Decision Report

Application for Works Approval

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

Works Approval Number	W6714/2022/1
Applicant	BHP Iron Ore Pty Ltd
ACN	008 700 981
File number	DER2022/000290
Premises	Mt Whaleback/Orebody 29/30/35 Tenements E52/2009-1, ML244SA, G52/19-G52/27, G52/276, G52/277, G52/279; and Special Leases K858923 and N088235 NEWMAN WA 6753 As defined by the coordinates in Schedule 2 of the works approval As defined by the premises map attached to the issued works approval
Date of report	2 February 2023
Decision	Works approval granted

Alana Kidd

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Alana Kidd
Manager, Resource Industries

an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

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1. Decision summary

This decision report documents the assessment of potential risks to the environment and public health from emissions and discharges during the construction and operation of the premises. As a result of this assessment, works approval W6714/2022/1 has been granted.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this decision report, the Department of Water and Environmental Regulation (the department; DWER) has considered and given due regard to its regulatory framework and relevant policy documents which are available at https://dwer.wa.gov.au/regulatory-documents.

2.2 Application summary and overview of premises

On 27 June 2022, the applicant submitted an application for a works approval to the department under section 54 of the *Environmental Protection Act 1986* (EP Act).

The application is to undertake construction works relating to tailings lifts at the premises. The Tailings Storage Facilities (TSFs) are approximately 4.5 km southwest of Newman.

The premises relates to category 5 and assessed production / design capacity under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) which are defined in works approval W6714/2022/1. The infrastructure and equipment relating to the premises category and any associated activities which the department has considered in line with *Guideline: Risk Assessments* (DWER 2020) are outlined in works approval W6714/2022/1.

The Applicant is requesting an increase in the storage capacity of the TSFs. This involves raising the two TSF facilities (TSF1 and TSF3) by a total of 9 m in three 3 m raises, allowing approximately 25,000,000 tonnes over 37 years. There is no increase in the production / design capacity of the Whaleback Hub as a result of this. Refer to Figure 1 for the TSF1 and TSF3 layouts.

The Mt Whaleback/Orebody 29/30/35 site is also regulated by licence L4503/1975/14, which is currently undergoing a review. This is further discussed in Section 2.3. Following the completion of the first lift, the Applicant may seek to transition the construction of the other lifts to the licence. A licence amendment was not a feasible option for these works at the time of the application as the licence is undergoing a review.

2.2.1 TSFs lifts

The existing footprint areas of TSF1 and TSF3 are 46.6 ha and 98.1 ha, respectively. Summaries of existing and proposed TSF embankment elevations and heights are presented in Table 1 and Table 2.

Each lift will take approximately 6 to 8 months to construct.

Table 1: Summary of TSF1 Embankment Characteristics

Embankment		TSF1 West Wall	TSF1 North Wall
Embankment crest level (RL X m)[1]	Existing	594	594
	Proposed Final	603	603
Embankment height (m)	Existing	16[2]	19
	Proposed Final	25[2]	28

Note 1: Assumed all heights refer to Admiralty Datum Port Hedland (ADPH)

Note 2: Height relative to toe of the barrier wall.

Table 2: Summary of TSF3 Embankment Characteristics and Cell Area

Embankment		Wall 1	Wall 2	SD1	SD2	SD3	South Wall 3
Embankment crest level (RL X m)[1]	Existing	593	593	593	593	593	593
	Proposed Final	602	602	602	602	602	602
Embankment height (m)	Existing	23	25	7	11	11	9
	Proposed Final	32	34	16	20	20	18

Note 1: Assumed all heights refer to Admiralty Datum Port Hedland (ADPH)

The perimeter embankment raises will be progressively constructed from Beneficiation rejects or suitable site-won materials (imported fill), typically in 3 m upstream raises.

2.2.2 Tailings Properties and Seepage

Mineralogical and geochemical test work has been conducted on tailings produced from the Beneficiation Plant. Tailings are typically geochemically enriched in Arsenic (As), Bismuth (Bi), Iron (Fe), Mercury (Hg), Sulfur (S), Antimony (Sb), Selenium (Se), and Tellurium (Te) relative to average crustal concentrations. Dominant minerals include iron oxides (hematite and goethite) and kaolin clay with low potential for acid formation (classified as non-acid forming (NAF)).

The tailings material shows slightly elevated levels of trace metals, these are at or close to the laboratory limit of reporting (LOR). The tailings supernatant / process water composition is characterised as alkaline pH, non-saline and containing very high alkalinity. Concentrations of most trace metal(loid)s were consistently low to very low or below the laboratory LOR, with exceptions being Aluminium (Al), Iron (Fe) and Manganese (Mn). These results reflect the presence of colloidal particles in addition to the fact that the analytical results represent total analysis.

In line with the existing operating, maintenance and surveillance (OMS) manual for the TSF, tailings will be actively discharged into the TSF at a rate of up to ~1 Mtpa through multiple spigots around most of the perimeter and from the dividing wall, with deposition adjusted as required to maintain the supernatant ponds around the water recovery systems of TSF1 and TSF3, located near the ridgeline bounding the TSFs to the southwest. This is consistent with

the existing operation of the TSFs. Tailings deposition will periodically be rotated between TSF1 and TSF3 to allow the tailings to dry and consolidate, prior to each embankment raise.

The Applicant proposes to continue operating the TSFs with the lifts as per the existing facilities and the Applicant has stated that they do not expect an increase in potential leaching from the facility.

A two-dimensional (2D) seepage assessment has been undertaken for the proposed TSF geometry.

The objective of the seepage studies was to assess:

1) Predicted seepage flux through the base of the TSF under normal operating conditions.
2) Phreatic surface development within the TSFs and groundwater, as per the planned deposition schedule.

The results indicate the following:

- A maximum seepage rate through the base of the TSF in the order of 0.9 L/s is expected throughout operations. This is estimated to be approximately equivalent to 1.5% of the water discharged to the TSF per day, during tailings deposition;
- The phreatic surface developed due to the TSF operations is expected to be mostly contained within the tailings surrounding the supernatant pond and is not expected to develop adjacent to the confining embankment; and
- Groundwater mounding due to TSF operations is not expected to occur under expected conditions.

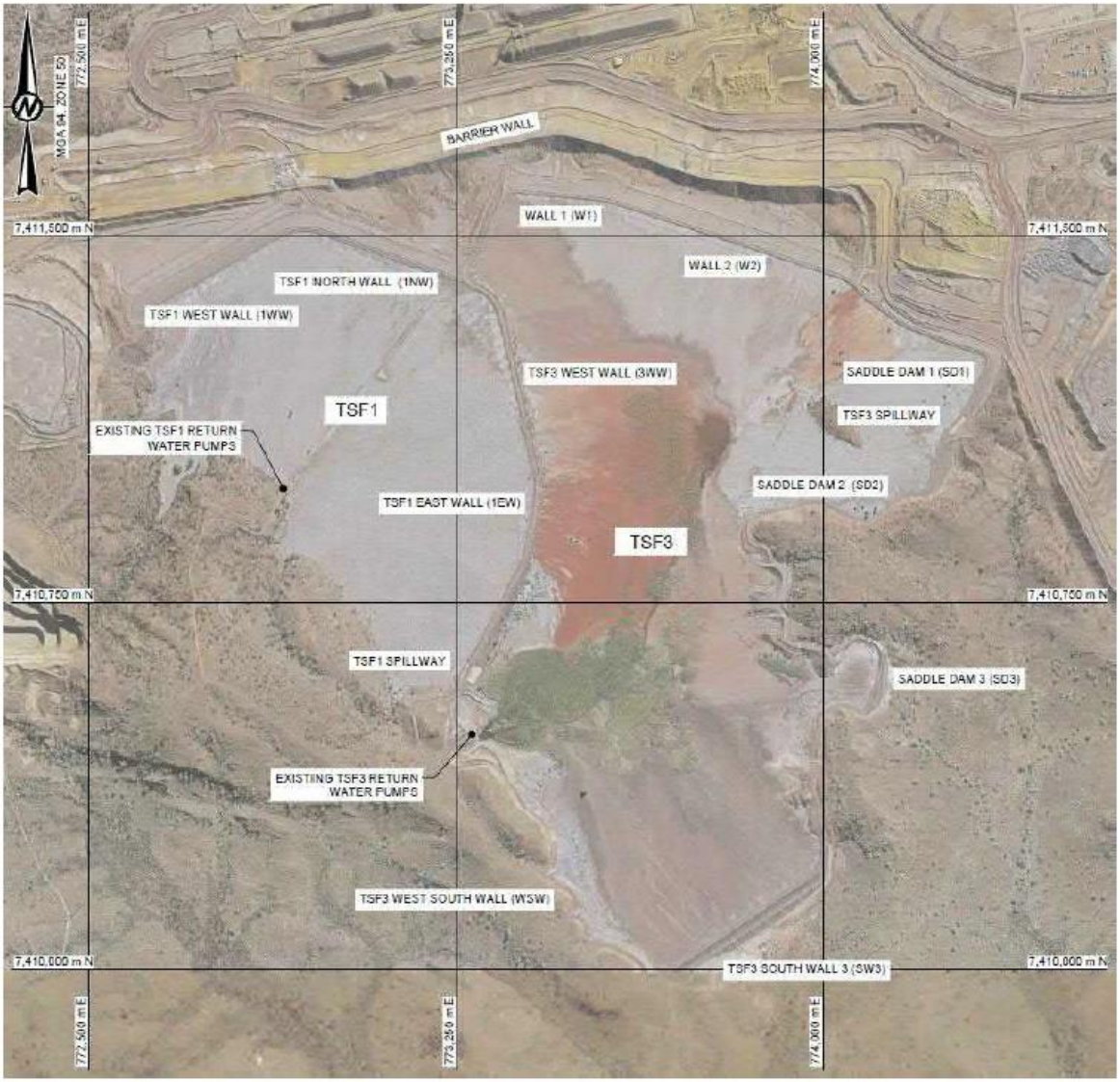

Figure 1: TSF1 and TSF3 Layouts

2.2.3 Tailings emissions and controls

Ore with a lower grade is further processed through the Bene Concentrator Plant to remove non-ferrous material. Waste is sent to a thickener to remove water content before being discharged to the TSF. Waste is typically fine, clayey material that has the potential to generate dust if allowed to dry, is disturbed and/or is exposed to high winds.

DWER officers sighted the TSF during an inspection conducted in November 2020 and noted that where tailings had dried, a crust had formed adding a protective layer that minimises the potential for dust liftoff. Refer to Figure 2. The Licence Holder manages the TSF by depositing tails at various locations around the TSF, controlling the location of the pond. This is primarily for the purpose of managing seepage and preventing overflow but also acts to keep the surface layer around the TSF damp and promotes consolidation/crusting of tails at the surface.

Figure 2: Tailings storage

2.3 Hydrogeological Assessment

2.3.1 Geochemical testing of the tailings materials

The tailings materials were subjected to the following tests to determine their geochemical characteristics, and to assess their potential to produce harmful leachate within the TSFs:

- An assessment of the mineralogy of the tailings materials;
- An assessment of the concentrations of potentially harmful elements in the tailings materials by comparison with their average crustal abundance;
- Short-term leaching tests with deionised water; and
- Kinetic testing under both oxic and anoxic conditions.

DWER considers that a suitable suite of geochemical testing has been undertaken on the tailings materials. Based on the results of this testing, DWER considers that there is a very low risk of harmful leachate being produced from these materials under the geochemical conditions that are likely to be present within the TSFs.

2.3.2 Water balance assessment and seepage modelling

The risk of seepage taking place from a TSF is usually determined through a water balance assessment. Provided that all directly measurable inputs and outputs from a TSF can be measured with a **high level of accuracy**, the unknown variable (the seepage rate) can also be estimated with a high level of accuracy.

Information that was provided in the Appendix 8B document indicates that the applicant has been able to assess water inputs to the TSFs with a high level of certainty, but this is not the case for daily evaporation rates for these facilities. Instead, it has been assumed that daily evaporation data from a site located about 100 km away from the TSFs would be applicable to these facilities.

DWER does not consider this method of estimating evaporation rates to be sufficiently rigorous. This is because TSF1 and TSF3 are located in a P1 Water Source Protection Area, where environmental and public health risks need to be assessed with a high level of certainty. Additionally, research by CSIRO has indicated that there is often a poor correlation between evaporation rates that are directly measured at a mine site with results obtained from distant meteorological monitoring stations (McJannet *et al*., 2017).

To provide a high level of measurement certainty, DWER recommends that the applicant is required to measure evaporation on the TSFs using the methods and modelling techniques that are outlined in McJannet *et al*. (2022). This is considered to be necessary, as there is a risk that the applicant has overestimated the evaporation rate from the TSFs, and, consequently, has underestimated the seepage rates. This is because the rate of evaporation can be highly variable across the surface of a TSF, and it should not be assumed that evaporation is uniformly high across its upper surface.

The Applicant has stated in response to the above that WSP Golder has developed a reasonably calibrated Mt Whaleback TSF water balance model in GoldSim using available monitoring/site data for the TSF. The model was developed under a separate cover and includes deterministic and probabilistic simulations using a daily timestep. This model supersedes the results of the average annual and monthly water balance assessment summarized in Section 8.3 of the design report. As part of the GoldSim model, a climate review was undertaken using data from various sources (i.e., site and BOM climate stations, and gridded datasets from SILO). Climate data was taken from SILO and not from the Wittenoom site.

The model also includes the results of the seepage modelling as summarised in the design report which is considered a reasonable estimate of seepage rates based on extensive laboratory and in-situ testing. The seepage model assumes zero evaporation in estimating flux through the base of the TSF, so whilst evaporation rates have been updated in the more recent models, seepage remains unchanged. The updated models indicate a higher decant rate for TSF1 due to revised (lower) evaporation volumes but are aligned for TSF3.

Based on the outcomes of the updated modelling outlined (using more local evaporation data) above the Applicant is not proposing to install additional evaporation monitoring instrumentation at the TSF.

A further review of the revised water balance modeling by DWER's Principal Hydrogeologist considers the conceptual model as technically sound; however, considers that the predicted effects of global heating and climate change on the water balance of the TSF are likely to be much less reliable. This is due to annual rate of evaporation being not only related to changes in air temperature, but also dependent on changes in wind speed and relative humidity that would not necessarily change at a given site with global heating.

As a result of these factors, changes in measured pan evaporation rates are highly variable throughout Australia, and the rate of change of these rates over time is not simply related to temperature changes (Stephens *et al*., 2018). Additionally, evaporation rates in some parts of the continent do not appear to have experienced significant increases, despite increases in

annual temperatures (Ukkola *et al*., 2019).

Although the revised water balance modeling is technically sound, DWER recommends the installation of a weather station near the TSF from the decant pond and beach areas to collect site-specific rainfall and evaporation data. The recommended approach for doing this is using the methodologies that are outlined in McJannet *et al*. (2022). The reasons for this recommendation include:

- To further improve the accuracy of the water balance for the TSF; and (more importantly)
- To enable changes in the water balance for the facility to be continuously tracked over time. This would enable large increases in the seepage rate from the TSF to be detected, which (if necessary) would enable measures to be implemented in a timely manner to manage the situation.

2.3.3 Groundwater monitoring requirements

Based on existing geological information from the mine area, the department supports the view of the proponent that the installation of a network of deep bores would be of limited value for monitoring seepage from TSFs 1 and 3, at least from a purely technical perspective. This is because the deep water-table, the low permeability of rocks between the base of the TSFs and the water table, and the low concentrations of contaminants of concern in seepage would limit the impacts of seepage on groundwater quality near these facilities.

Seepage risk from the TSFs is assessed on an ongoing basis through undertaking water balance assessments. It is recommended that these are undertaken on at least a quarterly basis using onsite measurements of evaporation rates according to the methodologies outlined in McJannet *et al.* (2022).

Significant increases in the seepage rates that are determined by the water balance assessment should trigger a management response by the proponent. One such measure could include reducing the water content of the tailings that are discharged to the TSFs to reduce the seepage potential of these materials.

2.4 Licence L4503/1975/14 Dust Emissions

On 6 October 2020, the Department notified the Licence Holder that it will be reviewing the licence. This review has focused on dust emissions and impacts from the premises, to ensure that the impacts of dust are well understood and regulated to the appropriate levels.

While the Pilbara is a naturally dusty environment and there are numerous sources of local and regional dust, the premises has the potential to significantly contribute to ambient dust at Newman.

Potentially dusty activities and sources at the premises includes ore crushing, screening, blasting, truck movements on mine roads, open/unsealed areas and clearing and rehabilitation works, among other general activities. Of these activities, the licence regulates ore processing activities, which includes crushing and screening of ore.

Ambient air quality monitors located in Newman, Town Centre and Newman East, are located approximately 4.7 km and 6.1 km to the east of the nearest prescribed premises infrastructure (Train Load Out stockpile) respectively. Other major dust influences on these monitors include the nearest Premises stockpile (2.7 km and 4.6 km) and Eastern Ridge, which is approximately 5.5 km northeast of the Town Centre monitor and 4.3km northeast of the Newman East monitor. Refer to Figure 3.

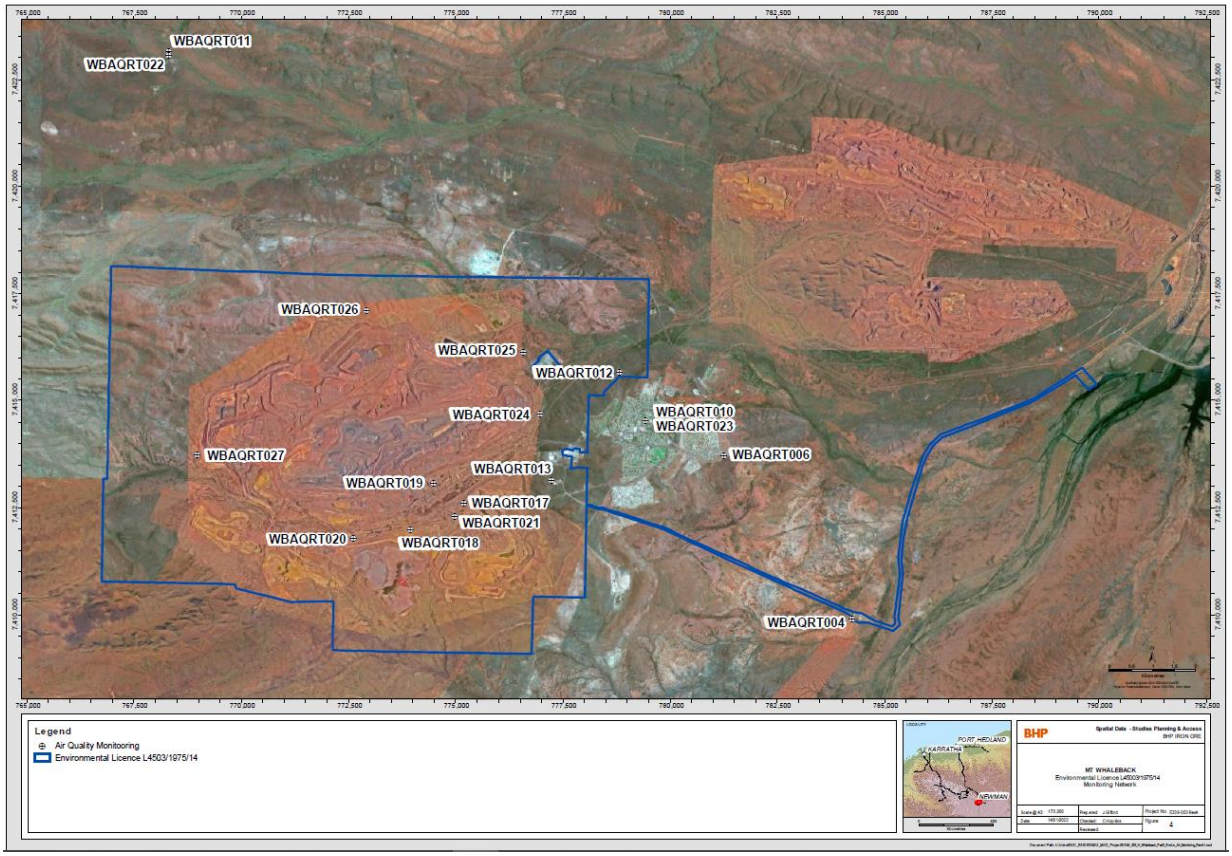

Figure 3: Newman air quality monitoring

2.5 P1 Newman Water Reserve, Public Drinking Water Source Area (PDWSA)

The TSF project area is located within the P1 Newman Water Reserve, which is subject to the *Newman Water Reserve drinking water source protection plan Newman town water supply (June, 2009 / Reviewed 2014).*

The 2009 plan defines all Crown land within the Newman Water Reserve as Priority 1 area. The P1 public drinking water source area (unconfined aquifer) is vulnerable to contamination from inappropriate land uses, it is the sole source for the Newman drinking water supply, and therefore, it should be afforded the highest feasible level of protection.

The 2009 plan identifies the existing tailings dam in the P1 Newman Water Reserve as an **existing non-conforming activity**. The plan identifies that the potential water quality risk from the tailings dam was chemical leaching from tailings, although it was also noted that iron ore tailings are chemically inert.

Recommended strategies to help protecting this PDWSA include ongoing water quality monitoring and best management practices.

The 2009 plan also states: *"These land uses need to be managed as existing non-conforming land uses, provided they continue to operate according to their relevant approvals."* The department will not support expansion or intensification of an existing, incompatible land use unless the overall water quality contamination risk is reduced. Therefore, ongoing monitoring and best management practices need to be implemented to reduce the risks.

The 2009 plan also recommends *"to investigate alternative locations for public drinking water supply bores remote from existing or future mining and upstream of the town"*. The 2014 review states that the applicant is conducting these investigations and this had led to the applicant's

proposal for a new bore field in the Homestead Creek area, to become the main source of Newman's drinking water. The new Homestead bore field will be in the undeveloped Homestead Creek surface water catchment area, approximately 5 to 10 kilometres north of Newman.

The risk of water quality contamination at the proposed Homestead bore field will be lower than at the existing bore field. This is due to the considerable distance between the proposed bore field and mining operations and urban activities.

2.6 Part IV of the EP Act

Ministerial Statement MS 963 conditions the discharge of excess mine dewatering to Ophthalmia Dam and the monitoring of terrestrial and groundwater ecosystems and is not relevant to this proposal.

2.7 Department of Mines, Industry Regulation and Safety

The full design of the TSF lift is detailed in *Whaleback TSF Wall Lift* (Golder 2022) and has also been submitted to the Department of Mines, Industry Regulation and Safety (DMIRS) as part of a Mining Proposal Application on 13 April 2022.

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 have been considered in this decision report are detailed in Table 3 below. Table 3 also details the control measures the applicant has proposed to assist in controlling these emissions, where necessary.

Table 3: Proposed applicant controls

Emission	Sources	Potential pathways	Proposed controls
Construction			
Dust	Construction earthworks generating localised dust	Air / windborne pathway	• Occupational and ambient dust levels are controlled by the implementation of the following measures: ➢ Water tankers are used to apply water to sites within areas of operation which have the potential to generate dust, including unsealed roads, haul roads and construction areas; ➢ Areas of exposed soil (land disturbance) are minimised; and ➢ Disturbed areas are rehabilitated as they become available;

Emission	Sources	Potential pathways	Proposed controls
			• Routine maintenance and housekeeping practices are employed to ensure that waste materials in or around the premises do not accumulate and lead to the generation of unacceptable airborne dust; • Chemical suppressants will be used for general site dust suppression where practicable; • Major traffic thoroughfares will be sealed and kerbing or bunding will be installed to discourage off-road passage where practicable. Vehicle traffic will preferably be directed along routes that are regularly maintained and sprayed with dust suppressants; • Speed limits will be enforced to minimise dust emissions; and • Site personnel will be required to undergo training and be made aware of their responsibility to reduce and report excessive dust emissions.
Noise	Construction activities	Air / windborne pathway	• Noise generation from construction activities will be adjacent to active mining areas. The Applicant has not proposed specific mitigation measures, however, monitoring of noise at the major sources will continue.
Operation			
Dust	TSFs surface	Air / windborne pathway	• Occupational and ambient dust levels are controlled by the implementation of the following measures: ➢ Water tankers are used to apply water to sites within areas of operation which have the potential to generate dust, including unsealed roads, haul roads and construction areas; ➢ Areas of exposed soil (land disturbance) are minimised; and ➢ Disturbed areas are rehabilitated as they become available; • Routine maintenance and housekeeping practices are employed to ensure that waste materials in or around the premises do not accumulate and lead to the generation of unacceptable airborne dust; • Chemical suppressants will be used for general site dust suppression where practicable; • Major traffic thoroughfares will be sealed and kerbing or bunding will be installed to discourage off-road passage where practicable. Vehicle traffic will preferably be directed along routes that are regularly maintained and sprayed with dust suppressants;

Emission	Sources	Potential pathways	Proposed controls
			• Speed limits will be enforced to minimise dust emissions; • Site personnel will be required to undergo training and be made aware of their responsibility to reduce and report excessive dust emissions; • Tailings deposited to the TSF are wet. As the tailings dry they set in a hard crust preventing the lift off of dust from the facility; and • The final tailings percentage solids is a function of the ability to thicken the very dilute reject stream from the Bene plant and the pumping capability to deliver it to the furthest spigots of the TSF. The tailings average solids by mass has been at ~35.6% over the past 20 years for the facility.
Tailings that are geochemically enriched in As, Bi, Fe, Hg, S, Sb, Se, and Te and/or supernatant water	Pipeline leaks / spills	Direct discharge	• Pipeline has leak detection alarms provided by flow meters installed at the processing plant and on the TSF embankment; • Pipeline has pressure alarms provided by pressure transmitters at the discharge of the transfer pumps; • Pipeline is installed through brownfields areas of the site, typically the pipeline runs in a pipeline trace bordered by earthen windrows to contain any potential spillage, or adjacent to existing roads which are bounded by edge protection windrows that will perform the same function in containing spills; and • Where the pipeline is buried it is fully enclosed in a HDPE pipe sleeve, including where it crosses a local watercourse.
	Overtopping of the TSFs	Direct discharge	• The TSFs are designed and operated to maintain a minimum of a 300mm freeboard; • Supernatant water from the TSFs is removed via pump-out decant systems; and • The TSFs are designed to contain a 72-hour probable maximum precipitation (PMP) event, with emergency spillways constructed to manage a combined 1:1,000-year Annual Recurrence Interval (ARI) storm event when storage cell capacities are exceeded.
Supernatant water	Seepage through the base of the TSFs base and embankments	Infiltration	• Supernatant water from the TSFs will be removed via pump-out decant systems that are consistent with existing operations.

3.1.2 Receptors

In accordance with the *Guideline: Risk Assessment* (DWER 2020), the Delegated Officer has excluded the applicant's employees, visitors, and contractors from its assessment. Protection of these parties often involves different exposure risks and prevention strategies and is provided for under other state legislation.

Table 4 below provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises *(Guideline: Environmental Siting* (DWER 2020)).

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

Human receptors	**Distance from prescribed activity**
Newman	4.5 km northeast from the TSFs
Environmental receptors	**Distance from prescribed activity**
Threatened Ecological Communities Ethel Gorge Stygobiont Threatened Ecological Community	8 km east from the TSFs
Groundwater	The TSFs project area is located within the P1 Newman Water Reserve. Pilbara Groundwater Area regional aquifer, Hamersley – Fractured Rock Aquifer. The Precambrian rocks of the Hamersley Basin are principally volcanics, shales and iron formations. Groundwater is contained within fractures within these rocks. The groundwater level may be deep below the surface and is generally fresh.

3.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for each identified emission source and takes into account potential source-pathway and receptor linkages as identified in Section 3.1. Where linkages are in-complete they have not been considered further in the risk assessment.

Where the applicant 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 applicant's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the works approval as regulatory controls.

Additional regulatory controls may be imposed where the applicant's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 5.

Works approval W6714/2022/1 that accompanies this decision report authorises construction and time-limited operations. The conditions in the issued works approval, as outlined in Table 5 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

A licence is required following the time-limited operational phase authorised under the works approval to authorise emissions associated with the ongoing operation of the premises i.e., Category 5 activities. A risk assessment for the operational phase has been included in this decision report, however licence conditions will not be finalised until the department assesses the licence application.

Table 5: Risk assessment of potential emissions and discharges from the premises during construction, commissioning and operation

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
Construction								
Construction of the TSFs lifts	Dust	Air / windborne pathway causing impacts to health and amenity	Newman 4.5 km northeast from the TSFs	Refer to Section 3.1	C = Major L = Possible **High Risk**	Y	Condition 1, Table 1 Design and construction / installation requirements Requires construction dust management measures	N/A
	Noise			Refer to Section 3.1	C = Minor L = Possible **Medium Risk**	Y	N/A	N/A
Commissioning and Operations (including time-limited-operations operations)								
Use of the TSFs with lifts	Dust	Air/windborne pathway causing impacts to health and amenity	Newman 4.5 km northeast from the TSFs	Refer to Section 3.1	C = Major L = Rare **Medium Risk**	Y	Condition 1, Table 1 Design and construction / installation requirements Requires surface water management, stormwater diversions to minimize ingress into TSFs Condition 5, Table 2 Environmental commissioning requirements Requires wet tailings, deposition to manage supernatant water and decant recovery, maximizing consolidation of tailings Condition 10, Table 3 Infrastructure and equipment requirements	

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval	Justification for additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
							during time limited operations Requires wet tailings, deposition to manage supernatant water and decant recovery, maximizing consolidation of tailings	
	Release of tailings (geochemically enriched in As, Bi, Fe, Hg, S, Sb, Se, and Te)	Direct discharge via overtopping	Inundation of vegetation Contamination of groundwater	Refer to Section 3.1	C = Minor L = Unlikely **Medium Risk**	Y	Condition 1, Table 1 Design and construction / installation requirements Requires wall heights, surface water management, stormwater diversions to minimize ingress into TSFs, freeboard Condition 5, Table 2 Environmental commissioning requirements Requires testing and verification of decant return pumps, transfer pipeline, spigots, tailings discharge rate, deposition to manage supernatant water and decant recovery, maximizing consolidation of tailings, freeboard Condition 10, Table 3 Infrastructure and equipment requirements during time limited operations Requires testing and verification of decant return pumps, transfer pipeline, spigots, tailings discharge rate, deposition to manage supernatant water and	

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval	Justification for additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
							decant recovery, maximizing consolidation of tailings, freeboard	
	Supernatant water from the TSFs	Infiltration	Contamination of groundwater	Refer to Section 3.1	C = Minor L = Unlikely **Medium Risk**		Condition 1, Table 1 Design and construction / installation requirements Requires wall heights, surface water management, stormwater diversions to minimize ingress into TSFs. Condition 5, Table 2 Environmental commissioning requirements Requires testing and verification of decant return pumps, transfer pipeline, spigots, tailings discharge rate, deposition to manage supernatant water and decant recovery, maximizing consolidation of tailings Condition 10, Table 3 Infrastructure and equipment requirements during time limited operations Requires testing and verification of decant return pumps, transfer pipeline, spigots, tailings discharge rate, deposition to manage supernatant water and decant recovery, maximizing consolidation of tailings	

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

Note 2: Proposed applicant controls are depicted by standard text. **Bold and underline text** depicts additional regulatory controls imposed by department.

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4. Consultation

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

Table 6: Consultation

Consultation method	Comments received	Department response
Application advertised on the department's website on 05/09/2022	None received	N/A
Local Government Authority advised of proposal on 05/09/2022	None received	N/A
Department of Mines, Industry Regulation and Safety (DMIRS) advised of proposal 05/09/2022	DMIRS replied on 27/09/2022 stating / advising that a small area of the TSF falls into tenement G52/277 administered under the Mining Act only and as a result a Mining Proposal and a Mine Closure Plan (MCP) have been submitted with DMIRS for approval of the proposed lifts. Awaiting geotechnical advice from the geotechnical engineer. In relation to G45/277, the depth of that tenement is the usual default 15m BGL and that may create some limitation in terms of the depth of piezometers or monitoring bores if any are required to be installed deeper than that 15m depth BGL. DWER followed up on 14/11/2022 and DMIRS replied on 15/11/2022 stating that the DMIRS geotechnical engineer reviewed the proposed TSF 1 and 3 raises and from a geotechnical perspective did not raise any concerns (advice received on the 05/10/22): Summary: • Other aspects of the proposed embankment raise including construction materials, construction quality management, monitoring instrumentation, tailings deposition, freeboard, operation, and maintenance are adequately covered in the documentation. The information provided in the documentation shows the embankment raise design has been	Noted.

	prepared to comply with the DMIRS Code of Practice on Tailings Storage Facilities, and ANCOLD Guidelines on Tailings Dams. The Design also covers the requirements of the Global Industry Standards for Tailings Management (GISTM).	
Department of Department of Jobs, Tourism, Science and Innovation (JTSI) advised of proposal 05/09/2022	None received	N/A
Water Corporation advised of proposal 18 October 2022	Water Corporation has reviewed the supporting documentation and notes that although there is limited information provided by the proponent on the underlying hydrological conditions associated with the proposal, it is unlikely that it presents a significant risk to the Newman drinking water supply. There are no objections to the proposal subject to: • Adherence to DWER's Water Quality Protection Note 25 – Land use compatibility tables for public drinking water source areas (2021), noting the specific conditions associated with tailings storage facilities; and • Adherence to DWER's Water Quality Protection Guidelines No. 2 – Mining and Mineral Processing – Tailings facilities (2000), if relevant.	Noted.
Applicant was provided with draft documents on 20 January 2023	The applicant's comments are provided in Appendix 1.	The Department's responses are provided in Appendix 1.

5. Conclusion

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

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.
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5. BHP Iron Ore Pty Ltd, Appendix 8B (Part 1) TSF Lift Design Report 27/07/2022, Perth, Western Australia.
6. BHP Iron Ore Pty Ltd, Appendix 8B (Part 2) TSF Lift Design Report 27/07/2022, Perth, Western Australia.
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9. BHP Iron Ore Pty Ltd, RE: NOTIFICATION: APPLICATION FOR A WORKS APPROVAL (W6714/2022/1) - REQUEST FOR FURTHER INFORMATION 22 November 2022, Perth, Western Australia.
10. BHP Iron Ore Pty Ltd, RE: NOTIFICATION: APPLICATION FOR A WORKS APPROVAL (W6714/2022/1) - REQUEST FOR FURTHER INFORMATION 24 November 2022, Perth, Western Australia.
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Appendix 1: Summary of applicant's comments on risk assessment and draft conditions

Condition	Summary of applicant's comment	Department's response
-	Updated premises map, Figure 1 with the inclusion of the on-site weather station.	-
1, Table 1	BHP currently has a weather station installed at the location shown on the updated Figure 1 (attached). This station is currently not complaint with • AS/NZS 3580.1 (siting). • AS 3580.14 (operation). BHP is not proposing to upgrade the weather station to AS/NZS 3580.1 (siting) or AS 3580.14 (operation) as the current data provided from the station is considered sufficient to monitor both rainfall and evaporation at the site. Regional evaporation is well understood and there is also a weather station located at Newman Airport that can be used to compare to the onsite station. BHP considered that the current station therefore provides sufficient inputs into the TSF water balance model to enable the facility risks to be adequately managed. Based on this BHP would like to request that the reference to AS/NZS 3580.1 (siting) or AS 3580.14 (operation) for the weather station is removed from Table 1.	The Department has removed the installation of a weather station from Condition 1, Table 1. On-site weather station is listed under Condition 11, Table 3 to indicate the operational requirements (i.e., record monthly site rainfall and evaporation rate) and the infrastructure location as indicated in the updated premises map, Figure 1.
2 (a)	BHP requests that the reference T1 and T2 be updated to Condition 1. The current wording is a little unclear as there is no specific T1 or T2 reference anywhere else in the document.	The Department has amended this condition to reference Condition 1 and not T1 / T2.
8 (b)	The reference to Condition 7 does not appear to be correct. The correct reference appears to be Condition 5.	The Department has amended reference to Condition 7, which is now referenced as Condition 5.

Appendix 2: Application validation summary

SECTION 1: APPLICATION SUMMARY					
Application type					
Works approval	☒				
Licence	☐	Relevant works approval number:		None	☐
		Has the works approval been complied with?		Yes ☐ No ☐	
		Has time limited operations under the works approval demonstrated acceptable operations?		Yes ☐ No ☐ N/A ☐	
		Environmental Compliance Report / Critical Containment Infrastructure Report submitted?		Yes ☐ No ☐	
		Date Report received:			
Renewal	☐	Current licence number:			
Amendment to works approval	☐	Current works approval number:			
Amendment to licence	☐	Current licence number:			
		Relevant works approval number:		N/A	☐
Registration	☐	Current works approval number:		None	☐
Date application received		27 June 2022			
Applicant and Premises details					
Applicant name/s (full legal name/s)		BHP Iron Ore Pty Ltd			
Premises name		Mt Whaleback/Orebody 29/30/35			
Premises location		Tenements E52/2009-1, ML244SA, G52/19-G52/27, G52/276, G52/277, G52/279; and Special Leases K858923 and N088235 NEWMAN WA 6753			
Local Government Authority		Shire of East Pilbara			
Application documents					
HPCM file reference number:		DWERDT622880			
Key application documents (additional to application form):		Application Form Supporting Documents TSF Lift Design Report Part 1 TSF Lift Design Report Part 2			
Scope of application/assessment					
Summary of proposed activities or changes to existing operations.		Works approval Construction of TSFs lifts to TSF1 and TSF3.			

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

Table 1: Prescribed premises categories

Prescribed premises category and description	Assessed production or design capacity	Proposed changes to the production or design capacity (amendments only)
Category 5: Processing or beneficiation of metallic or non-metallic ore	80 Mtpa	N/A

Legislative context and other approvals

Has the applicant referred, or do they intend to refer, their proposal to the EPA under Part IV of the EP Act as a significant proposal?	Yes ☐ No ☒	Referral decision No: N/A Managed under Part V ☐ Assessed under Part IV ☐
Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?	Yes ☒ No ☐	Ministerial statement No: MS 963 EPA Report No: 1501 Conditions the discharge of excess mine dewatering to Ophthalmia Dam and the monitoring of terrestrial and groundwater ecosystems.
Has the proposal been referred and/or assessed under the EPBC Act?	Yes ☐ No ☒	Reference No: N/A
Has the applicant demonstrated occupancy (proof of occupier status)?	Yes ☒ No ☐	Certificate of title ☐ General lease ☐ Expiry: Mining lease / tenement ☐ Expiry: Other evidence ☐ Expiry:
Has the applicant obtained all relevant planning approvals?	Yes ☐ No ☐ N/A ☒	Approval: N/A Expiry date: N/A If N/A explain why?
Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes ☒ No ☐	CPS No: CPS [5617/5]
Has the applicant applied for, or have an existing CAWS Act clearing licence in relation to this proposal?	Yes ☐ No ☒	Application reference No: N/A Licence/permit No: N/A
Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes ☐ No ☒	Application reference No: N/A Licence/permit No: N/A Licence / permit not required.

Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes ☒ No ☐	Name: Newman Water Reserve Type: P1 Has Regulatory Services (Water) been consulted? Yes ☐ No ☐ N/A ☐ Referring to DWER Water Regional office: North West
Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes ☒ No ☐	Name: Newman Water Reserve Priority: P1 Are the proposed activities/ landuse compatible with the PDWSA (refer to WQPN 25)? Yes ☐ No ☐ N/A ☐ Referring to DWER Water
Is the Premises subject to any other Acts or subsidiary regulations (e.g. *Dangerous Goods Safety Act 2004, Environmental Protection (Controlled Waste) Regulations 2004, State Agreement Act xxxx*)	Yes ☒ No ☐	*Iron Ore (Mount Newman) Agreement Act 1964*
Is the Premises within an Environmental Protection Policy (EPP) Area?	Yes ☐ No ☒	N/A
Is the Premises subject to any EPP requirements?	Yes ☐ No ☒	N/A
Is the Premises a known or suspected contaminated site under the *Contaminated Sites Act 2003*?	Yes ☒ No ☐	There is one contaminated site within the TSFs Project Area: Site WB08: Whaleback ANFO storage facility (old) – DSI (In progress) The project will not impact on this site.