Government of Western Australia
Department of Water and Environmental Regulation

Decision Report

Application for Works Approval

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

Works Approval Number	W3102/2025/1
Applicant	CITIC Pacific Mining Management Pty Ltd
ACN	119 578 371
File number	APP-0031626
Premises	Sino Iron Project Mine Site Mining tenements M08/123, M08/124, M08/125, M08/264, M08/265, M08/266, G08/53, G08/54 and L08/126 MARDIE WA 6714 As defined by the premises map attached to the issued works approval
Date of report	15/05/2026 **(FINAL)**
Decision	Works approval granted

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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 W3102/2025/1 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

On 30 September 2025, CITIC Pacific Mining Management Pty Ltd (applicant/ CITIC) submitted an application (CPM 2025) for a works approval to the department under section 54 of the *Environmental Protection Act 1986* (EP Act).

On 16 January 2026, the department requested further information (RFI) from the applicant to finalise the assessment of the application. The applicant provided this information on 13 February 2026 (CPM 2026).

The application is for the construction and operation of Tailings Storage Facility (TSF) 3 (Stages 1A, 1B and 1C only) at the Sino Iron Project Mine Site (premises). The premises is located approximately 80 km south-west of Karratha in the Pilbara region of Western Australia.

To enable ongoing mining and processing operation at the premises, additional tailings storage capacity is required. The proposed TSF 3 will be located to the north of the current TSF 2 facility (as shown in Figure 1) and will increase available capacity for tailings disposal at the premises as TSF 2 is approaching capacity.

The premises relates to category 5 and the assessed design capacity under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) which is defined in works approval W3102/2025/1. 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 W3102/2025/1.

TSF 2 is currently licensed to receive 67.4 million tonnes per annum (Mtpa) of tailings (under existing Licence L8308/2008/3). The proposed TSF 3 will receive tailings from the existing wet process plant (from mid-2027 onwards) and as such the tailings deposition rate will not change.

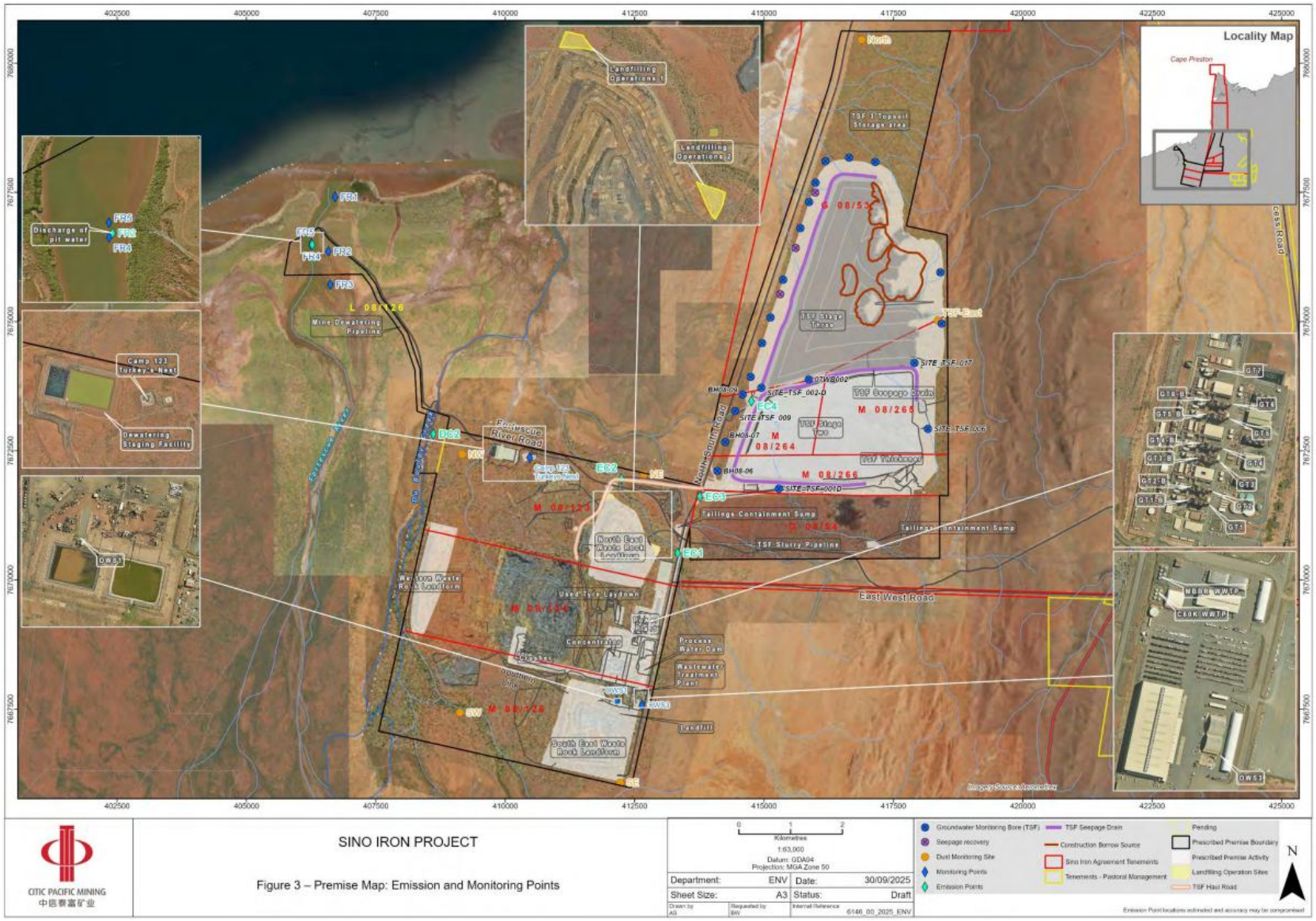

Figure 1: Location of TSF 3

Works approval: W3102/2025/1

2.2.1 Overview of the premises ore process

The applicant operates the premises under existing Licence L8308/2008/3. Employing conventional drill and blast mining techniques, the premises extracts ore that is crushed through a process plant, producing high-grade magnetite concentrate which is then pumped to the port.

Tailings slurry from the Magnetic Separators and Desliming Elution Columns is thickened to approximately 50% solids (range 45-55% solids) by the two Tailings Thickeners (primary thickening) located in the Concentrator (at the process plant). The tailings slurry is then pumped from the Tailings Pump Station at the Concentrator via a single steel “delivery” pipeline to the two TSF Thickeners (secondary thickening) located at the south-east corner of TSF 2 where it is further thickened to 60-62% solids weight per weight (w/w).

Thickened tailings from the TSF Thickeners are transported via four “tailings distribution” pipelines each connected to a dedicated or a standby thickener underflow pump train. These four TSF thickener underflow tailings distribution pipelines (two for each TSF thickener) enter the tie-in station on the south-east corner of TSF 2. Tailing is then deposited into TSF 2 along the perimeter embankment via the tailings distribution pipelines.

2.2.2 TSF 3 (Stages 1A, 1B and 1C) and associated infrastructure

TSF 3 construction will include tailings compound (embankment walls); access roads; pipeline corridor; tailings delivery pump upgrade; new slurry delivery line; decant infrastructure; and groundwater monitoring.

TSF 3

The key elements and design criteria for TSF 3 (Stages 1A, 1B and 1C) are shown in Table 1.

Table 1: TSF 3 key elements

TSF 3 General Detail	
Tailings Throughput	44 Mtpa (dry solids)
Starter embankment	36 metres (m) above Relative Level (RL)
Commissioning (Date Stage 1A)	2027
Deposition	Sub-aerial deposition methods
Decant location	Central
Discharge location	Perimeter
Freeboard	1,000 mm
Stage 1 capacity	~ 3 years
Tailings Properties	
Solid Content	~ 60-62% by mass
Beach Slope	~ 0.3%
Specific Gravity of Solids	2.97 tonnes per cubic metre (t/m^3)
Hydraulic conductivity	1×10^{-7} to 2×10^{-8} metres per second (m/s)
Tailings Settled Dry Density	~ 1.72 t/m^3
Acid generating potential	Non-acid forming
Acid and metalliferous drainage (AMD)	Unlikely to generate acid and AMD
Works Approval Application (Stage 1)	
Stage 1A starter capacity	1 year of deposition
Stage 1B starter capacity	1 year of deposition
Stage 1C starter capacity	1 year of deposition

The embankment will be constructed in stages throughout the life of the facility as shown in Table 2. Stage 1 is designed to contain 3 years of tailings production and lifts will be constructed every 1-2 years approximately thereafter.

The Stage1 embankments will be constructed downstream and only along the western and northern perimeters.

Table 2: Embankment staging details

Stage	Construction Year	Embankment Configuration	Capacity Cumulative (Mt)	Cumulative Storage (Years)	Embankment Level (mRL)
1A	1 (2026)	Downstream	44	1	26.0
1B	1 (2027)	Downstream	88	2	31.0
1C	2 (2028)	Downstream	132	3	36.0
2*	3	Centreline	225	5.1	41.0
3*	4	Centreline	294	6.7	46.0
4*	5	Centreline	365	8.3	51.0
5*	7	Centreline	436	9.9	56.0
6*	9	Centreline	507	11.5	61.0
7*	11	Centreline	579	13.2	66.0
8*	12	Centreline	652	14.8	71.0
9*	14	Centreline	724	16.5	76.0

* Stages 2-9 are not part of this assessment.

Embankment materials

TSF 3 Stages 1A, 1B and 1C embankment materials will primarily be sourced from preparatory earthworks, basin borrow within TSF 3 and supplemented with suitable mine waste as required.

The embankment will comprise of Zone C1, Zone C2 and Zone C3 material as summarised in Table 3 and as shown in Figure 2.

The upstream embankment will be constructed with C2 material (highly weathered rock, soil with fines). When moisture conditioned and compacted, a permeability of less than 1 x 10^{-7} m/s (which is typically specified for a low permeability material) is expected to be achieved (CPM 2026).

CPM 2026 states tests will be carried out to confirm C2 material properties before being placed on the embankment as part of the Quality Assurance / Quality Control (QA/QC) works during construction.

Table 3: Summary of material specification

ZONE KEY	ZONE TYPE	DESCRIPTION	MAXIMUM LAYER THICKNESS **	COMPACTION SPECIFICATION	GRADING
	ZONE C1	STRUCTURAL FILL (FRESH WASTE ROCK) BY MINING FLEET	500 TO 1500mm	TRAFFIC COMPACTED BY LOADED HAUL TRACKS	D_{MAX} = 2/3 LAYER THICKNESS FINES < 5%
	ZONE C2	LOW PERMEABILITY	300mm	98% OF SMDD OMC -2% < MC < OMC +3%	D_{MAX} = 100mm FINES > 30%
	ZONE C3	STRUCTURAL FILL (FRESH WASTE ROCK WITH GRAVEL AND SAND) BY MINING AND CIVIL FLEET	500 TO 1500mm	TRAFFIC COMPACTED BY LOADED HAUL TRACKS	D_{MAX} = 2/3 LAYER THICKNESS FINES < 5%

Testing indicates approximately 4% of waste rock from the premises is potentially acid forming (PAF). Waste materials from the oxidized zone, such as those used for the C2 materials, are

non-acid forming (NAF). PAF samples are generally associated with the Mount McRae and Whaleback Formation shales. As part of the mining operations, a site geologist identifies waste types that the NAF and are therefore suitable for use in the TSF construction. Shale materials are excluded from the mine waste used for construction.

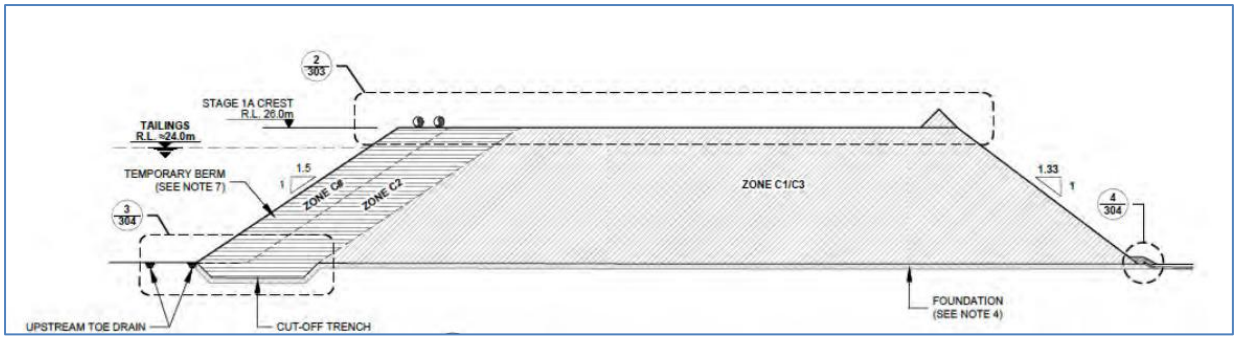

Figure 2: Typical Stage 1A west embankment section (where Zone C# is Zone C2 material)

Tailings deposition / decant facility

As per the current process thickened tailings from the Concentrator will be pumped via the single delivery pipeline to the two TSF Thickeners (near TSF 2) for secondary thickening. Four new tailings distribution pipelines are required for TSF 3. The valves and fittings at the tie-in station will be upgraded to accommodate the increased slurry transport distance required for TSF 3 operations. The tie-in station has also been re-designed to enhance the interconnectivity, ensuring that each tailings distribution pipeline for TSF 3 is aligned with 4 underflow trains.

A pipeline corridor from the TSF Thickeners will enter TSF 3 from the south-east corner. Two pipelines will be located within a pipeline corridor along the east embankment with TSF 3 catchment terminating at the north. The other two pipelines will be located along the west embankment (both routed each side of TSF 2) also terminating at the north.

Tailings will be discharged into TSF 3 by sub-aerial deposition, using a combination of spigots at regularly spaced intervals (approximately 40-60 m) along the embankments and single point locations.

TSF 3 Stage 1A will primarily adopt a configuration of single large spigots spaced at 300 m intervals along each tailings distribution pipeline. While each tailings distribution pipeline will operate with only one active discharge spigot at any given time, three to four tailings distribution pipelines will run concurrently to accommodate the production from the six milling lines.

During Stage 1A and 1B of TSF 3 tailings deposition the decant return will be managed utilising interim deposition discharge arrangements and a trailer-able decant pump to enable a tailings beach to progressively form from the western and northern embankments at the lowest topography of the TSF basin. Deposition will be managed to move the supernatant water to a central decant location for construction at Stage 1C.

The deposition of tailings is divided into four phases (as shown in Figure 3) over the operating life:

- Stage 1A: During the first year, deposition will occur from the north, west and south into the lower basin. Deposition level from the south will be slightly elevated to ensure the supernatant pond is in the central valley for ease of pond control. The upstream catchment to the east will report into the TSF during this time as the east diversion will not be built.
- Stage 1B: The western and northern embankments will be progressively developed. The deposition level will be relatively even to maintain the supernatant pond within the center of the facility. Embankments will remain downstream constructed.

- Stage 1C: The eastern embankment (many small saddles) will be constructed. Embankments will continue to be downstream constructed during this phase. At the same time, deposition will commence from the east to centralise the pond and a minor decant causeway will be developed.
- Stage 2 – Final*: The embankments will be raised to a final crest elevation of RL 76 m. A surface water diversion channel will be constructed along the eastern perimeter. Embankments will be centreline constructed during this phase. Deposition will occur from all embankments to ensure development of a single centralised decant pond.

  *Note that this Decision Report does not consider the construction of Stage 2 – Final.

The decant return line will progressively move with the supernatant water as the tailings beach is formed until the pump system in the center of TSF 3 is commissioned (during Stage 1C). The decant return line will run along the causeway to the eastern embankment, then south along the east embankment.

Decant water is generally collected in the staging pond (located adjacent to the south-west corner of TSF2) prior to being pumped back to the processing plant for reuse.

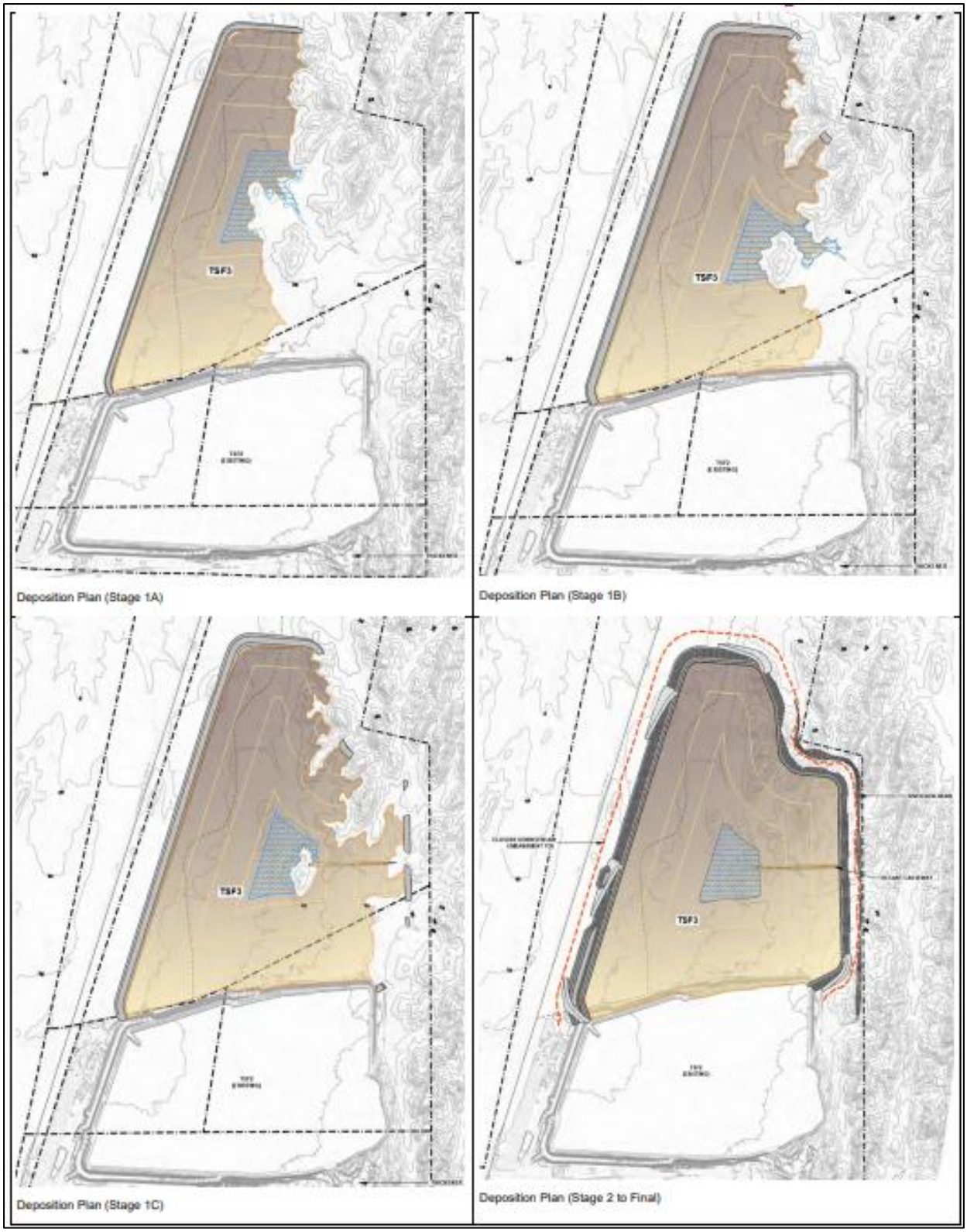

Figure 3: TSF 3 deposition plan

Underdrainage and seepage

A cut-off trench will be located beneath the entire length of the upstream toe and will be excavated into the in-situ foundation and backfilled with low permeability fill to reduce seepage below the embankment.

An underdrainage system will be installed during Stage 1A as shown in Figure 4. Upstream toe drains will be constructed along the upstream toe of the western and northern embankments to reduce the phreatic surface and provide drainage of the tailings at the embankment. Main collector drains will be located along the existing creek lines within the TSF 3 basin. Finger drains will aid drainage from tailings into the collector drains. The toe drain and main collector drains will drain by gravity to three locations at the lowest elevation points in TSF 3 and then underneath the embankment to downstream seepage recovery sump ponds.

The seepage recovery sump ponds will be connected to the seepage return pipe which will pump captured seepage, to the existing collection sump located at the south-west downstream toe of TSF 2. The existing collection sump serves as the central hub for seepage management, equipped with a high capacity pumping station consisting of three independent pump units.

Process water with a Total Dissolved Solids (TDS) concentration greater than 2,000 mg/L is not suitable for use within the processing plant due to the increased risk of corrosion to process circuit plant equipment.

Water levels in the existing collection sump are maintained by:

1. Disposal of TSF decant and seepage water through the existing authorised emission point DC2 at Du Boulay Creek;
2. Emergency disposal of stormwater and process water via the existing authorised emission points EC3 and EC4 (discharge pipe to a tributary of Edwards Creek) as a result of an uncontrolled event; and
3. Seepage water is prioritised for mine-site dust suppression (reuse on-site), integrating captured water back into the premises water circuit to reduce raw water consumption.

Seepage water is generally high in salinity (typically ~4,500 to 6,800 mg/L) therefore it can't be reused in the processing circuit so it is generally pumped directly to emission point DC2 by way of a HDPE pipeline.

The discharge of TSF decant and seepage water via existing emission point DC2 only occurs when:

1. TDS concentrations are greater than 2,000 mg/L;
2. TSF decant and seepage water is surplus to operational dust suppression requirements; and
3. All other options for storage and/or reuse of TSF decant and seepage water have been exhausted.

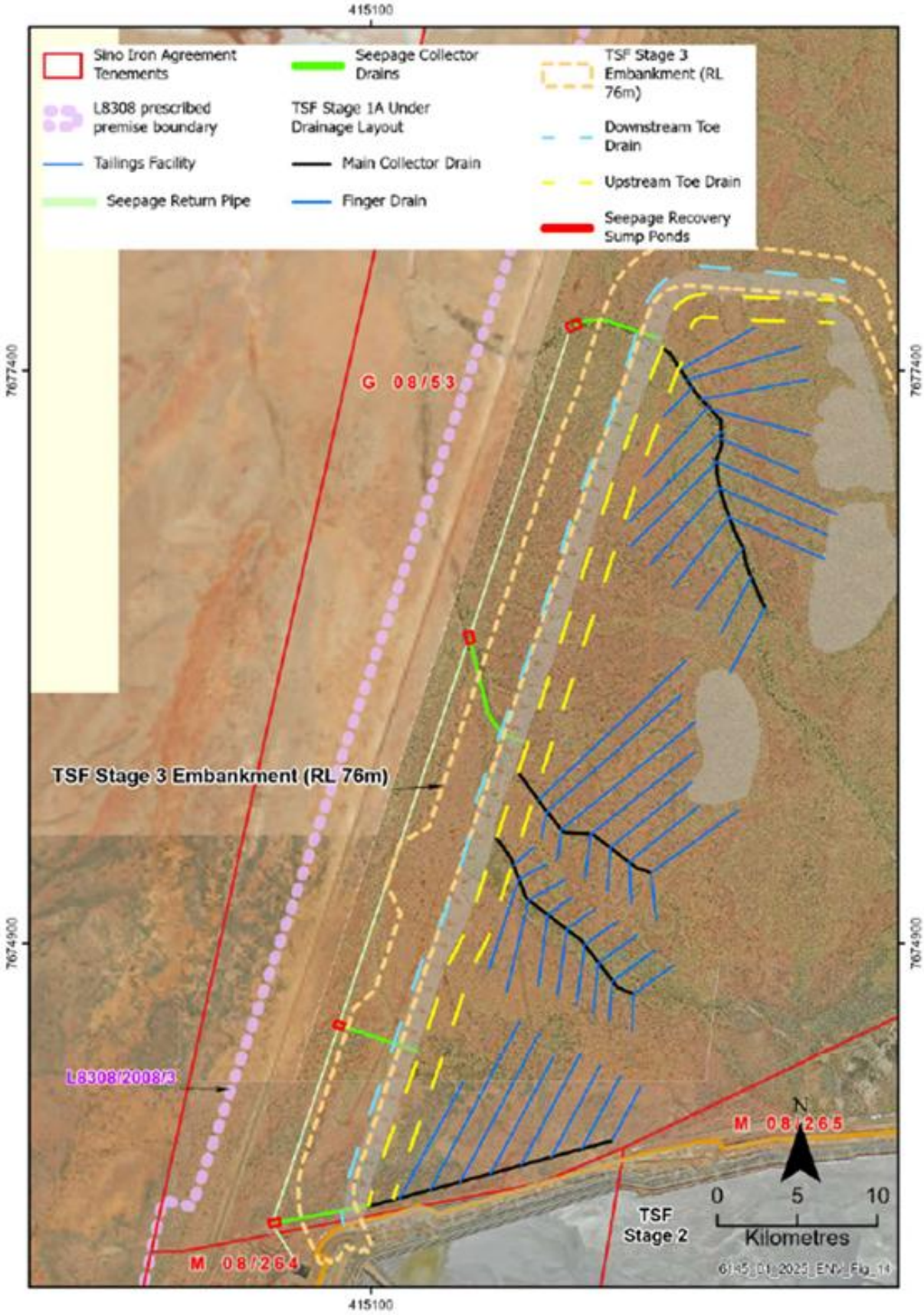

Figure 4: TSF 3 underdrainage system

2.2.3 Tailings Characterisation

TSF 3 tailings characterisation has been informed by the existing TSF 2 tailings assessments. TSF 3 is to receive tailings from the existing mine orebody, concentrator plant and tailings thickening system that supplies thickened tailings to TSF 2. Process chemicals utilised in ore processing and tailings deposition remain unchanged.

Golder Associates carried out laboratory testing on a sample of tailings from the premises in 2008; and were commissioned to conduct geochemical assessment work for the premises to determine the potential of the rock types to generate AMD in 2007.

In response to the department's request for further information, the applicant provided a summary of tailings geotechnical field investigations which were carried out in 2017, 2022 and 2024.

No additional tailings testing has been conducted as part of the TSF 3 design. It has been assumed that the physical and geochemical characteristics of the tailings and slurry liquor will remain comparable to that discharged to the currently operational TSF 2.

CPM 2026 states "*The tailings are classified as non-acid forming due to low sulphur concentrations, adequate acid neutralising capacity and low metal leaching concentrations in supernatant water. The orebody is known to contain some fibrous minerals comprising predominantly massive (non-asbestiform) riebeckite; however, caution must still be applied to prevent unnecessary dusting"*.

"Characterisation testing indicated the specific gravity varied from around 2.96 to 3.13 across various testing programmes. Atterberg limits indicated that the tailings is generally low to non-plastic Silt (ML) with trace sand and clay, with a liquid limit of around 27% and linear shrinkage of around 2%".

Based on the targets (60-62% solids by weight) for discharge into the TSF, previous settling tests and operational data, the estimates of water release are provided in Table 4.

Table 4: Tailings water release estimates

Percent Solids	**50% w/w (at Plant)**	**60% w/w (at TSF)**	**70.5% w/w (Initial Settlement)**	**79% w/w (Shrinkage Limit)**
Dry Density (t/m^3)	0.75	1.00	1.32	1.67
Void Ratio	2.96	1.97	1.24	0.78
Water in Slurry (m^3)	1.00	0.67	0.42	0.27
Water Released	-	0.33 m^3 from 50% solids w/w	0.25 m^3 from 60% solids w/w	0.15 m^3 from 70.5% solids w/w

2.2.4 Hydrogeology, seepage and associated monitoring bores

There are two potential main aquifer systems in the TSF 3 area, the highly and moderately weathered bedrock zone and the fractured rock aquifer. Several geotechnical investigation bores drilled as part of the TSF 3 investigation intersected highly to moderately weathered/fractured bedrock, which may serve as groundwater conduits and potential seepage pathways from TSF 3. Although the colluvium horizon (mainly clay of variable thickness with low permeability), overlies the weathered bedrock, this layer is not continuous throughout the TSF 3 area and may allow potential seepage from TSF 3 into the weathered and fractured bedrock aquifers.

CPM 2026 states "*With consideration of the likely seepage water quality, there are no known*

sensitive receptors in the weathered rock and fractured-rock systems. There are no other groundwater users".

The seepage analysis program SEEP/W was used to assess the order of magnitude seepage loss from the TSF 3, as well as the potential phreatic surface in the tailings and embankment. Seepage analyses were undertaken to evaluate the following:

- The total seepage loss from the TSF 3 to provide an indication of the potential environmental impact from operation of the TSF 3.
- The effect of the underdrainage system on the overall phreatic surface in the facility.
- Predict flows through the embankment and into the underdrainage for different scenarios of drainage efficiency/blockage.
- Predict phreatic surface in the tailings mass and embankment, to be verified and monitored during operation.

Seepage modelling was conducted for the main west embankment and the east embankment for the purpose of estimating the phreatic surface for stability modelling.

Steady state seepage models for Stage 1A were conducted with various pond sizes and different underdrainage scenarios. The indicative seepage losses to the ground for Stage 1A are shown in Table 5 for average pond and a 72 hour storm event.

Table 5: Estimated indicative seepage loss of TSF 3 during average pond condition and 72-hour storm event

Stage	Supernatant pond and drainage scenarios	Estimated Seepage Loss to Ground (kL/day)
Stage 1A – RL26 m	Average pond condition, toe drain and basin drain functional	0.61
	Average pond condition, toe drain and basin drain non-functional	0.98
	72-hour storm event, toe drain and basin drain functional	228.22
	72-hour storm event, toe drain and basin drain non-functional	590.49

The modelling indicates that the effectiveness of the drainage system, particularly the basin drains and toe drains, becomes increasingly critical as the TSF 3 embankment height increases. These drains play a key role in lowering the phreatic surface within the facility.

A high seepage loss was observed for Stage 1A for storm conditions, which was mainly due to the pond water being above the tailings level and water seeping through the existing basin ground and embankment. It is expected that under a 72-hour 100-year ARI event, the TSF 3 will be water shedding via the emergency spillway. As tailings beach increases with the embankment raise, the seepage loss will decrease as the tailings will act as a low permeable layer below the pond.

The applicant monitors water quality at TSF 2, which includes supernatant pond water quality; seepage trench water quality; Du Boulay Creek (DC2) discharge point; and ambient groundwater quality.

The applicant provided (CPM 2026) existing groundwater quality trends (5 years) for the TSF 2 monitoring bores and have stated "*to date groundwater monitoring has not indicated any issues or trends in analytes to cause concern*".

As TSF 3 will receive tailings from the existing processing plant, the applicant considers that the supernatant recovery water (Table 6) and seepage water quality (Table 7) is representative of the likely decant and seepage water quality for TSF 3, under normal operating conditions.

The quarterly (May 2023 – May 2025) water quality results for Du Boulay Creek (DC2) discharge point are shown in Table 8.

Table 6: TSF 2 supernatant pond water quality results

Supernate Pond Water (decant pond stage 1B sample point)	3/05/2023	8/08/2023	14/11/2023	5/02/2024	30/04/2024	20/08/2024	7/11/2024	9/02/2025
Oxygen Reduction Potential (mV)[1]	43.9	117.9	59.5	38.6	44.5	199.8	97.5	98.4
pH (pH units)[1]	9.45	9.04	9.49	9.22	9.45	9.13	8.76	8.58
Dissolved Oxygen (mg/L)[1]	9.46	8.75	5.77	7	6.12	6.96	7.35	7.55
Temperature (°C)[1]	25.2	20.1	20.7	27.2	24.3	21.3	25.2	32.2
Electrical Conductivity (µs/cm)[1]	2922	2791	2960	4014	2777	2644	3679	898
Total Dissolved Solids (mg/L)	1540	1560	2160	2620	1790	1660	2140	527
Acrylamide	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Nitrogen	18.0	24	14.9	19.9	21.5	14.1	13.6	6.0
Nitrate as N	12.5	17.8	9.93	15.6	16.4	12.0	11.8	4.87
Nitrite as N	1.39	2.76	1.87	0.36	2.21	0.41	0.14	0.05
Ammonia	0.02	0.17	0.37	0.36	0.35	0.30	0.06	0.11
Total Sulfur (mg/L)	40	40	56	80	50	44	128	20
Calcium(mg/L)	13	15	10	13	10	9	21	12
Sodium(mg/L)	526	466	654	762	539	521	579	123
Total Alkalinity(mg/L)	328	343	377	354	298	356	313	132
Chloride(mg/L)	652	587	837	965	648	660	758	141
Magnesium(mg/L)	24	33	28	29	29	24	55	12
Potassium(mg/L)	91	91	129	143	83	90	155	53
Sulfate(SO42-) (mg/L)	118	91	164	226	141	153	360	56
Bicarbonate(HCO3-) (mg/L)	98	253	208	296	221	281	268	123
Carbonate(CO32-) (mg/L)	229	90	169	58	77	75	45	9
Aluminium(mg/L)	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
Lead(mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Copper(mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001
Hexavalent Chromium(mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel(mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc(mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt(mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron(mg/L)	<0.05	<0.05	0.11	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese(mg/L)	<0.001	0.004	<0.001	0.004	0.002	0.002	0.010	0.004

Table 7: TSF 2 Seepage Trench water quality results

TSF Seepage Trench (Combination of Seepage Waters)	3/05/2023	8/08/2023	14/11/2023	5/02/2024	30/04/2024	20/08/2024	7/11/2024	9/02/2025	18/05/2025
Oxygen Reduction Potential (mV)[1]	112.6	138.7	142.6	129.5	114.6	188.9	163.3	151.3	295.5
pH (pH units)[1]	7.16	7.46	7.75	7.82	7.44	7.35	7.4	7.12	7.75
Dissolved Oxygen (mg/L)[1]	7.37	8.11	8.96	7.93	7.35	7.97	7.75	8.21	8.77
Temperature (°C)[1]	27.5	26	28.2	31.8	26.3	24.5	27	33.4	25.8
Electrical Conductivity (µs/cm)[1]	8242	8141	6182	7320	6914	7395	7837	9083	8109
Total Dissolved Solids (mg/L)	5130	5320	4960	5480	5650	5610	4660	5920	5500
Acrylamide	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Nitrogen	5.6	6.3	5	4.3	4.7	7.9	6.8	15.4	9.5
Nitrate as N	5.13	5.92	4.59	3.92	3.79	7.61	6.13	14.4	8.45
Nitrite as N	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.03	0.02
Ammonia	0.06	0.06	0.06	0.12	0.39	0.01	0.30	0.13	0.34
Total Sulfur (mg/L)	278	299	283	290	270	344	314	310	306
Calcium(mg/L)	451	416	407	390	374	454	420	438	425
Sodium(mg/L)	964	919	854	807	844	922	886	1040	873
Total Alkalinity(mg/L)	271	227	276	261	278	262	276	258	246
Chloride(mg/L)	2440	2180	2150	1980	1990	2030	2100	2520	2500
Magnesium(mg/L)	306	288	283	270	293	296	288	327	285
Potassium(mg/L)	16	18	13	11	9	12	9	21	13
Sulfate(SO42-) (mg/L)	717	796	789	700	748	823	862	831	873
Bicarbonate(HCO3-) (mg/L)	271	227	276	261	278	262	276	258	246
Carbonate(CO32-) (mg/L)	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aluminium(mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Lead(mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Copper(mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Hexavalent Chromium(mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel(mg/L)	0.002	0.001	0.001	<0.001	0.001	0.001	<0.001	0.001	<0.001
Zinc(mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.009	0.007	<0.005
Cadmium(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt(mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese(mg/L)	0.004	0.002	0.002	<0.001	0.003	0.008	0.002	0.009	0.002

Table 8: Du Boulay Creek (DC2) discharge point quarterly monitoring data

DC2 (DuBoulay Creek Discharge Point)	3/05/2023	8/08/2023	14/11/2023	6/02/2024	30/04/2024	20/08/2024	7/11/2024	9/02/2025	18/05/2025
Oxygen Reduction Potential (mV)[1]	99.9	104.5	186.7	109.5	79	192.4	14.8	139.9	261.1
pH (pH units)[1]	7.49	7.58	7.52	7.52	7.81	7.51	7.53	7.1	7.65
Dissolved Oxygen (mg/L)[1]	7.78	8.09	7.88	6.98	7.57	8.63	7.34	7.04	7.78
Temperature (°C)[1]	27.8	25.8	27.7	34	28.9	22.8	30.8	33.8	26.1
Electrical Conductivity (µs/cm)[1]	8089	8010	6252	7327	7234	7495	7896	9279	8042
Total Dissolved Solids (mg/L)[1]	4940	5290	5010	5310	5880	5630	4680	6390	5460
Acrylamide	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Nitrogen	5.6	6.4	5.7	5	5.1	10.0	5.6	17.8	8
Nitrate as N	5.00	5.64	5.09	4.42	4.09	9.64	5.20	16.5	7.5
Nitrite as N	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.02	<0.01
Ammonia	0.02	0.19	0.06	0.02	0.02	0.01	0.02	0.07	0.05
Total Sulfur (mg/L)	270	286	287	296	283	343	308	315	289
Calcium(mg/L)	418	405	409	387	370	443	406	443	428
Sodium(mg/L)	910	910	861	788	911	987	880	1060	848
Total Alkalinity(mg/L)	278	227	271	256	267	244	271	250	253
Chloride(mg/L)	2420	2160	2160	2050	2040	2060	2100	2570	2440
Magnesium(mg/L)	282	287	290	264	299	305	281	329	275
Potassium(mg/L)	13	16	14	12	13	15	8	24	10
Sulfate(SO42-) (mg/L)	664	750	787	826	786	931	812	849	832
Bicarbonate(HCO3-) (mg/L)	278	227	271	256	267	244	271	250	253
Carbonate(CO32-) (mg/L)	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aluminium(mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Lead(mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Copper(mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Hexavalent Chromium(mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel(mg/L)	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc(mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt(mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese(mg/L)	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.001	0.002	<0.001

The DC2 discharge point under existing Licence L8308/2008/3 restricts the discharge of stormwater and process water; and TSF decant and seepage water from this point if the pH is not between 6.5-9 pH units; and if TDS is not less than 50,000 mg/L.

The applicant is proposing to construct 12 groundwater monitoring bores (consisting of depths of 20 – 40 m) and three seepage recovery bores (to a depth of 100 m) primarily along the western and northern boundaries (as shown in Figure 5), downgradient of TSF 3, to enable water level and quality to be measured and recovered seepage initiated (if required)..

The applicant has advised (CPM 2026) the following:

- Nested and multi-screen bores were considered and determined to be not required due to the shallow nature of the aquifer;
- Drilling of the bores commenced in February 2026. The department notes that is prior to the commencement of Stage 1 and prior to W3102/2025/1 being granted; and
- Existing groundwater monitoring bore 09NC430 is located 2 km north of TSF 3 northern embankment wall outside the expected influence of TSF 2, TSF 3 and dewatering. This bore will be utilised as a background bore to provide a reference for groundwater level and chemistry.

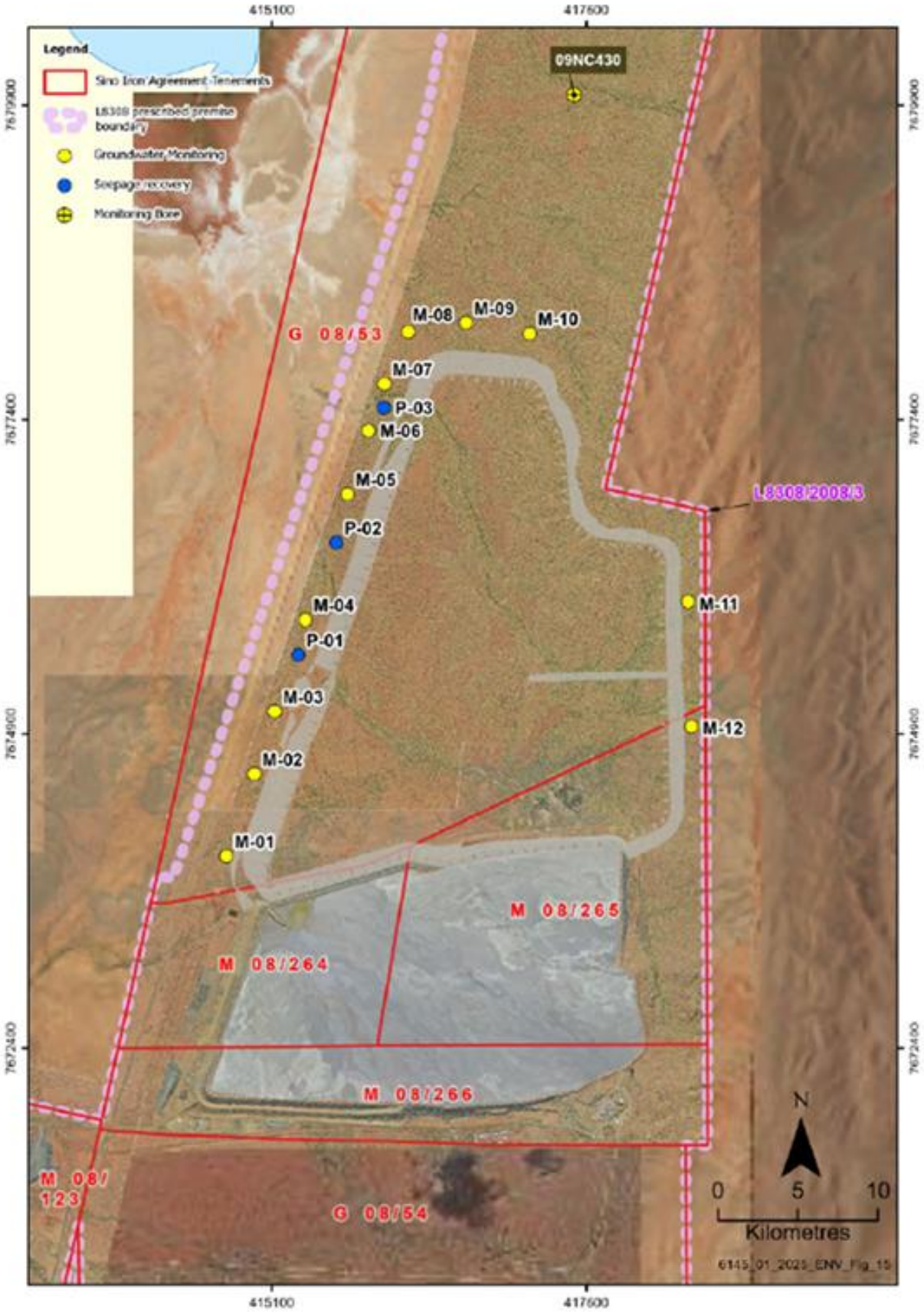

Figure 5: TSF 3 groundwater monitoring and seepage recovery bores

2.3 Other approvals

2.3.1 Environment Protection and Biodiversity Conservation Act 1999 (Cth)

The Sino Iron Mine Continuation Proposal (EPBC 2017/7862) to expand the existing iron ore mine and export facilities at Cape Preston, Western Australia including the expansion of tailings storage facilities, waste rock landforms, mine pit area and depth, port stockyard capacity and other supporting infrastructure and an increase in dewatering.

The referral decision "not a controlled action" was made under section 75 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 29 March 2017.

2.3.2 Department of Energy and Economic Diversification

The premises is subject to the *Iron Ore Processing (Mineralogy Pty Ltd) Agreement Act 2002*, regulated by the Department of Energy and Economic Diversification (DEED).

The application was referred to DEED who advised that the works approval application is in accordance with the *Iron Ore Processing (Mineralogy Pty Ltd) Agreement Act 2002* and the approved 2023 Mine Continuation Proposals under that Agreement.

2.3.3 Department of Mines, Petroleum and Exploration

The applicant advised that the TSF 3 Design Report and TSF 3 Operating Manual had been provided to the Department of Mines, Petroleum and Exploration (DMPE).

The department referred the application to DMPE to confirm that the TSF 3 is structurally sound and that no stability issues have been identified.

DMPE advised that "*A geotechnical review of the Sino Iron Project - TSF 3 concluded that the project provides information consistent with Department of Mines, Petroleum and Exploration (DMPE), guidelines and is aligned with Australian National Committee on Large Dams (ANCOLD) and Global Industry Standard on Tailings Management (GISTM) design standards".*

The applicant also advised on 17 February 2026 that the geotechnical reports for TSF 3 had been approved by DMPE.

2.3.4 Part IV of the EP Act

The Premises is subject to Ministerial Statement (MS) 635, MS 822, MS 1066 and MS 1169 under Part IV of the EP Act:

- MS 635, issued on 20 October 2003, approved the construction and operation of a 44.8 Mtpa iron ore mine, power station, desalination plant, processing plant, accommodation, and port facilities in the Cape Preston area.
- MS 635, Attachments 1 to 5 have resulted in approvals to increase the mining rate to 95 Mtpa, the production of concentrate to 27.6 Mtpa and produced waste to tailings storage to 67.4 Mtpa and discharge of up to 2 gigalitres per annum of dewatered groundwater from the mine pit to a point near the mouth of the Fortescue River.
- MS 822, issued on 23 December 2009, deleted conditions 7-1 5 (Marine Management Plan) and 8-1 to 8-4 (Marine Wastewater Outfall) of MS 635 and replaced with conditions 8-1 to 8-8 relating to Ecological Protection Areas.
- MS 1066, issued on 20 October 2017, approved the expansion of the iron ore mine, processing plant and export facilities in the Cape Preston area. For the mine and processing plant this included deepening the mine pit, additional infrastructure (including waste storage, creek diversion and infrastructure corridors), additional dewatering and discharge of surplus dewater.

Condition 16 (Decommissioning and Closure Plans) of MS 635 was replaced under MS 1066 (Rehabilitation and decommissioning – mine and borefield) and additional condition 17 (Amendment of plans, reports, systems or programs) included.

- MS 1169 issued on 10 June 2021 deleted and replaced conditions 8-3 and 8-8 of MS 822 and included new condition 8-9.

The applicant has stated (CPM 2025) that they have an Operational Environmental Management Plan (OEMP) approved by DWER as meeting the requirements of MS 635 (as amended).

The OEMP includes the following environmental issues relevant to this assessment:

- Pit dewatering and vegetation dominated by *Melaleuca argentea*; *Eucalyptus camaldulensis*; and *Eucalyptus victrix* (groundwater dependent vegetation (GDV)) monitoring plan;
- Spill management;
- Surface water management;
- Groundwater management;
- Dust management
- Noise management; and
- Aboriginal heritage management.

To ensure any conditions set under Part V of the EP Act are consistent and/or not contrary to the Ministerial requirements, the application was referred to the department's Environmental Protection Authority (EPA) Services.

2.3.5 Aboriginal Heritage Act 1972

On the 14 May 2026, the applicant advised DWER that they had received consent under section 18 of the *Aboriginal Heritage Act 1972* in relation to the proposed TSF 3 (S18A-00005631). Consent pursuant to section 18(3) of the *Aboriginal Heritage Act 1972*, was dated 7 May 2026.

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 9 below. Table 9 also details the control measures the applicant has proposed to assist in controlling these emissions, where necessary.

Table 9: Proposed applicant controls

Emission	Sources	Potential pathways	Proposed controls
Construction			
Dust	Construction activities associated with TSF 3 infrastructure and vehicle movement	Air / windborne pathway	• Water carts and/or surface binding agents. • TSF is a designated area, respiratory protective equipment is mandatory. • Reduce vehicle traffic on unsealed roads and other exposed areas, where practicable. • Use real time ambient monitoring to respond to elevated dust emissions associated with the premises.
Sediment laden stormwater		Overland runoff	• Surface water runoff contained within TSF 3 embankment.
Commissioning and Operation (including time-limited operations)			
Dust from TSF 3 surface	Deposition of tailings into TSF 3	Air / windborne pathway	• Rotating the discharge points to keep the tailings surface wetted to inhibit dust generation. • Rewetting the tailings dam surface. • TSF is a designated area, respiratory protective equipment is mandatory. • Daily visual assessments of the tailings beach for signs of drying and dust generation.

Tailings supernatant containing dissolved solids, metals and metalloids		Seepage
		Groundwater mounding
			• A cut-off trench excavated into the in-situ foundation and backfilled with low permeability fill to reduce seepage below the embankment.
			• An underdrainage and seepage interception system consisting of:
			  ○ Upstream toe drain along the upstream toe of the western and northern embankments;
			  ○ Downstream toe drain;
			  ○ Main collector drains; and
			  ○ Finger drains.
			• Any water or seepage water collected within the toe drains or main collector drains gravity fed into one of three seepage collector drains.
			• The seepage pipeline connects to three

Emission	Sources	Potential pathways	Proposed controls
			underdrainage collection sumps. • Water from these collection sumps are pumped out via a submersible pump (equipped with a flow meter) to the existing TSF 2 seepage collection sump.
Tailings and contaminated water		Overtopping	• Sub-aerial deposition methods, using a combination of spigots at regularly spaced intervals along the embankments and single point locations. • Spigots with knife gates and burst discs to allow even deposition. • Active beach regularly rotated around TSF 3 to ensure the supernatant pond is centrally located. • Excess water expelled during settling and rainfall runoff to be returned to the process plant for re-use, initially from a trailer mounted decant, until a central decant is established. • Once central decant established, 2 decant pumps (one duty, one standby) installed with a nominal rate of 500 m^3 per hour. However, if necessary, both pumps may operate simultaneously, providing a return capacity of 1,000 m^3 per hour. • TSF 3 designed to contain the 1% Average Exceedance Probability (AEP) 72-hour rainfall event. • During Stage 1, the supernatant water pond normally located away from any perimeter embankment. • Freeboard of 1,000 mm maintained. • Decant return water pumped to the tailings thickener overflow for reuse in processing. • Deposition managed to move the supernatant water to a central decant location for construction at Stage 1C. • Visual check on tailings and water levels versus embankment crest and marker guide posts (freeboard) undertaken per shift.
Spillage of tailings and decant return water through leaks, pipeline ruptures or	Tailings delivery / distribution and decant return pipelines	Direct discharges to land / infiltration	All pipelines and pipeline corridors to be inspected per shift. <u>Delivery pipeline:</u> • Existing tailings discharge containment sumps located on the delivery pipeline in

Emission	Sources	Potential pathways	Proposed controls
failure			case of emergency discharge. • Pipeline pressure sensors. • Flow meter fitted. <u>Tailings distribution pipelines</u>: • Where the pipelines are required to be routed outside TSF 3 catchment, they will be bunded and accessible to allow maintenance and spill recovery activities. • Each line fitted with a flow meter and density meter to reconcile the total tonnage and percent solids to TSF 3. • Along the distribution pipeline a combination of spigots with knife gates, full size single point discharge locations and burst discs will be located to allow even deposition around TSF 3. • A bursting disc assembly installed on each pipeline to protect from over-pressurisation. • The bursting disc assembly has a short section of HDPE pipe connected that directs any ruptured burst disc pipeline contents into TSF 3 and can be visually identified by the operator. <u>Decant return lines</u>: • Fitted with a flow meter and a datalogger to monitor water return volumes at the pump discharge. • All meters utilise telemetry to report to process control operators. • Pressure gauges used for leak detection monitoring.
Sediment laden stormwater	TSF 3	Overland runoff	During stage 1 of the TSF 3 development, surface water including upstream flows to be contained within the facility and returned via the decant for use in the processing plant or collected in the underdrainage system.
TSF decant and seepage water with TDS concentrations greater than 2,000 mg/L	Disposal of excess water via existing discharge point DC2	Discharges to surface water	• Routine monitoring in accordance with the existing licence and limits for TDS and pH. • Existing program to utilise decant and seepage water in other aspects of the project (i.e. dust suppression and used to supplement water in the secondary tailings thickeners) so that only the remaining water (surplus to operational requirements) is discharged to DC2.

Emission	Sources	Potential pathways	Proposed controls
			After significant rainfall (when considered a safe practice) the applicant conducts the following: • Visual monitoring of Du Boulay Creek for scouring, excessive sedimentation and contamination. • Visual inspection of vegetation adjacent to stream lines.

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 10 and Figure 6 below provides a summary of potential human and environmental receptors that may be impacted because of activities upon or emission and discharges from the prescribed premises *(Guideline: Environmental Siting* (DWER 2020)).

Table 10: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	Distance from prescribed activity
A public road facilitating access to the Fortescue River mouth recreation area (informal campsite not managed by the City of Karratha).	Passes approximately 3.5 km to the south of the proposed TSF 3 running in an east-west direction.
Environmental receptors	**Distance from prescribed activity**
Mardie Pastoral Station Post mining land use is pastoral. A CITIC group company holds the Mardie pastoral lease.	The proposed TSF 3 is located within the Mardie Pastoral Station.
Surface water The premises is located adjacent to the lower reaches of the Fortescue River. Edwards Creek and Du Boulay Creek flow in a north-westerly direction through the premises with Du Boulay Creek extending up the western side of the ore body, parallel to the Fortescue River. Edwards Creek is a tributary of Du Boulay Creek, which discharges into the ocean adjacent to the mouth of the Fortescue River. The TSF 3 area predominantly drains to the north west towards the coastline. The southern extent adjacent to TSF 2 drains westward to Edwards Creek.	Yagobiddi Creek is approximately 2 km north-west of the proposed TSF 3 (CPM 2026). Edwards Creek is approximately 5 km west of the proposed TSF 3 (CPM 2026). Du Boulay Creek is approximately 4.5 km west of the proposed TSF 3. Three surface water drainage features are intercepted by TSF 3.

The watercourses in the premises are ephemeral and generally flow after heavy rainfall events. There are no fresh water permanent or semi-permanent pools. Coastal areas are subject to tidal inundation (CPM 2026).	
Groundwater Groundwater salinity measured in TSF 2 monitoring bores is brackish with median TDS during the 2024/2025, 4,150 mg/L. Generally flows to the west-north-west from the ridges in the east towards the Indian Ocean.	Groundwater levels monitored during the TSF 3 geotechnical assessment ranged from 1.7 to 6.7 m below ground level (mbgl).
Rights in Water and Irrigation Act 1914 Proclaimed Pilbara Groundwater Area Proclaimed Pilbara Surface Water Area	Overlays the premises boundary.
TECs/PECs Horseflat Land System of the Roebourne Plains.	Approximately 3 km to the east of the proposed TSF 3.
Aboriginal heritage site ID 18847 Artefacts / Scatter ID 26650 Artefacts / Scatter ID 18845 Artefacts / Scatter ID 18846 Artefacts / Scatter ID 26642 Artefacts / Scatter; Engraving; Grinding areas / Grooves; Quarry	Within the area proposed for TSF 3.

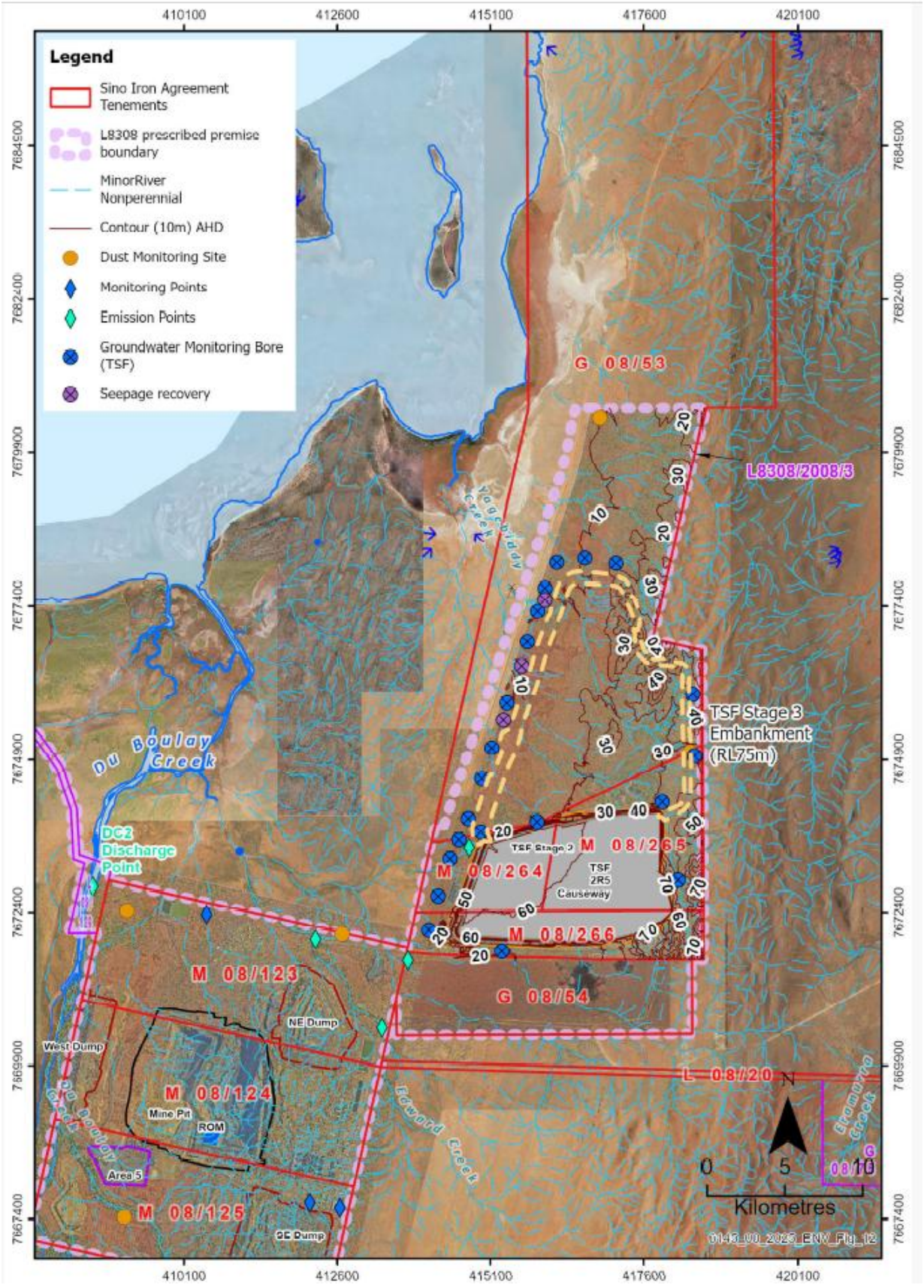

Figure 6: Distance to sensitive receptors

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 11.

Works approval W3102/2025/1 that accompanies this decision report authorises construction, commissioning and time-limited operations. The conditions in the issued works approval, as outlined in Table 11 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

An amendment to Licence L8308/2008/3 is required following the time-limited operational phase authorised under the works approval to authorise emissions associated with the ongoing operation of 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 11: 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 / licence	Justification for additional regulatory controls / DWER comments
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
Construction								
Construction activities associated with TSF 3 infrastructure and vehicle movement	Dust	Air / windborne pathway impacting vegetation health due to dust deposition leading to reduced ability for photosynthesis and smothering	Surrounding vegetation Public while utilising access to the Fortescue River Aboriginal heritage sites	Refer to Section 3.1	C = Moderate L = Possible **Medium Risk**	Y	No regulatory controls imposed through the works approval or licence	The general provisions of the EP Act apply Existing OEMP regulated under Part IV of the EP Act
	Sediment laden stormwater	Overland runoff causing increased sedimentation impacting vegetation, surface water drainage lines and water quality	Surrounding vegetation Surface water drainage lines Riparian vegetation	Refer to Section 3.1	C = Minor L = Possible **Medium Risk**	Y	No regulatory controls imposed through the works approval or licence	The general provisions of the EP Act applies as does the *Environmental Protection (Unauthorised Discharges) Regulations 2004* Existing OEMP regulated under Part IV of the EP Act
Commissioning and Operation (including time-limited operations)								
Deposition of tailings into TSF 3	Dust from TSF 3 surface (dusting)	Air / windborne pathway causing impacts to vegetation health	Surrounding vegetation Aboriginal heritage sites	Refer to Section 3.1	C = Moderate L = Unlikely **Medium Risk**	Y	No regulatory controls imposed through the works approval Existing Licence condition (condition 8) for the prevention of dust generation from the surface of the TSF	Existing OEMP and Dust Operational Management Plan regulated under Part IV of the EP Act

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval / licence	Justification for additional regulatory controls / DWER comments
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
	Tailings supernatant containing dissolved solids, metals and metalloids	Seepage causing contamination and waterlogging of soil Impacting vegetation health and groundwater quality	Soil and vegetation in vicinity of TSF 3 Groundwater Groundwater-dependent vegetation	Refer to Section 3.1	C = Moderate L = Possible **Medium Risk**	N	Works approval conditions imposed: **Condition 2** – Critical containment infrastructure construction requirements for the TSF 3 upstream slope and underdrainage and seepage interception system Conditions 5 and 6 – Submission of a Critical Containment Infrastructure Report **Conditions 8 and 9** – Bore construction and baseline groundwater monitoring Condition 11 – Requirement that environmental commissioning can only be undertaken once the Critical Containment Report has been submitted and deemed acceptable by the department Conditions 13 and 19 – Authorised discharge point Condition 18 – Operational requirements during time-limited operations for the underdrainage and seepage interception system Condition 20 – Groundwater monitoring during time-limited operations Condition 23 – Water balance during time-limited operations **Condition 25** – Tailings	**Refer to section 3.3 for additional regulatory controls applied to the works approval** Existing OEMP (groundwater management) and Groundwater Dependent Vegetation Monitoring Plan regulated under Part IV of the EP Act
		Groundwater mounding impacting seepage expression on surface, waterlogging soils and/or salinising soils	Groundwater Vegetation / soils Groundwater-dependent vegetation	Refer to Section 3.1	C = Moderate L = Possible **Medium Risk**	N		

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval / licence	Justification for additional regulatory controls / DWER comments
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
							characterisation **<u>Condition 28</u>** – Cumulative seepage assessment <u>Existing Licence conditions:</u> • Condition 11 - Annual water balance • Condition 23 – Process monitoring • Condition 24 - Monitoring of ambient environmental conditions (groundwater and surface water) These conditions will be updated under a subsequent licence amendment to incorporate TSF 3 Existing Licence also includes conditions relating to: • Condition 25 – Monitoring of ambient vegetation health • Condition 31 – Annual reporting requirements	
	Tailings and contaminated water	Overtopping of TSF 3 causing contamination of surrounding soils. Impacting vegetation health and surface water quality	Soil and vegetation in vicinity of TSF 3 Surface water drainage lines Aboriginal heritage sites	Refer to Section 3.1	C = Moderate L = Unlikely **Medium Risk**	Y	<u>Works approval conditions imposed</u>: Condition 1 – Construction requirements for spigots and decant infrastructure Condition 2 – Critical containment infrastructure construction requirements for the TSF 3 perimeter	N/A

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval / licence	Justification for additional regulatory controls / DWER comments
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
							embankments Conditions 3 to 6 – Construction (critical and non-critical infrastructure) compliance reporting Condition 12 – Commissioning requirements Conditions 13 and 19 – Authorised discharge point Condition 18 – Operational requirements during time-limited operations for TSF 3 Condition 23 – Water balance during time-limited operations Condition 24 – Inspections <u>Existing Licence conditions:</u> • Condition 1 – Operational requirements • Condition 9 – Inspection of infrastructure • Condition 11 - Annual water balance • Condition 23 – Process monitoring • Condition 24 - Monitoring of ambient environmental conditions (groundwater and surface water) These conditions will be updated under a subsequent licence amendment to incorporate	

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval / licence	Justification for additional regulatory controls / DWER comments
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
							TSF 3	
Tailings delivery / distribution and decant return pipelines	Spillage of tailings and decant return water through leaks, pipeline ruptures or failure	Direct discharges to land / infiltration causing contamination of surrounding soils and vegetation. Also leading to reduced surface water quality	Soil and vegetation along pipeline route Ephemeral creeks between the processing plant and TSF	Refer to Section 3.1	C = Minor L = Unlikely **Medium Risk**	Y	<u>Works approval conditions imposed</u>: Condition 1 – Construction requirements for the pipelines Conditions 3 and 4 - Compliance reporting Condition 12 – Commissioning requirements Condition 18 – Operational requirements during time-limited operations for the tailings distribution and decant return water pipelines Condition 24 – Inspections <u>Existing Licence conditions:</u> • Condition 9 – Inspection of pipelines • Condition 10 – Telemetry and diversion containment of pipelines • Condition 24 - Monitoring of ambient environmental conditions (groundwater and surface water)	N/A
TSF 3	Sediment laden stormwater	Overland runoff causing increased sedimentation impacting vegetation and surface water drainage	Surrounding vegetation Surface water drainage lines Riparian vegetation	Refer to Section 3.1	C = Minor L = Possible **Medium Risk**	Y	No regulatory controls imposed through the works approval or licence	The general provisions of the EP Act applies as does the *Environmental Protection (Unauthorised Discharges)*

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval / licence	Justification for additional regulatory controls / DWER comments
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
								Regulations 2004 Existing OEMP regulated under Part IV of the EP Act
Disposal of excess water via existing discharge point DC2	TSF decant and seepage water from TSF 3 with TDS concentrations greater than 2,000 mg/L	Direct discharge to Du Boulay Creek causing impacts to the water quality, vegetation and soils within the drainage channel Impacts to flora and fauna within the creek and river Erosion/scouring	Du Boulay Creek water quality Riparian vegetation	Refer to Section 3.1	C = Moderate L = Possible **Medium Risk**	Y	No regulatory conditions imposed through the works approval Existing conditions on the Licence relating to: • Condition 15 – Authorised discharge points for surface water emissions including operational requirements • Condition 16 - Emission and discharge limits for TDS and pH via DC2. • Condition 19 – Emissions and discharge monitoring for DC2 (in-pipe and 500 m downstream) • Condition 24 ambient surface water monitoring requirements 500 m downstream of DC2 for TDS and pH. • Condition 25 ambient vegetation heath monitoring requirements for DC2.	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 conditions imposed

Condition 2: Critical containment infrastructure design and construction requirements

It is stated that the upstream embankment will be constructed with C2 material (highly weathered rock, soil with fines). When moisture conditioned and compacted, a permeability of less than 1 x 10^{-7} m/s (which is typically specified for a low permeability material) is expected to be achieved (CPM 2026).

Knight Piésold 2025 provides a summary of the material specification as shown in Table 12 below.

Table 12: Summary of material specification*

ZONE KEY	ZONE TYPE	DESCRIPTION	MAXIMUM LAYER THICKNESS **	COMPACTION SPECIFICATION	GRADING
	ZONE C1	STRUCTURAL FILL (FRESH WASTE ROCK) BY MINING FLEET	500 TO 1500mm	TRAFFIC COMPACTED BY LOADED HAUL TRACKS	D_{MAX} = 2/3 LAYER THICKNESS FINES < 5%
	ZONE C2	LOW PERMEABILITY	300mm	98% OF SMDD OMC -2% < MC < OMC +3%	D_{MAX} = 100mm FINES > 30%
	ZONE C3	STRUCTURAL FILL (FRESH WASTE ROCK WITH GRAVEL AND SAND) BY MINING AND CIVIL FLEET	500 TO 1500mm	TRAFFIC COMPACTED BY LOADED HAUL TRACKS	D_{MAX} = 2/3 LAYER THICKNESS FINES < 5%
	ZONE E	EROSION PROTECTION	300mm	TAMPED WITH EXCAVATOR BUCKET	D_{MAX} = 300mm FINES < 5%
	ZONE F1	DRAINAGE MEDIUM	N/A	UNIFORM DENSITY	D_{MAX} = 19mm % FINES < 5%
	ZONE F2				D_{MAX} = 37.5mm % FINES < 5%
	BACKFILL	IN-SITU MATERIAL (AS APPROVED BY THE ENGINEER)	N/A	TRAFFIC COMPACTED	AS APPROVED BY ENGINEER
	EMBANKMENT FOUNDATION	IN-SITU MATERIAL (AS APPROVED BY THE ENGINEER)	N/A	95% OF STANDARD MAXIMUM DRY DENSITY OMC -3% < MC < OMC +3%	AS APPROVED BY ENGINEER

* THE DETAILED MATERIAL SPECIFICATION SHALL BE REFERRED TO THE TECHNICAL SPECIFICATIONS.
** THE LAYER THICKNESS MAY BE ADJUSTED BASED ON THE FIELD TRIAL AND TEST RESULTS.

Through condition 2, the department has conditioned the upstream embankment material specifications for Zone C2 in line with Table 12.

The department has also included a coefficient of permeability of 1 x 10^{-7} m/s or less for Zone C2 material.

The applicant will be required to demonstrate that the TSF 3 perimeter embankment has been constructed as per condition 2.

Commissioning of TSF 3 is only authorised once the Critical Containment Infrastructure Report has been submitted and deemed acceptable by the department.

Condition 8 and 9: Compliance reporting – bore construction and baseline groundwater monitoring

The department generally conditions the construction of groundwater and/or seepage recovery bores within the Part V instrument/s.

This ensures that the groundwater monitoring bores are constructed to meet certain minimum standards, based on guidance outlined in the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (as amended) (Assessment of Site Contamination NEPM).

This approach provides synergies with any related contaminated sites investigations, should impacts to groundwater be observed from the prescribed premises and/or where there are existing reports or classifications under the *Contaminated Sites Act 2003* (e.g. site with a classification that requires further action in the form of investigation, site assessment, or remediation works).

The application was referred to the department's North West Region (NWR) Water Regulation Division (WRD) for advice.

NWR WRD provided recommended additions to the groundwater monitoring and seepage framework including:

- Confirm bore designs and request for nested or multi-screen bores along key downgradient flow paths to resolve shallow weathered and deeper fractured-rock behaviour.
- Addition of shallow bores near downstream creek lines, particularly along Yagobiddi Creek and the drainage paths toward Edwards and Du Boulay Creeks, to detect any seepage reaching these receptors.
- Installation of at least one background/upgradient bore located outside the expected influence of TSF 2, TSF 3 and dewatering, to provide a stable reference for groundwater levels and chemistry.
- Definition of clear trigger and limit values for groundwater levels and Electrical Conductivity / TDS (and selected ions where relevant to receptor sensitivity) and linking these to action plan that sets out when to investigate, adjust operations, rehabilitate drains or activate/increase recovery pumping.
- Demonstrating, via aquifer pump tests that the proposed recovery bores have sufficient capacity and influence to control mounding and intercept seepage under conservative (high seepage / degraded drain) scenarios.
- Decommissioning all existing bores (including exploration and geotechnical) within the TSF3 footprint in accordance with Australian bore-decommissioning guidelines, to prevent vertical preferential pathways that could significantly increase seepage to deeper aquifers.

These refinements would make the monitoring network more reliable for detecting early seepage, tracking plume behaviour and supporting adaptive management of TSF 3 seepage risks.

The applicant provided the following response to the recommendations:

- Nested and multi-screen bores were considered and determined to be not required due to the shallow nature of the aquifer.
- Background bore 09NC430 is located 2 km north of TSF 3 northern embankment wall outside the expected influence of TSF 2, TSF 3 and dewatering.
- Propose that the TSF 3 groundwater monitoring programme be consistent with Licence L8308/2008/3, TSF 2 groundwater monitoring requirements.
- Bores within the TSF 3 footprint, will be rehabilitated in accordance with Australian guidelines.

The department notes that the drilling of the bores commenced in February 2026. Based on this, condition 8 has been applied through the works approval which requires the applicant to provide a report following construction of the groundwater monitoring and seepage recovery bores.

The reporting requirements included will demonstrate that the bores have been constructed in accordance with the department's regulatory suite of conditions for the construction of

groundwater monitoring bores; and following on from the advice and recommendations received from DWER's NWR (WRD).

The applicant is also required though condition 9 to undertake baseline sampling of the groundwater monitoring bores prior to the commissioning of TSF 3 in accordance with the Assessment of Site Contamination NEPM.

Condition 25: Tailings characterisation

The applicant has stated (CPM 2026) that comprehensive tailings testing programs were conducted in different stages. These programs included:

- Physical Testing: Particle size distribution, setting tests, strength testing and hydraulic conductivity in July 2008, 2009, September 2015, June 2018, August 2023 and March 2025;
- Rheological Testing: Segregation characteristics, viscosity and pumpability in July 2008; and
- Geochemical Testing: Total Sulphur, Sulphur Speciation, Total Acid Neutralising Capacity, Net Acid Producing Potential, Reactive Acid Neutralising Capacity, Net Acid Generation, X-ray Diffraction, Whole Rock Chemistry, Metal Leaching Potential, Acid-Base Accounting in June 2008 and July 2008.

Knight Piésold 2025 states "*No additional testing has been conducted as part of the TSF 3 design. However, it is recommended that an operating tailings sample should be tested on a regular basis, typically every 2 to 5 years*".

Based on this recommendation, the department has included condition 25, which requires the applicant to have at least 10 tailings samples analysed to determine the likely behaviour of elements under a range of leaching conditions including:

- Leaching Environmental Assessment Framework (LEAF) Test Method 1313, which is designed to evaluate the partitioning of constituents between liquid and solid phases at or near equilibrium conditions over a wide range of pH values; and
- LEAF Test Method 1314, which is a percolation column test designed to evaluate constituent releases from solid materials as a function of cumulative liquid-to-solid ratio.

Condition 28: Cumulative seepage assessment

DWER's NWR (WRD) have concerns regarding the cumulative impact assessment. In particular, that highlighted:

TSF 3 is being constructed within a groundwater system that is already modified by TSF 2 seepage, TSF 2 seepage recovery pumping, large-scale pit dewatering and tidal influence. These activities have altered groundwater gradients, elevated salinity in parts of the aquifer and shifted the position of the saline interface. TSF 3 will add a large unlined seepage source into this system. As such, cumulative impacts are important to determine whether environmental risks are appropriately managed.

The application presents a "cumulative seepage assessment" by simply added TSF 3 SEEP/W seepage estimates to historic steady-state seepage values for TSF 2. This approach does not evaluate how combined seepage loads will influence groundwater mounding, phreatic geometry, salinity evolution, plume migration or the adequacy of the existing TSF 2 recovery system once TSF 3 is operating. It also does not assess how cumulative seepage may shift groundwater gradients or accelerate salinity movement toward downgradient receptors such as Yagobiddi Creek, Edwards Creek, Du Boulay Creek, groundwater-dependent vegetation and pastoral bores.

NWR (WRD) advised that the cumulative assessment must therefore integrate TSF 3 seepage fluxes into the site-wide groundwater model, alongside TSF 2 seepage, pit dewatering and local hydrogeological processes, to assess the combined changes in groundwater levels and salinity at receptor locations.

The department has therefore included condition 28 which requires the applicant to provide a report which includes an updated site-wide groundwater model and then oonce the site-wide modelling is completed, a review of the adequacy of the existing monitoring network to confirm whether additional receptor bores are required to verify seepage pathways to receptors.

Reporting requirements:

The following reports are required to be submitted:

- Conditions 3 and 4: Environmental Compliance Report demonstrating that the infrastructure has been constructed / installed as per the requirements committed to in condition 1.
- Conditions 5 and 6: Critical Containment Infrastructure Report demonstrating that the infrastructure has been constructed / installed as per the requirements committed to in condition 2.
- Condition 8: Bore Construction Report as outlined above.
- Conditions 14 and 15: Environmental Commissioning Report providing a summary of the commissioning activities with timeframes; volumes of tailings deposited; tailing stream solid content; seepage and decant return water volumes; volumes discharged via emission point DC2; and environmental performance.
- Condition 25: Tailings characterisation as outlined above.
- Conditions 26 and 27: Time Limited Operations Report providing timeframes; volumes of tailings deposited; tailing stream solid content; TSF 3 water balance summary; volumes discharged via emission point DC2; and an interpretation of the ambient groundwater monitoring undertaken including a comparison against the baseline results from condition 9.

  The comparison against baseline data has been included, since on review of the monitoring data (2024-2025) for DC2 and the TSF 2 groundwater monitoring bores within the related Annual Environmental Report, there were no previous results (except for the one year previous) to compare results.

  The reporting requirements under Licence L8308/2008/3 will be reviewed at the next Licence amendment. This will ensure that the department is receiving sufficient information and, in a format, (i.e. trend graphs to provide graphical representation of historical results (+5 years) and to support the interpretative summary) which will assist the department with making determinations on any environmental impacts from activities / emissions and discharges at the premises and whether limits / triggers and /or corrective actions need to be applied.
- Condition 28: Cumulative seepage assessment as outlined above.

4. Consultation

Table 13 provides a summary of the consultation undertaken by the department.

Table 13: Consultation

Consultation method	Comments received	Department response
Application advertised in The West Australian and on the department's website on 10 November 2025	One public submission was received on 21 November 2025.	Refer to Appendix 1.
City of Karratha advised of proposal on 10 November 2025	The City of Karratha provided the following response on 01 December 2025 - *The City of Karratha has reviewed the application and supporting documentation and advises that it has no objections to the proposed works.* *We note that standard environmental management measures should be implemented, including:* • *Compliance with relevant requirements for tailings storage facilities.* • *Adequate seepage control and groundwater monitoring.* • *Dust and noise mitigation during construction and operation.* • *Emergency response and closure planning.*	Noted.
Department of Mines, Petroleum and Exploration (DMPE) advised of proposal on 10 November 2025	DMPE provided a response on 08 January 2026. Refer to section 2.3.3.	Noted.
DEED advised of proposal on 10 November 2025	DEED provided comments on 18 November 2025. Refer to section 2.3.2.	Noted.

Consultation method	Comments received	Department response
Department of Lands, Planning and Heritage (DPLH) advised of proposal on 10 November 2025	DPLH Aboriginal Heritage Conservation responded on 25 November 2025 stating – A review of the Aboriginal Heritage Register of Places and Objects, as well as the DPLH Aboriginal Heritage Database, concludes that the subject area, as depicted in shapefile '20250909_TSF3_Design_MGA50_GDA2020', intersects with 8 Aboriginal sites and 35 Aboriginal heritage places. Therefore, based on the current information held by DPLH, approvals under the *Aboriginal Heritage Act 1972* (AH Act) are required for development within the boundary of the above Aboriginal sites and places. The works are within the Yaburara and Mardudhunera People Native Title Determination area, represented by the Wirrawandi Aboriginal Corporation (WAC). The applicant indicates they will be seeking Ministerial consent under section 18 of the AH Act to impact sites within the project area. It is understood that the management through salvage of the sites within the subject area will be determined through consultation with WAC. All other sites are to be managed under a co-designed Cultural Heritage Management Plan. Ongoing consultation with WAC is encouraged to allow for best practice management of the Aboriginal heritage extant in the vicinity of the project, and to ensure Heritage Surveys undertaken to date remain fit for purpose to manage Aboriginal heritage. The applicant is encouraged to seek further advice from DPLH Aboriginal Heritage Conservation via the ACHknowledge Portal if they have any questions regarding compliance with the AH Act and submitting a section 18 application.	The applicant was made aware of DPLH comments on 16 January 2026. The applicant advised that they continue to respect the values and position of WAC and continues to work with WAC through the section 18 process and continued project development. The applicant advised (CPM 2026) that a section 18 application was submitted to DPLH on 15 January 2026. The department notes that a section 18 under the AH Act seeks the Minister's consent for the use of land for any purpose that may excavate, damage, destroy, conceal or alter an Aboriginal site on the land, or otherwise be a beach of section 17 of the AH Act. The assessment and regulation of an activity through Part V of the EP Act processes does not exempt the applicant from meeting requirements under other legislation. This includes requirements under the AH Act. It is the applicant's responsibility to ensure proposed activities comply with the AH Act.
Wirrawandi Aboriginal Corporation (WAC) RNTBC on behalf of the Yaburara and Mardudhunera People advised of proposal on 10 November 2025	WAC responded on 06 January 2026. A summary of the comments is provided below: • WAC understands that the proposed TSF 3 infrastructure would be located within the area comprising G08/53 (while understanding that the TSF 3 footprint will not take up the whole	The applicant was made aware of WAC comments on 16 January 2026. The applicant advised that the project's purpose and operational requirements define the parameters of TSF 3. Substantial redesign—whether through relocation, reorientation, or reshaping— would:

Consultation method	Comments received	Department response
	of G08/53). There are **108 known cultural sites** (59 registered, 49 lodged) within G08/53. • The applicants activities would be a breach under the AHA without consent under section 18. • WAC has been informed that the applicant intends to seek consent to disturb, relocate or destroy **53 sites**, to enable construction of TSF 3. These impacted sites include important ethnographic, mythological, camping and rock art sites, in addition to artefact scatters. WAC notes no decision to consent to a program of works that involves the destruction of heritage has been given. The Traditional Owners, WAC and RRKAC have offered to inspect the locations on 3 March 2026 with a qualified anthropologist to consider the request and the proposed section 18. • The Traditional Owners have expressed concerns in respect of the applicants proposed extension of the existing Tailings Dam to its North and North East and have consistently sought a greater understanding of alternative options for the expansion to the East, West and further North of the existing Tailings Dam, to minimise impacts. Specifically, WAC has asked the applicant whether it is possible to redesign TSF 3 to avoid impacting a significant archaeological, ethnographic and ritual site of major importance known as Yagobiddy Ngurra site complex (DPLH Lodged Site ID 37684) situated in the South East corner of the proposed TSF 3. WAC has asked this question recently. It was also asked by the Yaburara and Mardudhunera (YM) traditional owners during 2018 survey of TSF3 area, as is captured in the relevant ethnographic report. • While the applicant has advised WAC that it is not technically or economically feasible to do so, to date the applicants responses have been insufficient and lacking in technical and financial rigor. The applicant has failed to provide sound evidence of any formal consideration of alternatives that may have been undertaken by them. • Relevantly, WAC notes that the Works Approval Supporting Document includes Knight Piésold design reviewer comments.	• Fail to provide the necessary storage capacity, • Conflict with fixed existing infrastructure, • Be precluded by physical and topographical constraints, and • Result in significant safety and engineering risks. For these reasons, redesign options that would meaningfully reduce heritage impacts are not available. The applicant acknowledged the cultural significance of the heritage sites within G08/53 and advised that they will continue to engage with WAC to discuss the section 18 process and continued project development. The assessment and regulation of an activity through Part V of the EP Act processes does not exempt the applicant from meeting requirements under other legislation. This includes requirements under the AH Act. It is the applicant's responsibility to ensure proposed activities comply with the AH Act. The department recognises the importance of other related approvals in achieving suitable environmental outcomes. As outlined in the Guideline: Industry regulation guide to licensing, the department takes into account the processes and perspectives of other decision-making authorities. In addition, following the Guideline: Decision making, responses from interested parties and advice from relevant government agencies are carefully evaluated. This collective input is considered when assessing risks to public health, public amenity, or the environment, ensuring a comprehensive and informed decision-making process. On the 14 May 2026, CITIC advised DWER that they had received consent under section 18 of the AH Act in relation to TSF 3 – for further information refer to Section 2.3.5.

Consultation method	Comments received	Department response
	The reviewer has asked whether 'potentially impacted cultural and heritage sites have been identified and, if so, how has this influenced the TSF layout and design?' (Comment 10, p. 201, 209). Knight Piésold responded that the applicant have conducted a heritage assessment and have 'been in contact with the traditional owners' and that the applicant 'has submitted documents to relevant authorities in relation to heritage sites'. The only heritage management option mentioned by Piésold is relocation of any heritage sites. • In WAC's view the applicants responses do not adequately answer the reviewer's question in respect of how the cultural heritage assessments have influenced the layout and design. WAC is unaware of any options considered or re-configuration of the layout or design of the proposed extension of the existing Tailings Dam based on concerns raised by the Traditional Owners, especially in relation to the Yagobiddy Ngurra site complex. The applicant has consistently told WAC that without the expansion to the North and North East its mine will shut down, however WAC has not been provided with any feasibility study in support of this assertion.	
The applicant was provided with draft documents on 27 March 2026. Within the draft package, the department included concerns raised by WAC and advised CITIC that it would not make a final decision on the works approval application until consent under section 18 of the AH Act had been gained, or until DPLH had advised that impacts on Aboriginal heritage sites can be adequately managed.	The applicant responded on 2 April 2026 addressing the queries in the draft documents. The applicant also waived the remaining comment period and requested the works approval to be granted to allow construction works to commence.	Documents updated accordingly. In seeking additional advice from DPLH on the section 18 consent process (beyond the advice outlined above), DPLH advised they were unable to provide an update until the Minister for Aboriginal Affairs had made a decision on the section 18 consent. On the 14 May 2026, CITIC advised DWER that they had received consent under section 18 of the AH Act in relation to TSF 3 – for further information refer to Section 2.3.5.

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. CITIC Pacific Mining Management Pty Ltd (CPM) 2024, *Operational Environmental Management Plan* (OEMP) (CDMS-3490064645467, Version 2.0) available at https://citicpacificmining.com/our-responsibilities/environment.
2. CITIC Pacific Mining Management Pty Ltd (CPM) 2025, *Sino Iron Project Mine Site L8308 – Works Approval TSF 3* (Document Number: ENVDR-1286095269-4459, V0), 24 September 2025.
3. CPM 2026, *RE: Application for a Works Approval under the Environmental Protection Act 1986 – Request for Further Information*, (CPM Ref: ENVDR-1084915769-4399), dated 13 February 2026.
4. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
5. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
6. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.
7. EPBC 2017/7862 can be searched at https://epbcpublicportal.environment.gov.au/all-notices/.
8. Knight Piésold Pty Limited (Knight Piésold) 2025, *Citic Pacific Mining - Sino Iron Project Tailings Storage Facility 3 Design Report* (KP Report No. PE801-00198/08, Rev 1), prepared for CITIC Pacific Mining Management Pty Ltd, August 2025.
9. Part IV of the EP Act Ministerial Statements can be searched at https://www.epa.wa.gov.au/all-ministerial-statements.

Appendix 1: Summary of public submission comments

Heading	Summary of public submission comments	Department response
Design Basis and Geotechnical Assumptions	Undrained Shear Strength of Foundation Clays The design adopts a minimum undrained shear strength of 45 kPa for the fully saturated eluvium and residual soils. This value is derived from laboratory tests on a limited number of samples (e.g., KP-BH01, KP-BH02) and from correlations. Concerns were raised on the range of measured undrained strengths in the laboratory spans 48 kPa to 220 kPa, indicating considerable variability. Moreover, the liquid limit of the eluvium (≈48 %) and its plasticity index (≈30 %) place it near the threshold where pore-pressure generation under rapid loading can be significant. A single conservative value may not capture spatial heterogeneity, especially where Gilgai soils are present. Recommendation Conduct a systematic undrained-strength mapping campaign across the western and north-western embankment footprints, targeting at least six additional boreholes at depths of 0.5–3 m where Gilgai deposits have been identified. Use both triaxial and direct-simple-shear tests to constrain the variability. If the lower-bound strength falls below 45 kPa, the design safety factors for short-term undrained loading (currently 1.5) may be insufficient. Shear-Key Effectiveness Concern was raised that even if the shear-key's primary purpose is to excise weak material, its presence (or absence) influences the failure-surface geometry. Ignoring it in the finite-element or limit-equilibrium models could underestimate the factor of safety, particularly for shallow failure modes that intersect the toe region.	The matters raised are typically outside the provisions of Part V of the EP Act, so they are not addressed further in this assessment. They are however considered by mining operators to meet legislative obligations for work health and safety under the *Mines Safety and Inspection Act 1994* and related environmental provisions under the *Mining Act 1978*. For the comments relating to the undrained shear strength of foundation clays; and shear-key effectiveness the department provides the following: • A Geotechnical specialist from the Department of Local Government, Industry Regulation and Safety (DLGIRS) reviewed the design report for TSF 3. • DLGIRS advised that the project provides information consistent with DMPE guidelines and is aligned with Australian National Committee on Large Dams (ANCOLD) and Global Industry Standard on Tailings Management (GISTM) design standards. Refer also to section 2.2.3 in relation to comments from the DMPE.

Heading	Summary of public submission comments	Department response
	Recommendation Incorporate the shear-key geometry (width, depth, material properties) into the SLOPE/W models for Sections A and B. Perform a sensitivity analysis where the shear-key is omitted to quantify its contribution to overall stability. If the factor of safety drops below the ANCOLD minimum (1.5 for long-term drained conditions), a redesign or reinforcement of the toe zone is required.	
	C2 Low-Permeability Material The C2 zone is specified to have a permeability of 1×10^{-7} m s^{-1}, yet laboratory tests on 2024 samples yielded values between 6.2×10^{-6} m s^{-1} and 9.9×10^{-6} m s^{-1}. The over-optimistic permeability assumptions can lead to under-prediction of seepage losses, phreatic-surface rise, and consequently, reduced effective stress in the embankment core. The seepage modelling results (average-pond condition, functional drains) already show a 22.8 kL day^{-1} loss for Stage 9, which would increase substantially if C2 is more conductive. Recommendation Adopt the measured upper bound ($\approx 1 \times 10^{-5}$ m s^{-1}) for a conservative seepage analysis, and re-run the SEEP/W model. If the functional-drain scenario yields seepage exceeding 30 kL day^{-1}, consider (i) increasing the thickness of the C2 blanket, ((ii) adding supplemental low-permeability liners (e.g., geomembrane) in critical zones, or (iii) revising the drainage layout to ensure redundancy.	The department has – • Conditioned the Zone C2 material for the upstream slope embankment to ensure a coefficient of permeability of 1 x 10^{-7} m/s or less is achieved. The applicant will be required to demonstrate that this permeability has been achieved for the Zone C2 material within the Critical Containment Infrastructure Report under condition 5, prior to the commissioning of TSF 3. • Conditioned the requirement for a cumulative seepage assessment, which integrates TSF 3 seepage fluxes into the site-wide groundwater model, alongside TSF 2 seepage, pit dewatering and local hydrogeological processes, to assess the combined changes in groundwater levels and salinity at receptor locations. Refer also to section 3.3. The department considers the regulatory controls listed above sufficient to address the public submission comments.
Seepage and Ground-Water Modelling	Boundary Conditions and Phreatic Surface The SEEP/W models impose a constant head on the downstream boundary based on a single groundwater elevation measurement (≈10.3 m RL for the western toe). However, monitoring data show	The department has – • Conditioned the Zone C2 material for the upstream slope embankment to ensure a coefficient of permeability of 1 x 10^{-7} m/s or less is achieved. • Conditioned the requirement for a cumulative seepage

Heading	Summary of public submission comments	Department response
	spatial variability of groundwater levels ranging from 3.5 m to 6.8 m mbgl across the site, with seasonal fluctuations of ±1.5 m. Using a uniform downstream head neglects the hydraulic gradient that drives seepage toward the Fortescue River. This could underestimate the hydraulic gradient across the embankment, especially during high-water-table periods. <u>Recommendation</u> Construct a spatially distributed groundwater-head surface using the 2024 bore data (KP-BH02 to KP-BH08) and the historic 2009 production-bore results. Apply this surface as a linearly varying boundary condition in SEEP/W. Evaluate the impact on the phreatic surface within the tailings and embankment core. If the modelled phreatic surface approaches the upstream toe, redesign the cutoff-trench depth or increase the C2 thickness.	assessment, which integrates TSF 3 seepage fluxes into the site-wide groundwater model, alongside TSF 2 seepage, pit dewatering and local hydrogeological processes, to assess the combined changes in groundwater levels and salinity at receptor locations. Refer also to section 3.3. The department considers the regulatory controls listed above sufficient to address the public submission comments.
	<u>Drainage System Redundancy</u> The modelling distinguishes “functional” versus “non-functional” under-drainage. The non-functional case for Stage 9 predicts 54.9 kL day^{-1} loss under average pond conditions – more than double the functional case. The probability of a complete drainage failure (e.g., blockage, pump outage) is not quantified. The consequences of a prolonged non-functional drainage state (e.g., weeks) are severe: increased pore pressures could trigger the short-term undrained failure mode (FoS ≈ 1.5). <u>Recommendation</u> Perform a probabilistic reliability analysis of the drainage system (e.g., Monte-Carlo simulation) using failure rates of the toe-drain, basin-drain and pump components. Define a target reliability (e.g., 0.999 year^{-1}) and, if unmet, introduce additional parallel drainage paths or emergency venting structures.	Through condition 2, the department has regulated the construction of the underdrainage and seepage interception system. The applicant will be required to demonstrate that this infrastructure has been installed as per commitments, prior to the commissioning of TSF 3 and this infrastructure. Operational requirements for the underdrainage and seepage interception system and associated pumps have been conditioned on the works approval (condition 18). The applicant is required to ensure this infrastructure is maintained and operated in accordance with the construction / installation requirements. The department considers the requirements / regulatory controls listed above sufficient to address the public submission comments.

Heading	Summary of public submission comments	Department response
Seismic and Liquefaction Assessment	Liquefaction Potential Four different liquefaction assessment methods were applied (Hunter-Fell, Seed, Boulanger-Idriss, Bray-Sancio). The majority indicate low susceptibility, yet the Hunter-Fell method flags a significant portion of the western embankment as potentially liquefiable, especially where the SPT N values are low (≈12–15). The Hunter-Fell method is conservative for coarse-grained, low-plasticity soils, which are present in the western toe (e.g., the "clay-hard" layer). Ignoring this could underestimate the post-seismic residual-strength reduction, particularly for the "no-potential-loss-of-containment" case where the FoS is only 1.34 (Section A, Stage 1A). Recommendation Adopt the most conservative liquefaction assessment (Hunter-Fell) for the design of the toe and near-shore zones. If the factor of safety falls below the ANCOLD minimum (1.0–1.2 for post-seismic), increase the compaction effort (target > 98 % SMDD) and consider soil improvement (e.g., vibro-flotation, stone columns) in the identified zones.	The matters raised are typically outside the provisions of Part V of the EP Act, so they are not addressed further in this assessment. They are however considered by mining operators to meet legislative obligations for work health and safety under the *Mines Safety and Inspection Act 1994* and related environmental provisions under the *Mining Act 1978*. Refer to the above comments from DLGIRS and to section 2.2.3 in relation to comments from the DMPE.
	Seismic Deformation The simplified seismic-deformation analysis yields a maximum crest settlement of 80 mm for a Maximum Credible Earthquake (MCE). The freeboard allocation for Stage 9 is 0.5 m (operational freeboard) plus 0.5 m (design freeboard), totalling 1.0 m. The settlement estimate does not account for potential differential settlement across the embankment crest, which could induce tensile stresses in the upstream low-permeability C2 zone, leading to cracking and accelerated seepage. Recommendation Conduct a finite-element dynamic analysis (e.g., using PLAXIS-Dynamic) that captures spatial variation of settlement and stress redistribution. Verify that the induced tensile strain in the C2 layer remains below the cracking threshold (≈0.1 %). If not, increase the C2	See the response to the comment directly above and earlier comments relating to TSF geotechnical considerations. The TSF design report was reviewed by a Geotechnical specialist (DLGIRS) confirming sufficient consideration of geotechnical aspects. The department has – • Conditioned the Zone C2 material for the upstream slope embankment to ensure a coefficient of permeability of 1 x 10^{-7} m/s or less is achieved. • Conditioned an operational freeboard of 1 m along the TSF 3 perimeter embankment.

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	thickness or introduce a geosynthetic reinforcement (e.g., geogrid) to limit differential movement.	The department considers the regulatory controls listed above sufficient to address the public submission comments.
Environmental Impact and Consequence Assessment	<u>Dam-Break Consequence Modelling</u> The dam-break analysis uses a conical breach shape with a 5 % back-scarp. The resulting inundation maps show the Fortescue River estuary and Indian Ocean potentially receiving contaminated runoff. The Population at Risk (PAR) is reported as <1, yielding a “HIGH C” ANCOLD consequence category. The PAR calculation excludes transient workers (e.g., contractors, fly-in-fly-out crews) who may be present on-site during construction or maintenance activities. Moreover, the model assumes instantaneous breach propagation without accounting for progressive erosion that could enlarge the breach and increase discharge volumes. <u>Recommendation</u> 1. Expand the PAR definition to include all personnel present on site (estimated 150 persons during peak construction) and recalculate the PAR and PLL. 2. Perform a progressive-failure breach simulation (e.g., using HEC-RAS or FLO-2D) that accounts for erosion of the embankment material, which may increase the breach width by up to 50 %. Assess the resulting flood-wave arrival times at the North-South road and downstream communities. 3. If the revised PAR exceeds 0.5, consider relocating critical infrastructure (e.g., office buildings, lay-down yards) or installing early-warning sirens along the road corridor.	See the above response relating to TSF geotechnical considerations. As there is minimal risk to human receptors, a PAR is not considered necessary for this proposal. In terms of potential human receptors (e.g. contractors, fly-in-fly-out crews) working within a prescribed premises held by the applicant, the department excludes these workers as receptors. Protection of these parties often involves different exposure risks and prevention strategies, and is provided for under other state legislation. The TSF design report was reviewed by a Geotechnical specialist (DLGIRS) confirming sufficient consideration of geotechnical aspects.

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	Water Quality and Salinity Ground-water monitoring reports TDS ranging from 1 200 mg L^{-1} to 6 500 mg L^{-1} across the TSF 3 vicinity. The tailings supernant water exhibits TDS of 640–1 070 mg L^{-1}. The seepage model assumes no contaminant attenuation. Even modest seepage volumes (e.g., 0.6 kL day^{-1} under functional drains) could raise the salinity of downstream groundwater, affecting agricultural use and ecological habitats. The current environmental impact statement does not quantify cumulative salinity loading over the 15-year operational life. Recommendation Develop a mass-balance salinity model that integrates projected seepage rates, tailings water chemistry, and dilution in the Fortescue River system. Compare the predicted downstream TDS with the Western Australian Water Quality Guidelines (maximum 2,000 mg L^{-1} for drinking water). If thresholds are approached, implement active treatment (e.g., constructed wetlands) for seepage before discharge.	The department has conditioned the requirement for a cumulative seepage assessment, which integrates TSF 3 seepage fluxes into the site-wide groundwater model, alongside TSF 2 seepage, pit dewatering and local hydrogeological processes, to assess the combined changes in groundwater levels and salinity at receptor locations. The applicant will also be required to undertake quarterly ambient groundwater monitoring and water balance for TSF 3 for each monthly period. The department considers the requirements / regulatory conditions listed above sufficient to address the public submission comments.
Operational and Monitoring Provisions	Instrumentation The monitoring plan lists piezometers, inclinometers, and vibration-wire (VW) sensors, but does not specify sampling frequency, data-transmission protocols, or threshold alert levels. Without real-time data transmission and predefined alarm criteria, the ability to intervene promptly during a rapid rise in pore pressure or unexpected settlement is compromised. Recommendation 1. Install wireless telemetry for all piezometers and inclinometers, transmitting data at hourly intervals to a central DWER-hosted server. 2. Define action thresholds (e.g., pore-pressure increase > 0.5 m above design level, settlement rate > 5 mm day^{-1}) that trigger	As per above responses, the TSF design report was reviewed by a Geotechnical specialist (DLGIRS) confirming sufficient consideration of geotechnical aspects. The department does not have the capabilities nor a requirement to have a centralised server to receive hourly data from all piezometers and inclinometers state-wide. The applicant has advised that a Trigger Action Response Plan (TARP) will be implemented to manage declining performance of the drainage system: • Level 1 (Observation): Flow rate deviates by >20% from model. Action: Increase monitoring frequency and inspect outfalls for chemical scaling. • Level 2 (Investigation): Piezometric levels exceed the "Alert" threshold. Action: Conduct CCTV inspection of

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	mandatory shutdown of tailings deposition and activation of emergency drainage. 3. Conduct quarterly independent audits of data integrity and sensor calibration.	accessible collector pipes and water chemistry analysis to identify the cause for reduction in seepage. • Level 3 (Intervention): Piezometric levels approach "Critical" limits. Action: Investigate remedial options based on investigation results. The department has determined not to condition these management actions under the works approval but expects the management commitments to be adopted as part of standard site operating procedures.
	Maintenance of Drainage Infrastructure The operating manual specifies inspection frequencies (monthly, after heavy rain). However, the functional reliability of the under-drainage system depends on cleanliness of the collector drains and availability of spare pumps. Blockage of the basin drains was identified as a high-impact failure mode (doubling seepage loss). The manual lacks a preventive-maintenance schedule (e.g., scheduled flushing, debris removal). Recommendation Implement a preventive-maintenance programme that includes: 1. Bi-annual flushing of all collector drains with high-pressure water jets. 2. Installation of filter screens (mesh ≤ 10 mm) at inlet points to capture coarse debris. 3. Keeping a stock of spare pump units on site, with quarterly functional testing.	The department has determined not to condition the preventative maintenance programme recommended. The applicant has advised the performance of the underdrainage system is monitored through a combination of hydraulic and volumetric indicators. A "progressive degradation" would be detected through the following signals: • Volumetric Flow Rates: Each drainage sector is equipped with flow measurement devices at the sumps. A consistent, downward trend in flow rates compared to predicted seepage models (at a given tailings head) would indicate potential pipe clogging. • Piezometric Head (Pore Pressure): Piezometers (VWP) installed at the foundation-tailings interface are the most critical sensors. An upward trend in pore water pressure at the base, while the supernatant pond remains stable, is a direct indicator that the drainage system is failing to dissipate the hydraulic head No underdrainage system maintenance is proposed during operations. To ensure long-term functionality, the following design features are incorporated: • Filter Design: The basin and toe drains utilise a multi-stage granular filter (specifically graded sand and

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		aggregate) designed to be internally stable and self-filtering, preventing the migration of fine tailings into pipes. The department determines the applicant's response adequate to address the public submission comments. The department will not impose additional regulatory controls.