, reference included under Appendix 1 Key documents