



Application for Works Approval

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

Works Approval Number W6653/2022/1

Applicant Robe River Mining Co. Pty Ltd

ACN 008 694 246

File number DER2022/000033

Premises Mesa J Hub – TSF8
Mining Lease AML248SA
FORTESCUE WA 6716
As defined by the premises map attached to the issued works approval

Date of report 11 August 2022

Decision Works approval granted

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

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

Table of Contents

1. Decision summary	1
2. Scope of assessment	1
2.1 Regulatory framework	1
2.2 Application summary and overview of premises	1
2.2.1 TSF8	2
2.2.2 Other infrastructure	6
2.3 Department of Mines, Industry Regulation and Safety (DMIRS) – geotechnical review summary	7
2.4 Part IV of the EP Act	8
3. Risk assessment	8
3.1 Source-pathways and receptors	8
3.1.1 Emissions and controls	8
3.1.2 Receptors	14
3.1.3 Hydrogeology	18
3.1.4 Tailings Characteristics	21
3.2 Risk ratings	22
3.3 Additional regulatory controls imposed	26
4. Consultation	27
5. Conclusion	27
References	27
Appendix 1: Summary of applicant’s comments on risk assessment and draft conditions	29
Appendix 2: Application validation summary	35
Table 1: TSF8 construction and raises schedule	4
Table 2: Indicative deposition staging plan	4
Table 3: Proposed applicant controls	9
Table 4: TSF8 proposed monitoring schedule	12
Table 5: Environmental receptors and distance from prescribed activity	14
Table 6: Groundwater monitoring data of monitoring bores within the vicinity of TSF8	18
Table 7: Estimated seepage rates	20
Table 8: Risk assessment of potential emissions and discharges from the premises during construction, commissioning and operation	23
Table 9: Consultation	27
Figure 1: Location of TSF8 at the Premises (as shown by green shaded area)	2

Figure 2: Indicative TSF8 configuration.....	3
Figure 3: Southern / western embankment downstream raises	5
Figure 4: Dividing embankment centreline raises	5
Figure 5: Groundwater and seepage interception system	11
Figure 6: TSF8 monitoring bore locations.....	13
Figure 7: Location of the Mesa J Hub Camp and Bungaroo Creek Water Reserve to the proposed TSF8	15
Figure 8: Location of the PECs	16
Figure 9: Location of surface water bodies to the proposed TSF8.....	17

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 W6653/2022/1 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

The Mesa J Hub (Premises) includes the Mesa J, Mesa K and Mesa H Iron Ore Mines and is located approximately 16 km south-west of Pannawonica.

Ore from the Mesa J Hub is processed in existing processing facilities (Processing Plant 1 (PP1) and Processing Plant 2 (PP2)). Waste fines generated at the Premises have been deposited to tailings storage facilities (TSFs) since 1998. There are three existing TSFs at the Premises (TSF3, TSF4 and TSF5). Currently tailings are deposited to TSF3. Deposition of tailings in TSF4 is expected to recommence in 2022 and it is estimated that the existing TSF storage capacity at the Premises will be exhausted by mid-2023.

On 19 January 2022, the applicant submitted an application (RTIO 2022a) for a works approval to the department under section 54 of the *Environmental Protection Act 1986* (EP Act).

The application is for the construction and commissioning of an in-pit TSF (TSF8) and associated infrastructure, which will be located within existing, exhausted pits 8, 11 and 12 at the Premises as shown in Figure 1.

The application relates to category 5 activities under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) and the assessed capacity of 20 million tonnes (Mt) per annum (Mtpa).

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 W6653/2022/1.

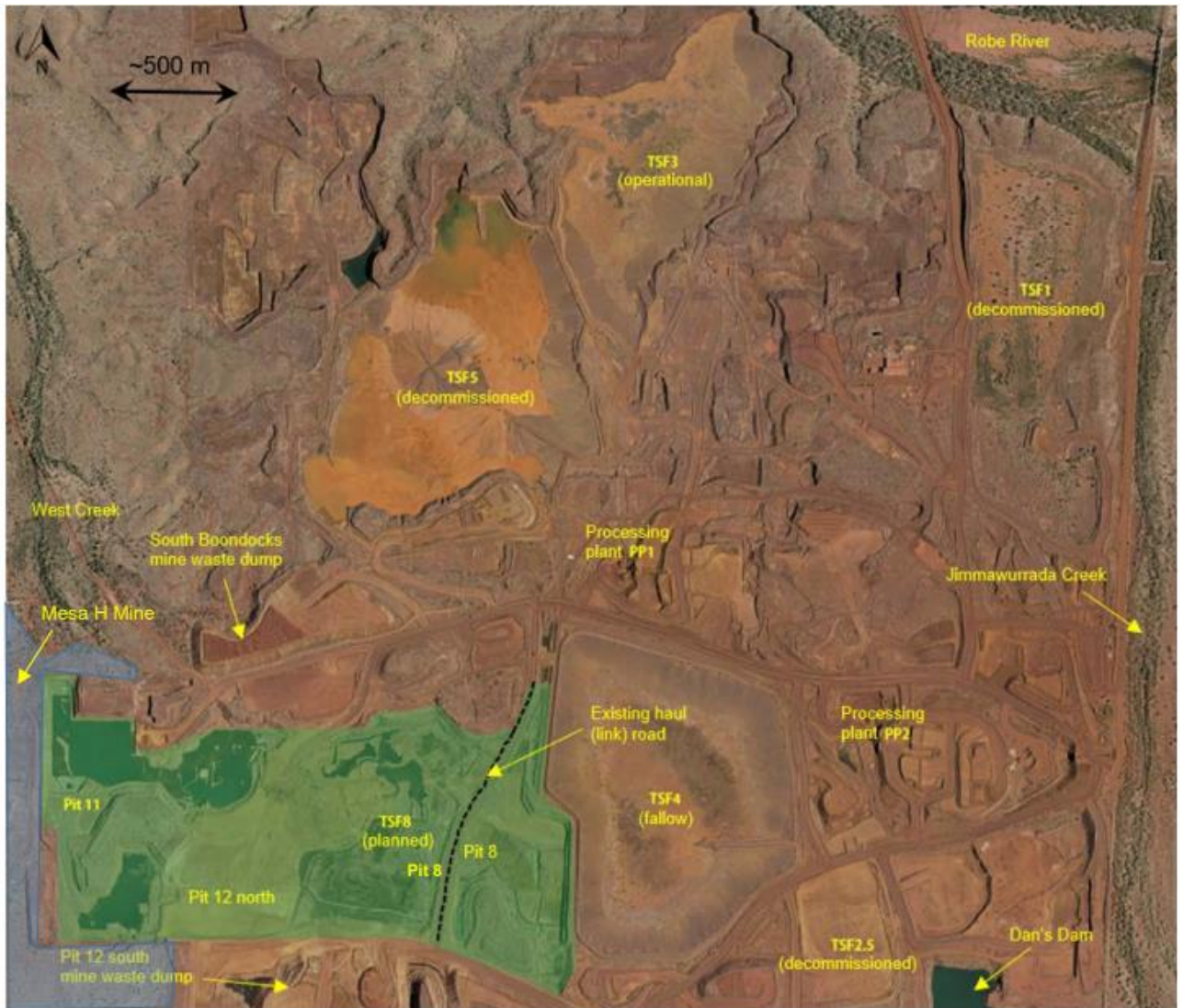


Figure 1: Location of TSF8 at the Premises (as shown by green shaded area)

2.2.1 TSF8

Tailings will be pumped to TSF8 from the surge tank, located immediately downstream of the PP2 tailings thickener. Tailings generated at PP1 will be pumped (unthickened) to PP2, where it will be comingled with PP2 tailings and thickened to solids concentrations between 35% and 50% by mass, before being pumped to TSF8.

TSF8 will be an in-pit facility, comprising of two cells: the East and West cells, with a common dividing embankment as shown in Figure 2.

TSF8 will have a final design elevation of 156.0 mRL providing storage capacity for approximately 31 million cubic metres (Mm³) of comingled and thickened tailings (at a target solids concentration by weight (C_w) of approximately 45%) from PP1 and PP2 over approximately 13.5 years.



Figure 2: Indicative TSF8 configuration

The perimeter of the East cell is bounded by the existing features to the east (Western and south-western embankments of TSF4) and north (remnant pit wall) and proposed embankments to the south (South-eastern embankment of TSF8) and north-east (North-eastern embankment of TSF8) (Rio Tinto, 2022b).

The South-eastern embankment of the East cell (except for the dividing embankment) will be constructed to the final design elevation of 156.0 mRL during the initial stage of construction (allowing for Stage 1 deposition). The dividing embankment will be constructed to a design elevation of 136.0 mRL during the initial stage of construction and will require on-going raises to allow for deposition into the Eastern cell.

The applicant has proposed an accelerated deposition opportunity, which will allow deposition into the Eastern cell following construction of the dividing embankment to a design elevation of 136.0 mRL, while construction of confining (south-eastern) embankment of the Eastern cell is ongoing.

As tailings are deposited to the Eastern cell, construction of the Western cell embankment and the dividing embankment will be completed and then tailings deposition will alternate to the Western cell. Refer to Tables 1 and 2.

The western and southern embankments of the Western cell will be progressively raised through a succession of downstream raises as shown in Figure 3. The dividing embankment will also be progressively raised through a succession of centreline raises as shown in Figure 4.

Over the life of the facility, tailings deposition will alternate between the Eastern cell and Western cell (Stage 3 – 9).

Table 1: TSF8 construction and raises schedule

Stage	Active Cell	Perimeter embankment (mRL)	Dividing embankment (mRL)
Stage 1: Early deposition	Eastern	140.0 (south-eastern embankment)	136.0
Stage 1: Initial construction commencing October 2022	Eastern	156.0 (final design elevation)	136.0
Stage 2: Initial construction	Western	141.0	140.3
Stage 3	Eastern	-	-
Stage 4: Raise 1	Western	146.0	144.7
Stage 5	Eastern	-	-
Stage 6: Raise 2	Western	151.0	149.6
Stage 7	Eastern	-	-
Stage 8: Raise 3	Western	156.0 (final design elevation)	152.0 (final design elevation)
Stage 9	Eastern	-	-

Table 2: Indicative deposition staging plan

Stage	Active Cell	Estimated Date Deposition Commences	Beach Elevation (mRL)	Storage Capacity (Mt)	Estimated Date Capacity Reached
Stage 1	Eastern	March 2023	138.2	4.1	October 2024
Stage 2	Western	November 2024	140.7	9.3	May 2028
Stage 3	Eastern	June 2028	143.2	4.0	August 2029
Stage 4	Western	September 2029	145.7	4.7	November 2030
Stage 5	Eastern	December 2030	148.2	4.7	January 2032
Stage 6:	Western	February 2032	150.7	5.1	April 2033
Stage 7	Eastern	May 2033	153.2	5.6	August 2034
Stage 8	Western	September 2034	155.7	5.6	January 2036
Stage 9 (final spillway)	Eastern	February 2036	155.7	2.7	September 2036

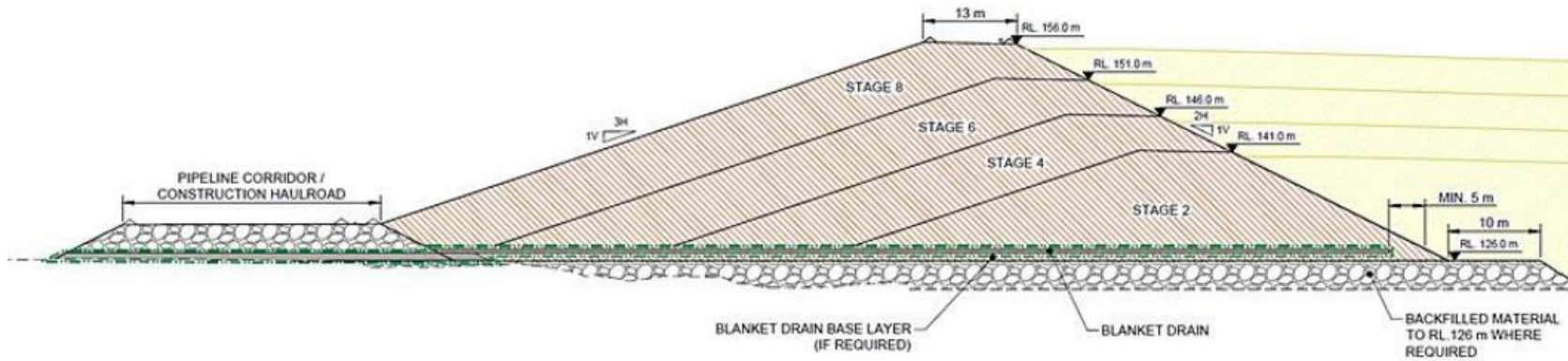


Figure 3: Southern / western embankment downstream raises

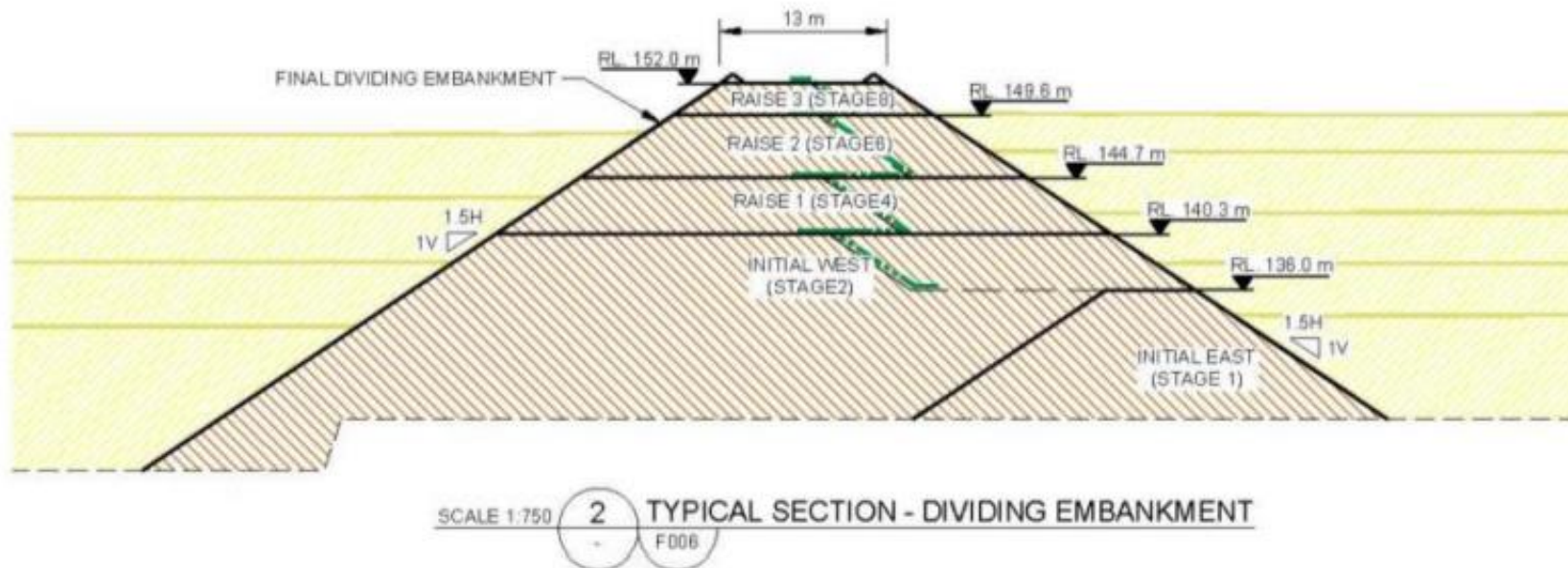


Figure 4: Dividing embankment centreline raises

It is important to note that while TSF8 is planned to be developed within the confines of Pits 8, 11 and 12, future mining at the Mesa H mine to the west and south will effectively render TSF8 an 'above-ground' facility, as the floor of the Mesa H mine will be roughly coincident with the foundation elevation of TSF8. The final elevation of the perimeter embankments will be roughly the same as the pre-mining ground elevations.

Works approval W6653/2022/1 will authorise the Stage 1 early deposition and Stages 1 and 2 initial construction and deposition to the Eastern and Western cells only as shown in Tables 1 and 2 (grey highlight - Stages 1 and 2 only), which is expected to accommodate the first five years of tailings production/deposition.

The applicant is proposing that subsequent raises to the confining embankments of the Western cell (and the dividing embankment) and Stage 3 – 9 deposition be included as a subsequent amendment to the existing licence L6820/1993/12 for the Premises, with compliance documentation provided following completion of each raise.

2.2.2 Other infrastructure

Spillway

An internal spillway will be maintained between the cells allowing for the management of rainfall events in both cells, with the total capacity of both cells accommodating inflows exceeding the 1:5000 Annual Exceedance Probability (AEP) 72-hour event.

The internal spillway between the two cells will be constructed to 135.5 mRL during initial construction, providing an initial capacity in excess of 2.6 Mm³. As tailings are deposited to the Eastern cell (stage 1 deposition), the Western cell will be constructed with a perimeter embankment elevation 5.5 m higher than the internal spillway elevation. The spillway elevation will be such that the Eastern cell can contain the 1:100 AEP event plus 0.5 m of freeboard. If a more extreme rainfall event were to occur and freeboard in the Eastern Cell were to be exhausted, water would flow via the spillway into the Western cell. Once tailings deposition is switched to the Western cell (stage 2 deposition), the internal spillways will be raised to an elevation that provides for the next cycle of deposition in the Eastern cell. This pattern will be replicated each time deposition is switched between the cells.

Tailings delivery and return water pipelines

Tailings will be delivered from PP2 to TSF8 via one of four tailings delivery pipeline routes.

1. Northern pipeline (north of TSF4) will allow deposition into both cells.
2. Eastern pipeline will allow for deposition into the Eastern cell.
3. Southern pipeline (south of TSF4) will allow for deposition along the southern embankment of both cells and the western embankment of the Western cell.
4. A smaller diameter pipeline will allow for deposition into the Eastern cell when only one process plant is operational.

Groundwater and seepage interception system

The groundwater and seepage interception system will be installed as part of the initial construction works and will operate for the life of the facility. It will consist of:

- Blanket drain;
- Collection trenches and sumps;
- Dewatering trenches and sumps; and
- Dewatering pipelines.

Upwardly-flowing groundwater into the pits, and comingled seepage water discharging through the floor into the groundwater will be directed to the blanket drain and flow under the perimeter

access road, discharging via interception drains that will be formed under the blanket drains. These will discharge to a deeper collection trench running parallel to the embankment toes, gravitating to one of the dewatering sumps located in the pit floor. The collected water in the dewatering sumps will be directed to Dan's Dam via the dewatering pipelines to supply water to PP1 and PP2.

2.3 Department of Mines, Industry Regulation and Safety (DMIRS) – geotechnical review summary

The application was referred to DMIRS to advise on the geotechnical aspects of the proposed TSF8. DMIRS Geotechnical Inspector of Mines reviewed *RTIO 2022a* and *Golder 2021*.

The review focused only on the stability of tailings containment structures (embankments, northern pit wall and waste dump) of TSF8.

The following comments were provided regarding the design of tailings containment structures of TSF8:

- *“Initially, TSF8 will be a two-cell in-pit TSF formed within the mined out Mesa J pits 8, 11 and 12. However, future mining at Mesa H to the west and south of TSF8 will render it an above-ground TSF with perimeter embankments on western and southern sides. These two embankments have been designed in accordance with the methods applicable to above-ground TSF embankments. They will initially be constructed to RL 141.0 m, and then raised by downstream methods of construction to a final elevation of RL 156.0 m in three 5 m increments.*
- *The eastern perimeter of TSF8 will be the western embankment of the existing TSF4 which is currently active. This embankment will be buttressed to improve stability during initial tailings deposition within TSF8.*
- *The south-eastern perimeter will be the existing waste dump. Stability of the waste dump will be improved by constructing an embankment along the waste dump face.*
- *The documentation presents the details of stability analyses of all perimeter embankments. The analyses have been carried out in accordance with the ANCOLD (Australian National Committee on Large Dams) guidelines on tailings management. The results of the stability analyses meet the ANCOLD recommended requirements.*
- *The northern perimeter will be the existing pit wall and a waste dump. These will be provided with drainage control measures. The stability of the pit wall and the waste dump has also been analysed using appropriate methods and the results meet the industry accepted limits.*
- *The two cells (east cell and west cell) of TSF8 will have a north-south aligned dividing embankment which will initially be constructed to RL 136.0 m. The dividing embankment will be raised incrementally to RL 152 m. Figure 22 of the design report shows that the dividing embankment will be substantially widened (almost three times initial base width) to the west as part of the first raise to RL 140.3 m. This is to prevent the subsequent embankment raise construction on wet tailings or in water.*
- *The stability of the dividing embankment, except the Stage 1 (initial) dividing embankment to RL 136.0 m, has also been analysed and the results meet the ANCOLD recommended requirements. There will be no water against the Stage 1 dividing embankment. Water comes in contact only at the end of Stage 2. Hence, the stability of the dividing embankment will not be a concern during Stage 1 and until the end Stage 2 operation.*

The information provided in the reviewed documentation shows that TSF8 has been designed in accordance with the DMIRS Code of Practice on tailings management and

the relevant ANCOLD guidelines.”

2.4 Part IV of the EP Act

The Mesa H Proposal (Revision to the Mesa J Iron Ore Development) was assessed by the Environmental Protection Authority (EPA) and approved under Ministerial Statement (MS) 1141 in July 2020.

MS 1141 states the implementation of the Revised Proposal shall ensure no irreversible impact to the health of the Robe River pools, Robe River and Jimmawurrada Creek ecosystems, including associated riparian vegetation, as a result of groundwater abstraction and/or discharge or surplus water.

The Mesa J Hub Environmental Management Plan (Mesa J Hub EMP) was prepared in accordance with MS 1141 for each of the following environmental factors:

- Inland Water / Vegetation
 - Riparian Vegetation
 - Pool Ecosystems (including pool water level, water quality and aquatic fauna (macroinvertebrates and hyporheic fauna)) for the Robe River Pools.
- Terrestrial Fauna
 - Matters of National Environmental Significance (MNES) species: Northern Quoll, Ghost Bat, Pilbara Leaf-nosed Bat, Pilbara Olive Python
- Subterranean Fauna
 - Troglifauna
 - Stygofauna

Rehabilitation and decommissioning are also regulated under condition 9 (9-1 to 9-4) of MS 1141.

This works approval application was referred to the EPA, to ensure consistency with the development as approved by MS 1141. The EPA responded stating that the proposed works approval activities do not appear inconsistent with MS 1141.

Requirements of MS 1141 are not re-assessed in this decision report and are not duplicated as conditions in the works approval.

3. Risk assessment

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

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

3.1 Source-pathways and receptors

3.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises construction and operation which have been considered in this 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 activities associated with TSF8 including raises and vehicle movement	Air / windborne pathway	<ul style="list-style-type: none"> • Dust suppression will be implemented (including use of water trucks, control of vehicle movements / restricted speeds).
Noise		Air / windborne pathway	<ul style="list-style-type: none"> • In accordance with the <i>Environmental Protection (Noise) Regulations 1997</i>.
Commissioning / Time limited operations and Operation			
Spillage of tailings and decant return water	Pipeline ruptures	Direct discharges to land and infiltration to soil	<ul style="list-style-type: none"> • Tailings delivery pipelines will be: <ul style="list-style-type: none"> ○ carbon steel, with the carbon steel sections supported on precast concrete plinths at a nominal spacing of 12 m. ○ beyond the extents of the carbon steel sections, the pipes will be high-density polyethylene (HDPE), which will be equipped with tees, valves and spigots at maximum 48 m centres to allow for deposition into TSF8. ○ contained within defined bunded pipeline corridors to contain pipeline leaks and provided with dump ponds at strategic locations for containment of undetected pipe leaks. ○ telemetry system installed to monitor pressure deviations and provide early warning of leaks. • Return water pipeline will be: <ul style="list-style-type: none"> ○ HDPE. ○ contained in the same pipe corridor as the southern tailings delivery pipeline. ○ equipped with pressure sensing and telemetry to activate alarms if a leak were to occur. • Daily visual inspections of the integrity of tailings delivery and return water pipelines. • The dewatering pipelines will be: <ul style="list-style-type: none"> ○ constructed of HDPE. ○ contained in the same pipe corridor as the southern delivery and return

Emission	Sources	Potential pathways	Proposed controls
			<p>water pipelines.</p> <ul style="list-style-type: none"> ○ fitted with pressure sensors and telemetry.
Tailings seepage	Deposition of tailings into TSF8	Seepage to soil/ground adjacent to TSF8 and infiltration to groundwater	<ul style="list-style-type: none"> • Tailings deposited via spigots located along the perimeter of the TSF, resulting in a beach that slopes towards the centre of the facility, where a decant pond will accumulate. • Tailings will be deposited in thin layers, nominally 300 mm thick via rotating deposition between spigots. • Decant pond managed to be located near to the centre of TSF8. • Decant pond maintained at a nominal depth of 0.5 m with a target maximum depth of 1 m. • Daily visual inspections of the operating spigots, location and water level of the decant pond and groundwater and seepage interception system operation. <p>Groundwater and seepage interception system (as shown in Figure 5) consisting of:</p> <ul style="list-style-type: none"> • Blanket drain; • Collection trenches and sumps; • Dewatering trenches and sumps; and • Dewatering pipelines. <p>The groundwater and seepage interception system will also include extraction bores if required during the later stages of operations, however, these will not be installed as part of initial construction.</p> <ul style="list-style-type: none"> • Monitoring undertaken in accordance with Table 4. • Four groundwater monitoring bores (MBTSF8a, MBTSF8b, MBTSF8c; and MBTSF8d) as shown in Figure 6 have been installed to the north along West Creek. • Two additional groundwater monitoring bores (MBTSF8e and MBTSF8f) will be installed after construction of the Western cell embankments, prior to stage 2 deposition. • Four vibrating wire piezometers (VWPs) have been installed at TSF8 to assess the operational performance of the facility and to indicate phreatic surface

Emission	Sources	Potential pathways	Proposed controls
			conditions within or beneath the embankments. Over the life of TSF8 an additional 15 VWP's will be installed in the western and southern embankments.
Discharge of tailings material	Overtopping	Direct discharges to land and infiltration to soil	<ul style="list-style-type: none"> • Freeboard of 0.5 m above the 1:100 AEP 72-hour event maintained. • Decant pumping system to facilitate removal of water. • Decanted water will be returned directly to PP2 for reuse in processing via the return water pipeline. • Internal spillway 30 m wide at its base, 0.5 m deep and 1:10 side slopes will be maintained between the two cells (refer also to section 2.2.2) allowing for the management of rainfall events in both cells, with the total capacity of both cells accommodating inflows exceeding the 1:5000 AEP 72-hour event. • Daily visual inspections of the integrity of the perimeter embankments and freeboard.

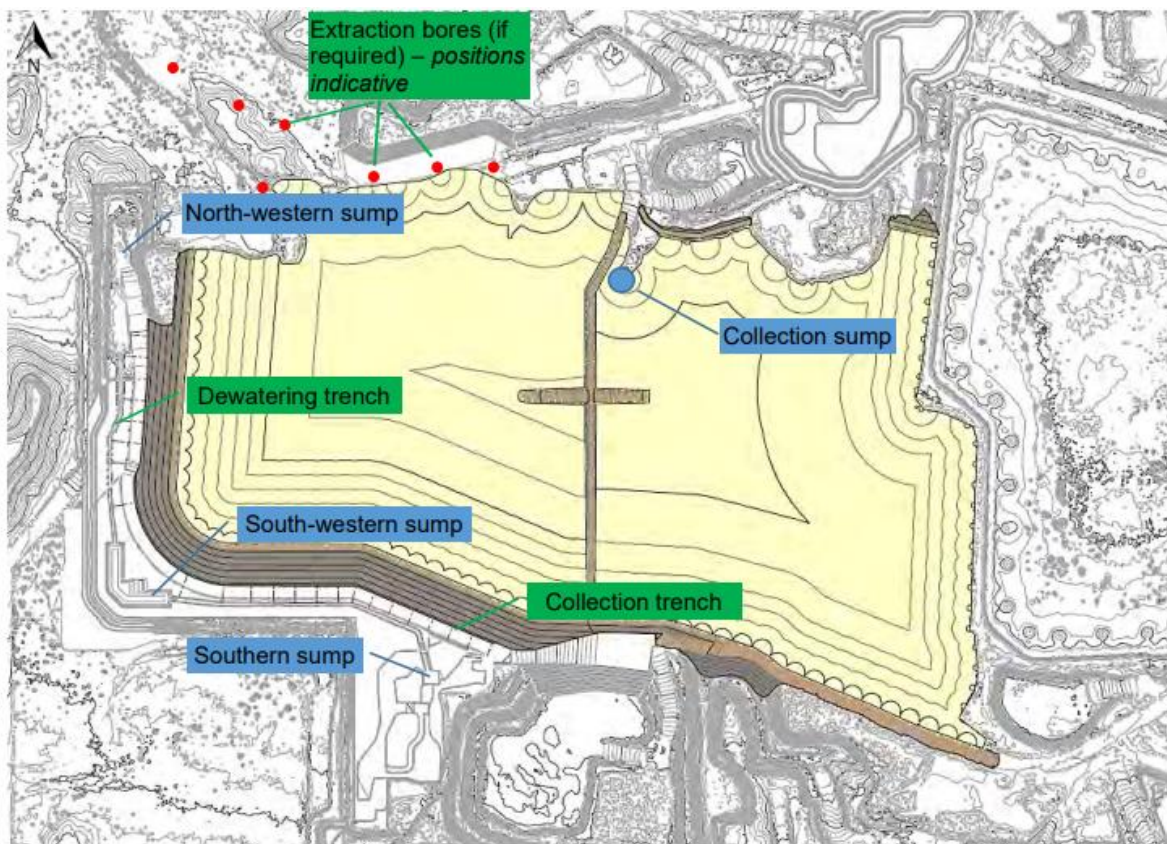


Figure 5: Groundwater and seepage interception system

Table 4: TSF8 proposed monitoring schedule

Monitoring Location	Monitoring parameter	Unit	Frequency
<p>Existing: MBTSF8a MBTSF8b MBTSF8c MBTSF8d</p> <p>Proposed: MBTSF8e MBTSF8f</p>	Standing water level	mbgl	Monthly
	pH ¹	pH units	
	Electrical conductivity ¹	µS/cm	
	Acrylamide	mg/L	
	Total Dissolved Solids ¹		
	Alkalinity (CaCO ₃)		
	Nitrate (NO ₃)		
	Calcium Chloride Fluoride Potassium Magnesium Sodium Sulphate	mg/L	Quarterly
	Aluminium Arsenic Barium Boron Cadmium Cobalt Chromium Copper Iron Mercury Manganese Molybdenum Nickel Lead Antimony Selenium Thallium Zinc		

Note 1: In-field non-NATA analysis.

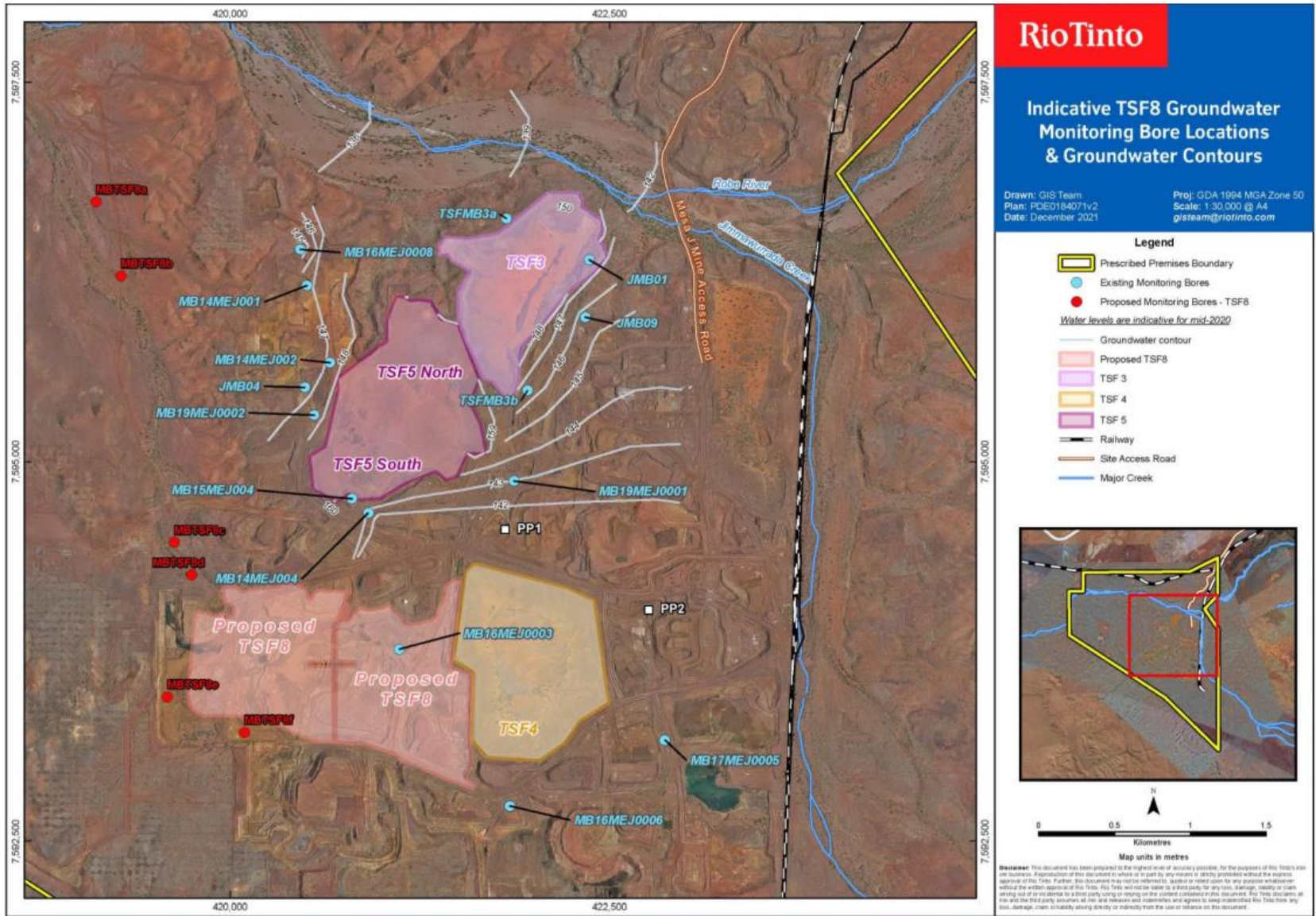


Figure 6: TSF8 monitoring bore locations

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.

The Mesa J Hub Multi-user Camp is located approximately 5 km north-west of the proposed TSF8 (as shown in Figure 7). As the camp is operated by the applicant, it is not considered a sensitive receptor for this assessment.

Table 5 and Figures 7, 8 and 9 provides a summary of potential 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 5: Environmental receptors and distance from prescribed activity

Environmental receptors	Distance from prescribed activity
<i>Rights in Water and Irrigation Act 1914</i>	The premises is located within the Proclaimed Pilbara Groundwater and Surface Water Areas.
Public Drinking Water Source Area (PDWSA) as shown in Figure 7	The Priority 1 Bungaroo Creek Water Reserve PDWSA is located within the Premises and its boundary is on the edge of the proposed TSF8. <i>Golder 2021</i> states the although the TSF8 footprint slightly overlaps the PDWSA, hydraulic gradients will slope towards the TSF8 during operation. This will limit the potential for hydraulic connection, and thus seepage flow from the TSF towards the PDWSA.
Priority Ecological Communities (PECs) as shown in Figure 8	The following PECs overlap the proposed location of TSF8: <ul style="list-style-type: none"> Priority 1 – Subterranean invertebrate community of pisolitic hills in the Pilbara (Robe Valley Pisolitic Hills); and Priority 1 – Subterranean invertebrate communities of mesas in the Robe Valley region (Robe Valley Mesas).
Priority Flora	Priority Flora are located within the Premises but not at the proposed TSF8 location.
Threatened Fauna	Threatened Fauna are located within the Premises but not at the proposed TSF8 location.
Surface water bodies as shown in Figures 7 and 9	The Robe River passes approximately 3.5 km north of the proposed TSF8. The Robe River is ephemeral and supports permanent springs and pools. Robe River/Robe River pools used for drinking, cooking, swimming purposes by traditional owners and other visitors.
Groundwater	Pit 8 has been dewatered to facilitate below water table mining. This has resulted in local groundwater levels being drawn down to approximately 120 mRL, creating a groundwater sink in the south-western part of Mesa J and in particular Pits 8, 11 and 12 (the pits in which TSF8 will be located).

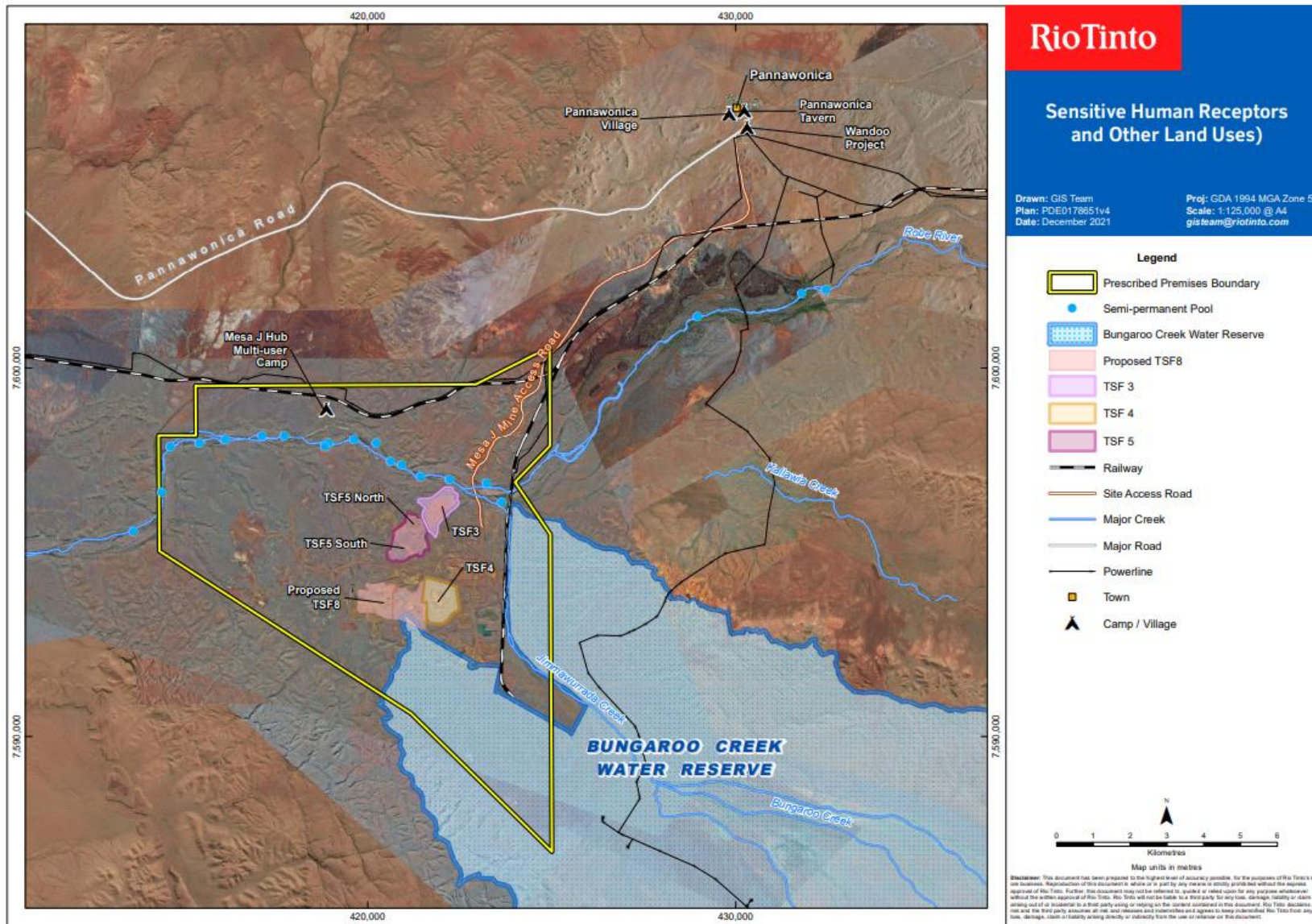


Figure 7: Location of the Mesa J Hub Camp and Bungaroo Creek Water Reserve to the proposed TSF8

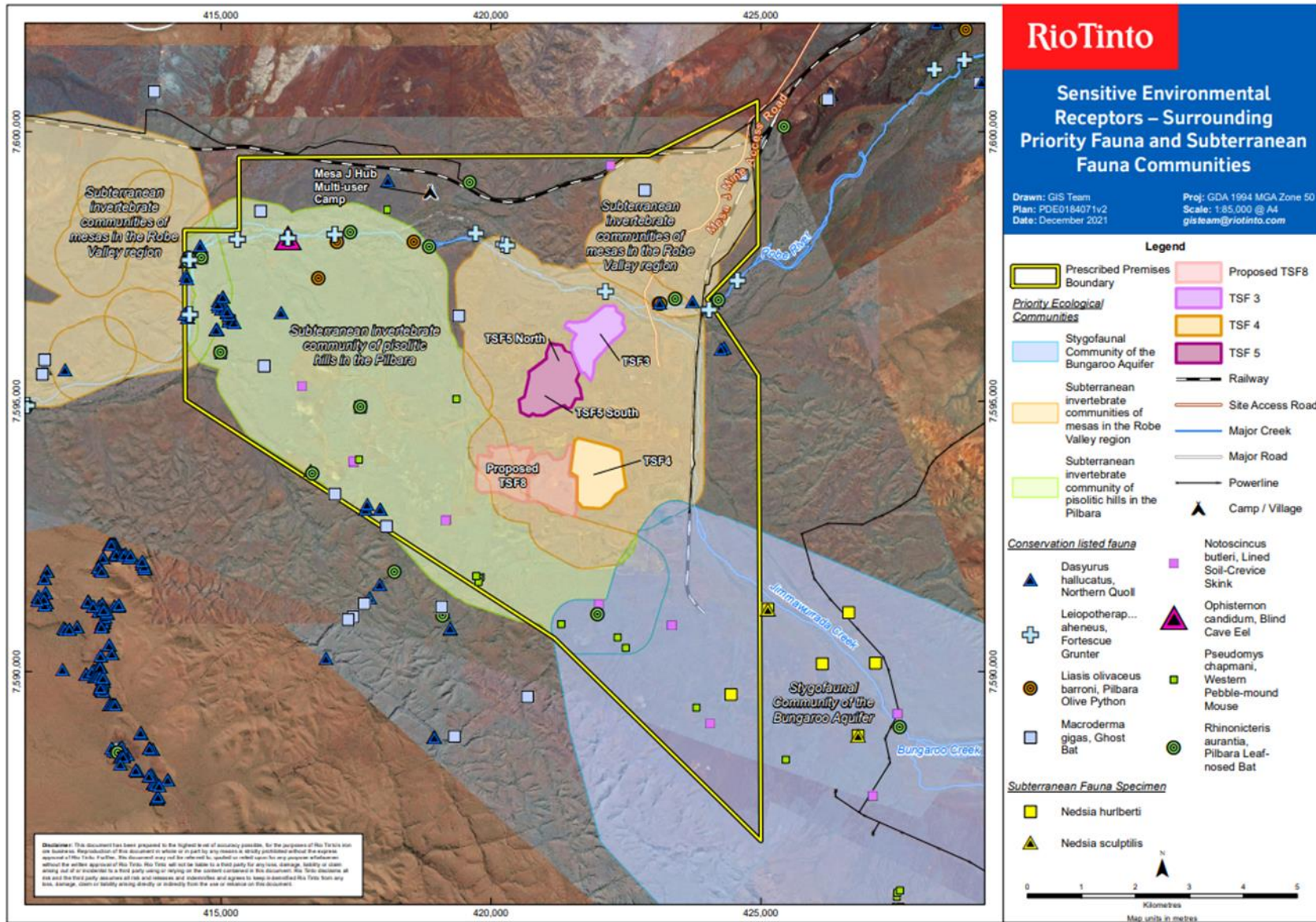


Figure 8: Location of the PECs

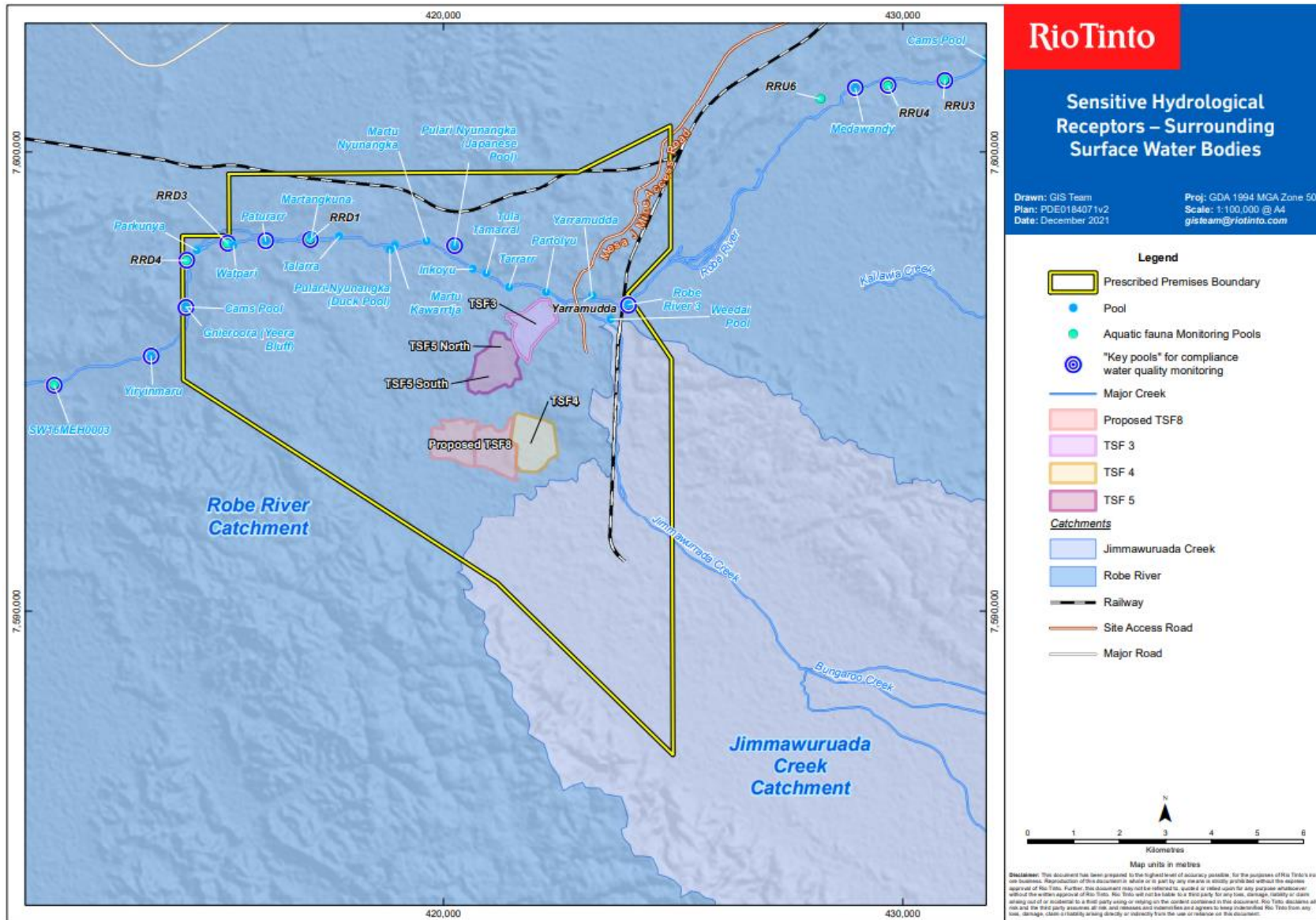


Figure 9: Location of surface water bodies to the proposed TSF8

3.1.3 Hydrogeology

RTIO 2022a states that elevated concentrations of some contaminants of concern have been observed in existing groundwater at the Premises. Trigger Criteria and Threshold Criteria for concentrations of those contaminants of concern have been set through the Mesa J Hub EMP, which is regulated under Part IV of the EP Act for MS 1141 (refer to section 2.4).

Elevated concentrations of nitrate, barium, copper and zinc have been observed in some groundwater samples. However, most concentrations are generally below the Trigger Criteria (except concentrations of nitrate and copper). The groundwater also has elevated levels of chloride, with concentrations that are undesirable from a product quality perspective (elevated chloride in the saleable ore product may be detrimental to downstream smelting processing (product limit of 100-150 mg/L)).

Table 6 shows the groundwater quality data for MB14MEJ004, MB16MEJ0003, MB16MEJ0006 and MB17MEJ0005 (refer to Figure 6) which are part of the existing licence L6820/1993/12 groundwater monitoring network (for TSF4 and TSF5), but which provides some baseline monitoring data for TSF8.

Table 6: Groundwater monitoring data of monitoring bores within the vicinity of TSF8

Monitoring Bore	Nitrate (mg/L)	Zinc (mg/L)	Barium (mg/L)	Chloride (mg/L)	Copper (mg/L)
Mesa J Hub EMP limit	15	0.0312	0.0803		0.0014
ANZG 2018 95% species protection level		0.0080			0.0014
MB14MEJ004					
27/06/2021		0.019		188	0.002
25/07/2021		0.007		180	<0.001
08/08/2021		0.008		182	<0.001
19/09/2021		<0.005		188	0.001
29/10/2021		0.02		192	<0.001
14/11/2021	65.9	0.029	0.007	186	0.002
MB16MEJ0003					
18/07/2018	<0.04	<0.005	0.007	91	<0.001
09/12/2018	<0.01	0.008	0.007	116	<0.001
20/11/2019	0.22	0.03		110	<0.001
27/09/2020	53.5	<0.005	0.012	205	<0.001
14/11/2021	56.7	<0.005	0.006	224	<0.001
MB16MEJ0006					
18/07/2018	<0.01	<0.005	0.044	184	<0.001

Monitoring Bore	Nitrate (mg/L)	Zinc (mg/L)	Barium (mg/L)	Chloride (mg/L)	Copper (mg/L)
Mesa J Hub EMP limit	15	0.0312	0.0803		0.0014
ANZG 2018 95% species protection level		0.0080			0.0014
09/12/2018	<0.01	<0.005	0.042	226	<0.001
20/11/2019	0.62	0.016		209	0.002
27/09/2020	2.79	<0.005	0.01	181	0.003
14/11/2021	18.8	<0.005	0.007	172	<0.001
MB17MEJ0005					
22/11/2017	16.9	<0.005	0.008	146	<0.001
17/07/2018	28.6	<0.005	0.021	136	<0.001
09/12/2018	41.8	0.007	0.014	158	<0.001
20/11/2019	28.5	0.016		155	<0.001
14/11/2021	48.7	<0.005	0.021	174	<0.001

Note 1: Red numbering denotes exceedance of proposed EMP threshold limit.

The historical dewatering of Pit 8 to facilitate below water table mining has resulted in local groundwater levels being drawn down to approximately 120 mRL, creating a groundwater sink where TSF8 will be located. Dewatering has been achieved via sump pumping, with volumes extracted from Pit 8 typically ranging between 2.4 to 4.8 giganlitres per annum (GL/a). The projected long term dewatering volume associated with Pit 8 is 2 GL/a.

A groundwater management / seepage interception system, comprising trenches and sumps is to be installed on the southern and western flanks of TSF8. Ongoing dewatering (projected dewatering rates between 2.5 and 3 GL/a) via the groundwater and seepage interception system during operation of TSF8 should maintain groundwater levels at approximately 123 mRL and the groundwater gradient towards TSF8, ensuring the area will continue to act as a groundwater sink (with groundwater flowing inwards).

It is anticipated that some seepage will occur through the floor of TSF8. Seepage from TSF8 will be limited by confining hydraulic pressure from the rising groundwater.

A summary of the estimated seepage from TSF8 is provided in Table 7. These are based on the permeability of 1×10^{-7} metres per second (m/s) for the Distal tailings. The seepage rate is compared to the average annual tailings slurry input water. The estimated water in the tailings slurry is based on a slurry solids concentration of 45%, particle density of 3.47 tonnes per cubic metres (t/m^3) and tailings average dry density of $1.5 t/m^3$.

Table 7: Estimated seepage rates

Analyses Section	Step	Seepage (m ³ /day)	Percentage of Slurry Water
West-east	Stage 1	825	~15%
	Stage 2	338	~6%
	Stage 6	560	~6%
	Stage 8	703	~8%
	Stage 9	840	~9%
	Average	~650	~8.5%
North-south	Stage 1	733	~13%
	Stage 2	284	~5%
	Stage 6	751	~8%
	Stage 8	929	~10%
	Stage 9	587	~6%
	Average	~650	~8.5%

Seepage modelling indicates that up to about 10% (average seepage rate of 8.5%) of slurry water sent to TSF8 may seep out, with values ranging between 284 cubic metres per day (m³/day) and 929 m³/day. However, this water should be captured by the seepage interception system and transferred to Dan's Dam for use in processing.

Seepage water emanating from TSF8 will comingle with rising groundwater, which will dilute the seepage water, before (or when) reporting to the groundwater and seepage interception system.

Numerical modelling using SEEP/W was undertaken to assess the groundwater response arising from TSF8 during operations, as well as post closure of the facility.

The application was referred internally, and the following advice provided:

- Despite the suitability of the SEEP/W model for simulating seepage from TSFs, seepage rates determined by the modelling are best available estimates under a specific range of conditions within a TSF, which can then be used to develop strategies to manage the potential impacts of the facility on nearby groundwater quality.
- Field measurements are generally required to provide more accurate estimates of the rate and distribution of seepage from a TSF, and of how seepage varies over time. These methods include:
 - Estimating seepage rates through a detailed assessment of the water balance of the facility at regular time intervals on an ongoing basis;
 - Measurements of the rate of water capture by the TSF underdrainage system;
 - Using water quality data and geochemical mixing models to determine the extent to which groundwater near a TSF has been contaminated by seepage from the facility (refer, for example, to Navarro-Ciurana *et al.*, 2019); and

- Using ground-based geophysical measurements to determine where seepage is taking place from a TSF, and the extent of groundwater contamination that has been caused by the seepage.

3.1.4 Tailings Characteristics

Tailings physical characterisation

The applicant commissioned SRK Consulting (SRK) in 2018 to undertake laboratory testing of Mesa H tailings (the tailings to be stored in TSF8). Golder Associates Pty Ltd (Golder) also undertook index testing on a sample of Mesa H tailings in 2020.

The following is a summary of the interpreted laboratory results on the Mesa H tailings (Golder 2021):

- Mesa H tailings are classified as low plasticity SILT (ML) with clay content of approximately 28%.
- The specific gravity of solids of the Mesa H tailings to be deposited in TSF8 is 3.47.
- The initial settled density of the tailings is ~ 1.04 t/m³ (59% solids by mass), which is expected to be achieved within about 12 days of deposition (assuming no effects of evaporation).
- The maximum dry density of the Mesa H tailings through air drying in the laboratory is 1.95 t/m³, although this density is unlikely to be achievable under field conditions during operation, so a conservative value of 1.5 t/m³ has been adopted for the design.
- The permeability of the deposited tailings will be low, and a value of 1 x 10⁻⁹ m/s is considered reasonable.

Tailings geochemical characterisation

Golder has carried out an assessment of the geochemical characteristics of Mesa H tailings in 2019 and 2021. To consider element mobility, Golder carried out a multi-element assay, leach extracts at variable solid to liquid ratios at variable filter sizes, as well as saline leach extracts and hydrogen peroxide extracts.

The following is a summary of geochemical characterisation of the tailings that will be deposited into TSF8 (Golder 2021):

- The tailings do not show potential for acidic and metalliferous drainage (AMD), but the tailings liquid fraction contains elevated concentrations of chloride and nitrate. During leaching of the tailings, there may be mobilisation of zinc, barium and strontium, in addition to chloride and nitrate present in the liquid fraction.
- Nitrate, chloride and zinc are potential contaminant of concern (PCOC) in tailings liquor, as well as in existing groundwater at the Premises, suggest that elevated concentrations of these PCOC in groundwater is related to the impact of existing TSFs, or of the mining process. Strontium, which may be leached from solid tailings, is considered a PCOC.
- Salinity is a PCOC in existing TSFs (but not Mesa H tailings liquor), and so it is likely that the existing TSFs are a contributing factor to elevated levels of salinity.
- Copper, which is PCOC in groundwater at the Premises, is not a PCOC in the tailings liquor or in the leachate, nor in the existing TSFs and is therefore unlikely to be derived from tailings.

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 8.

Works approval W6653/2022/1 that accompanies this decision report authorises construction, commissioning and time-limited operations. The conditions in the issued works approval, as outlined in Table 8 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

An amendment to existing licence L6820/1993/12 is required following the time-limited operational phase authorised under the works approval to authorise emissions associated with the operation of TSF8 at the premises. 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 8: Risk assessment of potential emissions and discharges from the premises during construction, commissioning and operation

Risk events					Risk rating ¹	Applicant controls sufficient?	Conditions ² of works approval	Justification for additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood			
Construction								
Construction activities associated with TSF8 and vehicle movement	Dust	Air / windborne pathway causing impacts to vegetation health due to dust deposition leading to reduced ability for photosynthesis and smothering Impacts on faunal habitats which represent shelter, foraging and dispersal	PECs Fauna	Refer to Section 3.1	C = Slight L = Possible Low Risk	Y	N/A	N/A
	Noise	Windborne noise which may disrupt nocturnal foraging behaviour	Fauna	Refer to Section 3.1	C = Slight L = Unlikely Low Risk	Y	N/A	N/A
Commissioning and time-limited operations of TSF8								
Deposition of tailings into TSF8	Tailings seepage containing metals, metalloids and residual flocculant	Seepage from the TSF potentially contaminating the soil and impacting on the water quality of the groundwater	Priority 1 PDWSA Bungaroo Creek Water Reserve Groundwater	Refer to Section 3.1	C = Moderate L = Possible Medium Risk	N	Condition 1 Condition 2 Condition 4 Condition 5 Condition 6 Condition 20 Condition 21	Refer to section 3.3
Tailings delivery and return water pipelines	Spillage of tailings and decant return water through leaks, pipeline ruptures or	Direct discharges to land and infiltration to soil resulting in contamination	Priority 1 PDWSA Bungaroo Creek Water Reserve PECs	Refer to Section 3.1	C = Minor L = Unlikely Medium Risk	Y	Condition 1 Condition 22	N/A

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				
	failure							
Overtopping	Tailings material	Direct discharges to land and infiltration to soil resulting in contamination	Priority 1 PDWSA Bungaroo Creek Water Reserve PECs	Refer to Section 3.1	C = Moderate L = Rare Medium Risk	Y	Condition 1 Condition 2 Condition 20 Condition 21	N/A
Operation of TSF8								
Deposition of tailings into TSF8	Tailings seepage containing metals, metalloids and residual flocculant	Seepage from the TSF potentially contaminating the soil and impacting on the water quality of the groundwater, (including contribution to existing identified issues)	Priority 1 PDWSA Bungaroo Creek Water Reserve Groundwater	Refer to Section 3.1	C = Moderate L = Possible Medium Risk	N	Licence will be updated to include ambient groundwater monitoring and water balance requirements for TSF8 Licence will be updated to include an annual TSF audit report since the TSFs within the Premises are not regulated by the DMIRS under the <i>Mining Act 1978</i> .	DWER does not consider monitoring alone, as a control. Any changes/impacts to water quality will need to be actively addressed. The application was referred internally with the following recommendations: <ul style="list-style-type: none"> Applicant required to measure evaporation rates on an ongoing basis within the mine void that will house TSF8. The recommended approach for this is to undertake evaporation measurements on the decant pond of the facility using the floating weather station and the modelling methodologies described by <i>McJannet e al. (2017) and (2019)</i>; and Water balance assessments for TSF8 are undertaken at least quarterly on an ongoing basis during the life of the facility to track how seepage rates change over time.

Risk events					Risk rating ¹	Applicant controls sufficient?	Conditions ² of works approval	Justification for additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood			
Tailings delivery and return water pipelines	Spillage of tailings and decant return water through leaks, pipeline ruptures or failure	Direct discharges to land and infiltration to soil resulting in contamination	Priority 1 PDWSA Bungaroo Creek Water Reserve PECs	Refer to Section 3.1	C = Minor L = Unlikely Medium Risk	Y	Licence will be updated to include pipeline containment and inspection requirements	N/A
Overtopping	Tailings material	Direct discharges to land and infiltration to soil resulting in contamination	Priority 1 PDWSA Bungaroo Creek Water Reserve PECs	Refer to Section 3.1	C = Moderate L = Rare Medium Risk	Y	Existing freeboard condition on licence, which will be updated to include TSF8	N/A

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.

3.3 Additional regulatory controls imposed

Conditions 4, 5 and 6

The applicant has stated that two further monitoring bores are planned to be installed after construction of the Western cell embankments, prior to stage 2 deposition (RTIO 2022a).

Ground: Design requirements for the construction and installation of the two new monitoring bores have been included to ensure bores are installed correctly and able to detect contamination (if applicable).

Monitoring of ambient groundwater levels and quality is required to determine if the Standing Water Level is changing indicating seepage from TSF8 or water quality is deteriorating. Monitoring prior to stage 2 deposition is required to ensure that baseline groundwater quality can be collected and used as a comparison against results obtained during commissioning and operation.

Condition 21

The applicant has proposed that groundwater monitoring will be undertaken in accordance with Table 4. The department has included dissolved oxygen, nitrite, ammonia and strontium to the list of parameters to be measured. The existing VWP for TSF8 have also been included.

For dissolved oxygen, nitrite, ammonia and VWP this is consistent with the monitoring requirements of existing works approval W6495/2021/1 for the modification and upgrades to TSF3 and TSF5 at the Premises.

Strontium has been identified as a PCOC in the tailings (refer to section 3.1.4). For this reason strontium has been included in the groundwater monitoring schedule under this works approval.

Conditions 5, 7, 9, 16 and 23

The following reports are required to be submitted:

- Bore construction report evidencing compliance with condition 4, ensuring the correct depth is targeted and depicting the new bore locations.
- Environmental Compliance Report demonstrating that the infrastructure has been installed as committed to in condition 1.
- Critical Containment Infrastructure Report (CCIR) demonstrating that the infrastructure has been installed as committed to in condition 2.

RTIO 2022a states that “whilst TSF8 is planned to be within existing, exhausted pits, confining embankments are required to contain tailings above the surrounding ground elevation following the planned mining of the surrounding Mesa H mining area. Confining embankments have therefore been designed as though TSF8 were an ‘aboveground’ facility.”

For this reason, the department requires the applicant to submit a CCIR for the TSF8 embankments, which needs to be approved by the department prior to the commencement of commissioning.

- Environmental Commissioning Report providing a summary of the commissioning activities with timeframes, waste fines deposited and summary of environmental / works approval holder’s performance.
- Time limited operations report to be submitted 90 days after the commencement of time limited operations. This report should provide the timeframes, waste fines density (solid vs water content), the TSF8 water balance summary, summary of monitoring results obtained and environmental performance and will be used to assist with the assessment of the licence amendment to include an operational TSF8.

Grounds: Reporting requirements are necessary for the administration of the works approval, validating ongoing acceptability of the operations and for validation against design criteria prior to operation.

4. Consultation

Table 9 provides a summary of the consultation undertaken by the department.

Table 9: Consultation

Consultation method	Comments received	Department response
Application advertised on the department's website on 15/03/2022	No comments received	N/A
Local Government Authority (Shire of Ashburton) advised of proposal on 16/03/2022	No comments received	N/A
DMIRS advised of proposal on 16/03/2022	DMIRS responded on 2/06/2022 Refer to section 2.3	Noted by the department
Department of Jobs, Tourism, Science and Innovation (JTSI) advised of proposal on 16/03/2022	JTSI responded on 14/04/2022 advising they had " <i>no comments to make</i> "	N/A
Applicant was provided with draft documents on 17/06/2022	The applicant provided comment on 6/07/2022 and 21/07/2022 Refer to Appendix 1	Refer to 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. ANZG 2018. Australian and New Zealand Governments and Australian state and territory governments. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Canberra. <http://waterquality.gov.au/anz-guidelines>.
2. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
3. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
4. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.
5. Golder Associates Pty Ltd (Golder) 2021, *Proposed Tailings Storage Facility No. 8 at Mesa J Mine Site, Supporting Document for Part V Works Approval Application*

(19127125-018-R-Rev2), prepared for Rio Tinto Limited, dated December 2021.

6. McJannet, D., Hawdon, A., van Niel, T., Boadle, D., Baker, B., Trefry, M. and Rea, I., 2017. Measurements of evaporation from a mine void lake and testing of modelling approaches. *Journal of Hydrology*, **555**, 631-647.
7. McJannet, D., Hawdon, A., Baker, B., Ahwang, K., Gallant, J., Henderson, S. and Hocking, A., 2019. Evaporation from coal mine pit lakes: measurements and modelling. Conference paper that is available from web site https://papers.acg.uwa.edu.au/p/1915_109_McJannet/.
8. Navarro-Ciurana, D., Soler, A., Saleta-Daví, A., Otero, N., Sotomayor, C.Q., San Miguel Cornejo, D., Jara, M.M., Godoy, G.N., Jaramillo C.C., Aguirre-Dueñas, E. and Escudero Vargas, M.A., 2019. Quantifying the potential seepage from the Quillayes porphyry Cu tailing dam using stable isotopes (Chile). Conference paper which is available from web site https://www.researchgate.net/publication/334749030_Quantifying_the_potential_seepage_from_the_Quillayes_porphyry_Cu_tailing_dam_using_stable_isotopes_Chile.
9. RTIO 2022a, *Works Approval Application Supporting Documentation, Mesa J Iron Ore Mine (L6820/1993) Tailings Storage Facility 8 (RTIO-HSE-0353522)*, dated January 2022.
10. RTIO 2022b, *Mesa J and K Iron Ore Mine (L6820/1993) – Review of Draft Works Approval W6653/2022/1 and Decision Report*, dated 6 July 2022.
11. RTIO 2022c, *RTIO Response W6653 Review 2*, received 21 July 2022.

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

Condition	Summary of applicant's comment (RTIO 2022b and RTIO 2022c)	Department's response
Condition 1 – Table 1 Tailings delivery pipelines	The applicant requests that the requirement for the installation of polyurethane-lined carbon steel, equipped with Victaulic coupling is removed.	The department has updated this point to state: <ul style="list-style-type: none"> Constructed of carbon steel with the carbon steel sections supported on precast concrete plinths at nominal spacing of 12 m.
	The applicant has stated that <i>“the installation of telemetry on the tailings delivery pipeline may not align with the timing of the East Cell Stage 1 – early deposition scope of works. To allow flexibility and ensure the accelerated deposition opportunity is realised an increase in inspection frequency in lieu of telemetry being installed is suggested. The dump pond capacity is 6 hours, two inspections per shift would address this risk.”</i>	The requirement for the pipelines to be fitted with a telemetry system has been kept. The department has updated this condition so that requirement for the pipelines to be fitted with a telemetry system is captured during Stage 1: Initial construction.
Condition 1 – Table 1 Return water pipeline	The applicant has stated that <i>“the installation of telemetry on the return water pipeline may not align with the timing of the East Cell Stage 1 – early deposition scope of works. To allow flexibility and ensure the accelerated deposition opportunity is realised an increase in inspection frequency in lieu of telemetry being installed is suggested.”</i>	The requirement for the pipelines to be fitted with a telemetry system has been kept. The department has updated this condition so that requirement for the pipelines to be fitted with a telemetry system is captured during Stage 1: Initial construction.
Condition 1 – Table 1 Decant pumping system	The applicant requests that reference to the turret is removed. The turret is specified for mechanical design purposes and does not represent emission control infrastructure.	The department has changed to this to (deletion in strikethrough): <ul style="list-style-type: none"> Decant pump intake equipped with a floating ‘turret’.
Condition 1 – Table 1 Internal spillway	The applicant has requested the following word change (inclusion in red, deletion in strikethrough): Utilising water holding capacity of cells to provide Providing an initial capacity in excess of 2.6 Mm ³ in both cells	The department has made the requested change.
Condition 1 – Table 1 Groundwater and	The applicant requests the inclusion of ‘where required’ against the blanket drain, collection trenches, collection sumps, dewatering trench, dewatering sumps, collection and delivery	The department has not made this requested change. Any changes to the groundwater and seepage interception system which

Condition	Summary of applicant's comment (RTIO 2022b and RTIO 2022c)	Department's response
seepage interception system	<p>pipelines subheadings.</p> <p>Stating that the design of this system is still progressing and the specific locations may be subject to change.</p>	differs to that which was assessed needs to be addressed in the Environmental Compliance Report and/or Critical Containment Infrastructure Report as departures.
Condition 1 – Table 1 Blanket drain	<p>The applicant requests the following revision (inclusion in red, deletion in strikethrough):</p> <ul style="list-style-type: none"> • Installed where required at the base of the western and southern embankments. • Direct inflowing groundwater via gravity to perimeter collection dewatering trenches. 	The department has made the requested change.
Condition 1 – Table 1 Collection trench	<p>The applicant requests the following deletions stating these are applicable to the dewatering trench not the collection trench:</p> <ul style="list-style-type: none"> • Constructed around the southern and western perimeter of TSF8. • Designed with a flow capacity of approximately 3.2 L/s (equivalent to a groundwater inflow of 2 GL/a). • Profiled (at a gradient of 0.4%) to drain to one of the dewatering sumps. 	The department has deleted these points under the collection trench requirements and relocated them under the dewatering trench requirements.
Condition 1 – Table 1 Collection and delivery pipelines	The applicant has requested this be renamed to “Dewatering pipelines”.	The department has made the requested change.
Condition 2 – Table 2 TSF8	<p>The applicant has requested that the following changes be made (inclusion in red, deletion in strikethrough):</p> <ul style="list-style-type: none"> • Storage capacity of 31 Mm³ 46 Mt of comingled and thickened tailings. <p>It is stated that the storage capacity of 31 Mm³ of tailings is equivalent to 46 Mt at a dry density of 1.5 t/m³. The applicant is requesting the maximum allowable amount of stored tailings in TSF8 be changed from a tonnage to a volume, as the volume is more accurately predicted and controlled.</p>	The department has made the requested change.

Condition	Summary of applicant's comment (RTIO 2022b and RTIO 2022c)	Department's response																		
Condition 3 – Table 3	The applicant requests an amendment to Table 3 stating that there is no perimeter embankment associated with the East cell and that the table should reference the South-eastern embankment.	<p>The department has updated the Table with the inclusion in red.</p> <table border="1" data-bbox="1214 403 2033 874"> <thead> <tr> <th data-bbox="1214 403 1373 520">Stage</th> <th data-bbox="1373 403 1491 520">Active cell</th> <th data-bbox="1491 403 1668 520">Perimeter embankment (mRL)</th> <th data-bbox="1668 403 1845 520">Dividing Embankment (mRL)</th> <th data-bbox="1845 403 2033 520">Infrastructure location</th> </tr> </thead> <tbody> <tr> <td data-bbox="1214 520 1373 655">Stage 1: Early deposition</td> <td data-bbox="1373 520 1491 655">Eastern</td> <td data-bbox="1491 520 1668 655">140.0 (South-eastern embankment)</td> <td data-bbox="1668 520 1845 655">136.0</td> <td data-bbox="1845 520 2033 874" rowspan="3">As shown in Schedule 1, Figures 3 and 4.</td> </tr> <tr> <td data-bbox="1214 655 1373 762">Stage 1: Initial construction</td> <td data-bbox="1373 655 1491 762">Eastern</td> <td data-bbox="1491 655 1668 762">156.0 (final design elevation)</td> <td data-bbox="1668 655 1845 762">136.0</td> </tr> <tr> <td data-bbox="1214 762 1373 874">Stage 2: Initial construction</td> <td data-bbox="1373 762 1491 874">Western</td> <td data-bbox="1491 762 1668 874">141.0 (downstream raise)</td> <td data-bbox="1668 762 1845 874">140.3 (centreline raise)</td> </tr> </tbody> </table>	Stage	Active cell	Perimeter embankment (mRL)	Dividing Embankment (mRL)	Infrastructure location	Stage 1: Early deposition	Eastern	140.0 (South-eastern embankment)	136.0	As shown in Schedule 1, Figures 3 and 4.	Stage 1: Initial construction	Eastern	156.0 (final design elevation)	136.0	Stage 2: Initial construction	Western	141.0 (downstream raise)	140.3 (centreline raise)
Stage	Active cell	Perimeter embankment (mRL)	Dividing Embankment (mRL)	Infrastructure location																
Stage 1: Early deposition	Eastern	140.0 (South-eastern embankment)	136.0	As shown in Schedule 1, Figures 3 and 4.																
Stage 1: Initial construction	Eastern	156.0 (final design elevation)	136.0																	
Stage 2: Initial construction	Western	141.0 (downstream raise)	140.3 (centreline raise)																	
Condition 4	<p>The applicant has requested that reference to <i>ASTM D5092/D5092M-16: Standard practice for design and installation of groundwater monitoring bores</i> be removed. Stating that (RTIO 2022b) <i>all monitoring bores are constructed as per the Australian Drilling Industry Association 'Minimum Construction requirements For Water Bores in Australia, Fourth Edition'</i>.</p> <p>The applicant requests the inclusion of a footnote for 'As depicted in Schedule 1, Figure 10 'Groundwater monitoring bore locations'.</p> <p>Requested footnote: "exact locations may be subject to change. Installation of monitoring bores is subject to additional engagement with Traditional Owners. Final locations are sensitive to the engagement process and may change".</p>	<p>The department has retained ASTM D5092/5092M-16 as the preferred standard, which is consistent with other approvals for the applicant.</p> <p>The department has included footnote 2 which states "Location of the two new monitoring bores is subject to change".</p>																		
Condition 15 -Table 6	The applicant has stated "if any delays are encountered for the East Cell Stage 1 – early deposition scope of works and the required spigot/s have yet to be installed the design allows for a contingency, enabling the tie in to the existing TSF4 slurry pipes	The department has updated the Table with the inclusion in red and included the footnote "unthickened tailings may be deposited into TSF8 during maintenance activities".																		

Condition	Summary of applicant's comment (RTIO 2022b and RTIO 2022c)	Department's response		
	<i>which will then deposit directly in the eastern cell of TSF8</i> .	Emission	Discharge point	Discharge point location
		Thickened ¹ tailings from PP2 surge tank to TSF8	TSF8 via spigots located along the perimeter	As shown in Schedule 1, Figure 10.
			Contingency tie-in from existing TSF4 pipeline to eastern cell of TSF8	As shown in Schedule 1, Figure 8 'TSF4 tailings slurry pipeline'.
Condition 20 – Table 7 TSF8	<p>The applicant has stated <i>“that tailings slurry will be pumped at a target solids concentration of 45%. The expected solids concentrations are between 35% and 50% by mass.”</i></p> <p>The applicant has requested that the operational requirement of 45% solids concentration be replaced by this range.</p>	<p>The department has updated to (inclusion in red, deletion in strikethrough):</p> <ul style="list-style-type: none"> Target solids concentrations by weight between 35% and 50% of approximately 45%. 		
	<p>The applicant requests the deletion of ‘tailings deposition alternate between the East and West cell’.</p> <p>It is stated that <i>“the East cell will be commissioned in February 2023 while the Western cell is still under construction. Deposition will transfer from the East cell to the West cell during the Time Limited Operation period. Deposition may occur into the East cell for short periods at any time.”</i></p>	<p>The department has made the requested deletion.</p>		
	<p>The applicant has identified a scenario where the deposition of unthickened tailings into TSF8 may occur. During maintenance activities, where the thickener is not operational, unthickened tailings may be deposited into TSF8 for short periods. A footnote is requested to reflect these non-standard operating scenarios.</p> <p>*Note: unthickened tailings may be deposited into TSF8 during maintenance activities.</p>	<p>The department has included under operational requirements for TSF8 “deposition of comingled and thickened tailings” and inserted the requested footnote.</p>		
Condition 20 – Table 7 Internal spillway	<p>The applicant has stated that the water storage capacity of 1:5000 AEP flood is an internal standard. The applicant therefore requests that the operational requirement be replaced with the DMIRS freeboard specification of a 1:100 AEP 72-hour event.</p>	<p>The department has made the following changes (inclusion in red, deletion in strikethrough):</p> <ul style="list-style-type: none"> Freeboard of 0.5 m above the 1:100 AEP 72-hour event maintained. 		

Condition	Summary of applicant's comment (RTIO 2022b and RTIO 2022c)	Department's response
		<ul style="list-style-type: none"> Total capacity of both cells accommodating inflows exceeding the 1:5000 AEP 72 hour event.
Schedule 2: Monitoring	The applicant has requested a footnote be included stating "Monitoring frequency to be adhered to unless access to monitoring bore/s is restricted for that period due weather constraints".	The department hasn't made the requested change. If monitoring can't be undertaken for whatever reason this should be stipulated in the associated monitoring report with explanation.
Decision Report Section 2.2.1 (page 2)	The applicant requests the storage capacity of 46 Mt be changed to 31 Mm ³ . The storage capacity of 31 Mm ³ of tailings is the equivalent to 46 Mt at a dry density of 1.5 t/m ³ .	The department has made the requested change.
Decision Report Section 2.2.1 (page 3)	<p>The applicant states that "<i>the perimeter embankments of the East cell are bound by existing features (the eastern flank is bounded by the existing western embankment of TSF4, the southern flank is bound by an existing mine waste dump, the northern flank is bound by a remnant mine pit wall and an existing mine waste dump).</i>"</p> <p>The applicant has requested the statement be updated to read –</p> <p>'The perimeter of the East cell is bounded by existing features to the east (Western and south-western embankments of TSF4) and north (remnant pit wall) and proposed embankments to the south (South-eastern embankment of TSF8) and north-east (North-eastern embankment of TSF8).'</p>	The department has made the requested change.
	<p>The applicant states "<i>the perimeter embankments of the Eastern cell (except for the dividing embankment) will be constructed to the final design elevation of 156.0 mRL during the initial stage of construction (allowing Stage 1 deposition).</i></p> <p><i>There is no perimeter embankment associated with the East cell.</i>"</p> <p>The applicant has requested the statement be updated to read –</p> <p>'The South-eastern embankment of the Eastern cell (except for the dividing embankment) will be constructed to the final design elevation of 156.0 mRL during the initial stage of construction (allowing for Stage 1 deposition).'</p>	The department has made the requested change.

Condition	Summary of applicant's comment (RTIO 2022b and RTIO 2022c)	Department's response
<p>Decision Report</p> <p>Section 2.2.2 (page 6) under tailings delivery and return water pipelines</p>	<p>The applicant has stated the following:</p> <ul style="list-style-type: none"> • There is no Northern embankment associated with East cell. The north flank of the East cell is bound by the mine pit wall and waste dump. • There is no Eastern embankment associated with the East cell. This is the eastern flank of the East cell, which is bound by the western flank of TSF4. • The eastern pipeline has been relocated to an existing access track below the crest of the TSF4 embankments. • The smaller diameter pipeline has been relocated to the existing access track below the crest of TSF4 embankments. • There is no Eastern embankment associated with the East cell. This is the eastern flank of the East cell, which is bound by the western flank of TSF4. 	<p>The department has updated this section to read (inclusion in red, deletion in strikethrough) –</p> <ol style="list-style-type: none"> 1. Northern pipeline (north of TSF4) will allow deposition into along the northern embankment of both cells. 2. Eastern pipeline (will already be in place for deposition of tailings to TSF4) will allow for deposition along the eastern embankment of into the Eastern cell. 3. Southern pipeline (south of TSF4) will allow for deposition along the southern embankment of both cells and the western embankment of the Western cell. 4. A smaller diameter pipeline around the northern and western crests of TSF4, which will allow for deposition along into the eastern embankment of the Eastern cell when only one process plant is operational.
<p>Decision Report</p> <p>Table 3 – Commissioning /Time limited operations and Operation for tailings seepage</p>	<p>The applicant has stated that there is no perimeter embankment associated with the East cell. The applicant requests the following changes (deletion in strikethrough):</p> <ul style="list-style-type: none"> • Tailings deposited via spigots located along the perimeter embankments of the TSF, resulting in a beach that slopes towards the centre of the facility, where a decant pond will accumulate. 	<p>The department has made the requested change.</p>

Appendix 2: Application validation summary

SECTION 1: APPLICATION SUMMARY		
Application type		
Works approval	<input checked="" type="checkbox"/>	
Date application received	19/01/2022 (DWERDT551776)	
Applicant and Premises details		
Applicant name/s (full legal name/s)	Robe River Mining Co. Pty. Ltd (ACN 008 694 246)	
Premises name	Mesa J Hub – TSF8	
Premises location	Mining Lease AML248SA FORTESCUE WA 6716	
Local Government Authority	Shire of Ashburton	
Application documents		
HPCM file reference number:	DER2022/000033	
Key application documents (additional to application form):	<ul style="list-style-type: none"> • Att 1A Mining Lease • Att 1C Authorisation • Att 2 Premises maps • Att 7 Siting and location maps • Att 8A Works Approval Application Supporting Document • Att 8B Groundwater Data • Appendix 1 Supporting Document for Part V Works Approval Application (Golder 2021a) 	
Scope of application/assessment		
Summary of proposed activities or changes to existing operations.	<p>Works approval for the construction and commissioning of an in-pit tailings storage facility (TSF) 8, which will be located within existing, exhausted pits 8, 11 and 12 at the premises.</p> <p>TSF8 will comprise two cell (Eastern and Western) with a common dividing embankment.</p>	
Category number/s (activities that cause the premises to become prescribed premises)		
Table 1: Prescribed premises categories		
Prescribed premises category and description	Proposed 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	20,000,000 tonnes per year	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 <input type="checkbox"/> No <input checked="" type="checkbox"/>	Referral decision No: Managed under Part V <input type="checkbox"/> Assessed under Part IV <input type="checkbox"/>
Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Ministerial statement No: 1141 EPA Report No: 1668
Has the proposal been referred and/or assessed under the EPBC Act?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Reference No: Decision Notice 2017/8017 for the Mesa H proposal
Has the applicant demonstrated occupancy (proof of occupier status)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Certificate of title <input type="checkbox"/> General lease <input type="checkbox"/> Expiry: Mining lease / tenement <input checked="" type="checkbox"/> Expiry: Other evidence <input type="checkbox"/> Expiry:
Has the applicant obtained all relevant planning approvals?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>	Approval: Expiry date: If N/A explain why? <i>Iron Ore (Robe River) Agreement Act 1964 and Land Administration Act 1997</i>
Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	No clearing is proposed – previously disturbed area
Has the applicant applied for, or have an existing CAWS Act clearing licence in relation to this proposal?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	No clearing is proposed – previously disturbed area
Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Licence/permit No: GWL107678 allows for extraction of 30,000,000 kL/a for exploration, construction and operations (dewatering, dust suppression and processing) purposes.
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Name: Pilbara Type: Proclaimed Groundwater Area and Surface Water Area Has Regulatory Services (Water) been consulted? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Regional office: North West

<p>Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p> <p>Though proposed TSF8 boundary borders the P1 PDWSA</p>	<p>Name: Bungaroo Creek Water Reserve</p> <p>Priority: P1</p> <p>Are the proposed activities/ landuse compatible with the PDWSA (refer to WQPN 25)?</p> <p>Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/></p>
<p>Is the Premises subject to any other Acts or subsidiary regulations (e.g. <i>Dangerous Goods Safety Act 2004, Environmental Protection (Controlled Waste) Regulations 2004, State Agreement Act xxxx</i>)</p>	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>	<p><i>Iron Ore (Robe River) Agreement Act 1964</i></p> <p><i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i></p>
<p>Is the Premises within an Environmental Protection Policy (EPP) Area?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	<p>N/A.</p>
<p>Is the Premises subject to any EPP requirements?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	<p>N/A.</p>
<p>Is the Premises a known or suspected contaminated site under the <i>Contaminated Sites Act 2003</i>?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	<p>Classification: N/A</p> <p>Date of classification: N/A</p>