



Application for Licence Amendment

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

Licence Number	L4680/1988/13
Licence Holder	FMR Investments Pty Ltd
ACN	009 411 349
File Number	2013/003899-1
Premises	Greenfields Processing Site Great Eastern Highway COOLGARDIE WA 6429 Legal description – Part of mining tenement M15/1836 and Lot 102 on Plan 40393 As defined by the Premises maps attached to the Revised Licence.
Date of Report	26 April 2024
Decision	Revised licence granted

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

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

Table of Contents

1. Decision summary	1
2. Scope of assessment	1
2.1 Regulatory framework	1
2.2 Application summary	1
2.3 Background	1
2.4 Proposed activities	2
2.4.1 TSF4 Stage 2 and 3 geotechnical assessments.....	3
2.4.2 Seepage management plan for TSF4.....	4
2.4.3 Decommissioning and closure of TSF4	5
3. Risk assessment.....	5
3.1 Source-pathways and receptors	5
3.1.1 Emissions and controls	6
3.1.2 Receptors.....	8
3.2 Risk ratings.....	10
4. Consultation.....	14
5. Conclusion	14
5.1 Summary of amendments.....	14
Appendix 1: Application validation summary.....	17
Table 1: TSF4 Stage 2 and Stage 3 embankment raise details.....	2
Table 2: Licence Holder controls.....	6
Table 3: Sensitive human and environmental receptors and distance from prescribed activity .	8
Table 4. Risk assessment of potential emissions and discharges from the premises during construction and operation	11
Table 5: Consultation	14
Table 6: Summary of licence amendments	14

1. Decision summary

Licence L4680/1988/13 is held by FMR Investments Pty Ltd (Licence Holder) for the Greenfields Processing Site (the premises), located on mining tenement M15/1836 and Lot 102 on Plan 40393.

This Amendment Report documents the assessment of potential risks to the environment and public health from proposed changes to the emissions and discharges during the construction and operation of the premises. As a result of this assessment, revised licence L4680/1988/13 has been granted.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this Amendment Report, the department 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 8 November 2023, the Licence Holder submitted an application to the department to amend licence L4680/1988/13 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The following amendments are being sought:

- Authorisation to construct the tailings storage facility (TSF) 4 Stage 2 and Stage 3 embankment raises, from the existing starter embankment height of RL 402.5 m to RL 405.5 m (Stage 2) and RL 405.5 m to RL 408.0 m (Stage 3);
- Once constructed, authorisation to operate the TSF4 Stage 2 and Stage 3 embankment raises (i.e., tailings deposition).

This amendment is limited only to changes to Category 5 activities from the existing licence. No changes to the assessed production capacity for Category 5 activities (i.e., 1,400,000 tonnes per annual period) have been requested by the Licence Holder.

2.3 Background

The Greenfields Processing Site is a toll milling facility located approximately 4 kilometres (km) north of Coolgardie. Tailings from the mill are currently deposited to the existing TSF3 and TSF4. Located directly north of TSF3 Cell C, TSF4 was constructed to provide additional tailings storage capacities for the premises.

The construction of the TSF4 Stage 1 starter embankment was authorised under works approval W6547/2021/1. Construction of the starter embankment commenced in November 2021 and reached the intended design height of RL 402.5 m by mid-2023. The operation of the starter embankment was authorised through two licence amendments, granted on 28 March 2023 (DWER 2023a) and 3 November 2023 (DWER 2023b).

The most recent Annual Audit and Management Review for TSF4 indicated the following (CMW 2024a):

- No sign of cracking, bulging, slumping or erosion on the TSF4 perimeter embankments, nor were there visual seepage observed around the TSF2, including within the diversion drain.
- The TSF4 underdrainage tower was not functional at the time of the audit. Remedial actions were taken in February 2024 to clear the blockage at the tower. The decant

pump was reinstalled in early April 2024 and the underdrainage is currently operational.

- Tailings deposition was not occurring at TSF4 at the time of the audit, as the Stage 1 starter embankment had been filled to capacity. Operational and total freeboard were noted to be approximately 0.5 m and 2.0 m, respectively. The tailings beach appeared to be drying with beach slopes of about 1% to 2%.
- The TSF4 supernatant pond was observed near the decant tower, about 20 m in radius. The decant tower was not active at the time of the audit and had been temporarily sealed.
- Associated groundwater monitoring bores and vibrating wire piezometers were regularly monitored, with groundwater monitoring results in the 2023 annual period summarised as follows:
 - Groundwater standing water levels (SWL) ranged between 4.2 mbgl (MB401) and 37.2 mbgl (MB403). The greatest rise in SWL observed in the 2023 annual period was 1.1 m at MB401.
 - pH ranged between 6.8 pH units and 7.8 pH units. Monitoring bore MB401 was observed to be slightly acidic, while MB402 and MB403 were slightly alkaline.
 - Total dissolved solids ranged between 14,000 mg/L and 110,000 mg/L, indicating hypersaline groundwater conditions.

Beyond the Stage 1 starter embankment, the TSF4 is intended to undergo up to four embankment raises to a nominal final embankment height of RL 413.0 m, with embankment raise heights typically mirroring those for TSF3 (CMW 2023), two of which are assessed under this licence amendment.

2.4 Proposed activities

The TSF4 will be raised in two stages (i.e., Stage 2 and Stage 3) using upstream construction method, from the existing RL 402.5 m to RL 405.0 m during Stage 2 and then to RL 408.0 during Stage 3. The facility will be raised a total of 5.5 m as part of the two-stage lifts. The design characteristics for the TSF4 Stage 2 and 3 embankment raises are detailed in Table 1.

Table 1: TSF4 Stage 2 and Stage 3 embankment raise details

Parameter	Stage 1 (existing)	Stage 2 (proposed)	Stage 3 (proposed)
Annual tailings production	1.0 mtpa	1.0 mtpa	
Dry tailings density	1.4 tonnes/m ³	1.4 tonnes/m ³	
Tailings slurry solids content	44% solids	44% solids	
Tailings beach slope	1.0%	1.0%	
Minimum total freeboard	700 mm	700 mm	
Maximum embankment height	RL 402.5 m	RL 405.5 m	RL 408.0 m
Increase in embankment height	N/A	3.0 m	2.5 m
TSF4 embankment area	12.7	13.9 ha	14.8 ha
TSF4 footprint area	14.6	17.5 ha	19.1 ha
Storage volume	800,000 m ³	358,000 m ³	299,000 m ³

Parameter	Stage 1 (existing)	Stage 2 (proposed)	Stage 3 (proposed)
Storage capacity	1.12 megatonnes	0.50 megatonnes	0.42 megatonnes
Storage life	1.1 years	0.5 years	0.4 years

Due to the upstream construction method, the new embankments will be constructed on the existing embankments as well as on the adjacent dried tailings beach. As with the existing Stage 1 starter embankment, no western embankment will be constructed as TSF4 abuts a low ridge to the west. The proposed embankment raises will utilise compacted dried tailings from the adjacent decommissioned TSF2 and active TSF3, as well as mine waste sourced from outside the premises. All construction material will be non-acid forming, with physical properties confirmed through laboratory testing during construction works.

The existing decant and underdrainage infrastructure will be raised along with the embankments and maintained in order to manage the stability and phreatic surface at TSF4. The decant structure comprises a decant tower of deep-slotted concrete pipes surrounded by select filter rock. The underdrainage system for TSF4 comprises slotted pipe underdrainage lines grading towards an underdrainage sump and tower. The decant tower and underdrainage tower will be raised along with the perimeter embankments, using centreline construction method.

During the operation of TSF4 Stage 2 and 3 embankment raises, tailings slurry will be discharged sub-aerially and cyclically from the upstream perimeter embankment crest in thin discrete layers (i.e., not exceeding 300 mm in thickness) from multi-point spigots to allow for optimum density and strength gain by subjecting each layer to a drying cycle. The TSF design assumes that the tailings beach will form a truncate prism with a depressed cone. Tailings deposition will be sequentially staged between TSF4 and the three-cell TSF3, such that the average rate of rise in each cell is less than 2.5 m annually.

The TSF4 supernatant pond will be maintained around the decant tower and away from the perimeter embankments at all times. Water within the TSF4 supernatant pond will be removed using pumps equipped to the decant tower. Return water is either sent to the Return Water Pond south-east of TSF3 Cell C for storage or directly to the processing mill for reuse. The minimum capacity of the return water system should be no less than 125 tonnes per hour, which is approximately 56% recovery rate, plus removal of water from a 1:100-year annual exceedance probability (AEP) storm event for up to 72 hours over one month.

Seepage analysis indicated that, where the TSF4 supernatant pond is maintained at a distance of at least 100 m from the perimeter embankments, seepage generated was estimated to be approximately 4 m³/day and 7 m³/day for the Stage 2 and 3 embankment raises, respectively. With the clay liner over the foundation of TSF4 and operation of the underdrainage system, seepage from the facility is expected to be low.

A water balance provided for the TSF4 Stage 2 and 3 showed that approximately 34% to 55% of water inputted into TSF4 will be lost through evaporation, seepage, and retention within the deposited tailings, while the remainder will be recovered from the supernatant pond to be reused in the processing circuit. The water balance showed that there is adequate water demand in the processing facility to accept the return water, while still experiencing a water deficit (to be made up from other water sources). Ultimately, the return water recovery rate will be dependent on the management of the supernatant pond and tailings beach.

The characteristics of tailings deposited into the TSF4 Stage 2 and 3 embankments is not expected to change from tailings that are currently produced and deposited into the TSF4 Stage 1 starter embankment.

2.4.1 TSF4 Stage 2 and 3 geotechnical assessments

The geotechnical and stability investigations undertaken by CMW (2023) for the proposed TSF4

Stage 2 and 3 embankment raises are summarised as follows:

- Based on the '*Tailings storage facilities in Western Australia – Code of Practice*' (DMP 2013), the hazard rating for the TSF4 Stage 2 and 3 embankment raises were assessed as 'Category 1 – Medium'.
- Based on the '*Guidelines on Tailings Dam Planning, Design, Construction, Operation and Closure*' (ANCOLD 2019), the consequence category for the TSF4 Stage 2 and 3 embankment raises were assessed as 'High C'.
- Factor of safety (FoS) assessed to be higher than the recommended minimum FoS (as per ANCOLD [2019] guideline) under static analysis, pseudo-static earthquake and post-seismic scenarios.
- Liquefaction assessment indicated a general risk category of "*almost certain it will not liquefy*" for Maximum Design Earthquake (MDE) for 1:1000 years Annual Exceedance Probability (AEP).
- Deformation of the Stage 2 and 3 embankment raises due to an MDE event likely to be in the order of 4 mm and 5 mm, respectively, which was considered to be insignificant.
- Under worst-case probable maximum precipitation failure conditions, embankment failure at either the Stage 2 or 3 embankment heights would result in approximately 33% of the stored tailings to be released into the environment over at least one hour.
- Probability of major embankment failure during the life of TSF4 was assessed as being extremely low, provided that construction and operation of the facility are within the design specifications.

In assessing and authorising the construction of the TSF4 Stage 2 and 3 embankment raises, the department consulted with the Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) for advice on the geotechnical and safety aspects of the proposed embankment raises. DEMIRS have indicated no issues with the design of the proposed embankment raises.

2.4.2 Seepage management plan for TSF4

In authorising the operation of the TSF4 Stage 1 starter embankment, licence L4680/1988/13 was amended to require the submission and implementation of a seepage management plan (SMP) for TSF4 should standing water level (SWL) at the associated monitoring bores become shallower than the prescribed trigger level of 6.0 metres below ground level.

During a groundwater monitoring event in November 2023, the SWL monitored at monitoring bore MB401 was at 4.7 mbgl. On 29 February 2024, the licence holder submitted an SMP for TSF4 in accordance with the conditions of existing licence L4680/1988/13.¹

The recommendations of the SMP for TSF4 included (CMW 2024b):

1. Repair works will be undertaken to bring the underdrainage system in operable conditions.²
2. Following successful repair of the underdrainage system, routine monitoring of existing groundwater monitoring bores (e.g., MB401, MB402 and MB403) will be undertaken. If evidence of groundwater mounding persists or intensifies after four months of monitoring (i.e., SWLs are not decreasing), the Licence Holder will install two seepage recovery

¹ An existing seepage management plan already exists for TSF3 and was submitted to the department in October 2021.

² The department understands that the underdrainage system was successfully repaired and is currently operational, as of April 2024.

bores and one additional groundwater monitoring bore along the northern perimeter embankment, close to where MB401 is located (i.e., where the shallowest SWL was detected). An adaptive management strategy will be adopted, where the seepage recovery bores will be operated until the Licence Holder is able to comply with the SWL trigger level and limit on the licence.

3. If, following successful repair and operation of the underdrainage system, a declining SWL trend is observed, the installation of the seepage recovery bores and additional monitoring bores will not be considered necessary.
4. Adequate management of the supernatant pond, such that the pond size is minimised and monitored through daily visual inspections. Furthermore, the decant pumping system should be optimised to ensure the pond depth is minimised.
5. SMP will be reviewed annually to identify potential improvements to groundwater management associated with TSF4.
6. Where future uncertainty in relation to the extent of groundwater mounding arises, further investigations may be required, including additional investigation and/or monitoring, geophysical survey (e.g., EM34 survey), aquifer testing and/or groundwater modelling to understand aquifer behaviour.

The department has considered the recommendations in the SMP as part of the risk assessment for the proposed activities.

2.4.3 Decommissioning and closure of TSF4

The TSF4 (and the wider TSF infrastructure at the premises) is located on freehold land, on part of Lot 102 on Plan 40393, and is not subject to regulation under the *Mining Act 1978*, which typically regulates the closure and rehabilitation aspects of these facilities. Upon decommissioning, the Licence Holder intends for TSF4 to remain as a permanent feature of the landscape and drain to an increasingly stable mass. The proposed post-mining land use is to maintain freehold ownership of Lot 102 on Plan 40393 and establish self-sustaining natural ecosystems as similar as possible to the original ecosystem.

In a previous amendment to licence L4680/1988/13 (DWER 2023b), the department assessed and considered relevant measures and controls to ensure that emissions and discharges associated with the closure and rehabilitation of TSF landforms do not present an unacceptable risk to human health and environment. The DEMIRS was consulted as part of the assessment. Consequently, licence L4680/1988/13 was amended to include conditions on Mine Closure Plan submission and outcomes of decommissioning and rehabilitation activities.

As the decommissioning and closure of TSF4 has not been modified since the previous assessment, no further assessment was undertaken on these aspects of TSF4 as part of this assessment. In accordance with existing condition 29, the Licence Holder is required to submit a revised Mine Closure Plan to the department in 2026, where the proposed decommissioning and rehabilitation activities and outcomes will be reassessed.

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 2020b).

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 Amendment Report are detailed in Table 2 below. Table 2 also details the proposed control measures the Licence Holder has proposed to assist in controlling these emissions, where necessary.

Table 2: Licence Holder controls

Emission	Sources	Potential pathways	Proposed controls
<i>Construction phase</i>			
Dust	Construction of TSF4 Stage 2 and Stage 3 embankment raises	Air / windborne pathway	<ul style="list-style-type: none"> Water cart will be utilised for dust suppression.
Noise			None.
Sediment laden stormwater		Overland runoff during rainfall events	<ul style="list-style-type: none"> Catchment runoff from upstream (north) of TSF4 will be diverted to the drainage lines in east through existing diversion drain.
<i>Operational phase</i>			
Dust	Deposition of tailings into TSF4 Stage 2 and Stage 3 embankment raises	Air / windborne pathway	<ul style="list-style-type: none"> Water cart will be utilised for dust suppression; Tailings deposition will be cycled around the perimeter embankment to maintain tailings moisture and minimise dust liftoff; Downstream embankment slope will be covered with rock armour to provide erosion protection and minimise dust liftoff.
Sediment laden stormwater		Overland runoff during rainfall events	<ul style="list-style-type: none"> Catchment runoff from upstream (north) of TSF4 will be diverted to the drainage lines in east through existing diversion drain; Upstream embankment crest will slope inwards to shed water onto the tailings beach, which has been designed to provide adequate allowance to store water during a 1% AEP storm event for at least 72 hours; Downstream embankment slope will be covered with rock armour to provide erosion protection.
Tailings seepage		Vertical infiltration and lateral migration	<ul style="list-style-type: none"> TSF4 embankment and foundation footprint was compacted to a depth of 300 mm; Where clay was absent, a compacted clay liner was constructed with a permeability of 1×10^{-8} m/s or less; Underdrainage system was installed, comprising underdrainage pipelines graded towards a sump within a concrete tower, and will be operated during tailings deposition; Supernatant pond will be kept as small as practicable and maintained at least 100 m away from the perimeter embankments, with supernatant water removed via a decant system; TSF4 will be visually inspected to assess the condition of the embankments, toe area and

Emission	Sources	Potential pathways	Proposed controls
			<p>tailings beach;</p> <ul style="list-style-type: none"> • Standing water level will continue to be monitored monthly, along with quarterly groundwater quality monitoring; • Where the target for standing water level is exceeded, monitoring frequency for standing water level will be undertaken fortnightly until exceedances are no longer observed; • Seepage management plan developed and implemented for TSF4, including installation of seepage recovery bores and additional monitoring bores, where required in order to remain compliant with existing trigger level and limit in the existing licence.
Tailings slurry		Embankment failure	<ul style="list-style-type: none"> • Tailings deposition will be cycled around the perimeter embankment to optimise tailings beach and supernatant pond formation; • Supernatant pond will be kept as small as practicable and maintained at least 100 m away from the perimeter embankments, with supernatant water removed via a decant system; • TSF4 will be inspected daily to assess the condition of embankment, toe area and tailings beach, as well as signs of embankment damage or erosion; • TSF performance will be assessed by independent engineers annually; • Vibrating wire piezometers have been installed on the embankments and will be monitored monthly; • Settlement pins have been installed on the embankments and will be monitored monthly for potential vertical deformation; • High-resolution survey will be undertaken biannually using an unmanned aerial vehicle; • Minimum operational freeboard of 300 mm and minimum total freeboard of 700 mm will be maintained at all times; • Catchment runoff from upstream (north) of TSF4 will be diverted to the drainage lines in east through existing diversion drain.
		Overtopping of TSF4	<ul style="list-style-type: none"> • Embankment raises were designed with adequate allowance to store water during a 1% AEP storm event for up to 72 hours; • Minimum operational freeboard of 300 mm and minimum total freeboard of 700 mm will be maintained at all times; • Volume of tailings deposited will be continuously monitored; • Tailings beach will be visually inspected at least daily.
		Pipeline leak or	<ul style="list-style-type: none"> • High-density polyethylene (HDPE) tailings and

Emission	Sources	Potential pathways	Proposed controls
Hypersaline return water		rupture	<p>return water pipelines will be installed within earthen bunded corridors;</p> <ul style="list-style-type: none"> Automated leakage detection system will be installed; Pipeline route will be routinely inspected (at least twice a day) and maintained.

3.1.2 Receptors

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

Table 3 below provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises (*Guideline: Environmental siting* (DWER 2020a)).

Table 3: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	Distance from prescribed activity
Coolgardie township	The Coolgardie township is approximately 3.5 km south-west of the premises boundary.
Pastoral activities	The premises is surrounded by pastoral leases and used for stock grazing. The nearest pastoral station is the Mungari, located approximately 1.6 km north-east of the premises boundary.
Environmental receptors	Distance from prescribed activity
Native vegetation	Low undulating mallee woodland and shrubland, comprising <i>Corymbia calophylla</i> , <i>Eucalyptus wandoo</i> and <i>Eucalyptus camaldulensis</i> abuts the premises on the northern, eastern and southern boundaries of the premises and the boundaries of the TSFs.
Surface water bodies	<p>Brown Lake is an ephemeral salt lake, located 5 km to the east of the premises boundary. Surface water typically drains to the east-southeast, towards Brown Lake. Brown Lake forms part of a chain of salt lakes, including Red Lake, Blue Lake, White Lake and Douglas Lake (in order of increasing distance from the premises).</p> <p>Streamflow in local gullies and watercourses are ephemeral due to the semi-arid environment.</p>
Groundwater aquifer	<p>Groundwater at the premises occurs naturally at depth within a shallow unconfined porous-media aquifer. This aquifer is hosted in lithologies comprising weathered residual soil profile and the underlying weathered rock (gabbro). The lithologies were of low permeability and may act as an aquiclude.</p> <p>Local groundwater mounding was observed at the premises due to seepage from TSF4 and the adjacent TSF3, with the shallowest and deepest standing water level observed at 4.2 mbgl (MB401) and 37.2 mbgl (MB403), respectively in the 2023 annual period (CMW 2024a).</p> <p>During the 2023 annual period, local groundwater salinity ranged between saline and hypersaline, with total dissolved solid concentrations ranging between 14,000 mg/L and 110,000 mg/L, which is characteristic of the regional hypersaline aquifer</p>

	<p>(CMW 2024a).</p> <p>Trace concentrations of heavy metals and metalloids (e.g., arsenic and nickel) were detected in most groundwater monitoring bores. Weak acid dissociable cyanide (WAD CN) was also measured at concentrations above the limit of reporting at monitoring bores MB302 to MB307 (i.e., along the southern and south-eastern corner of TSF3) (CMW 2024a).</p> <p>There are no groundwater bores registered within 2.5 km hydraulically downgradient of the TSFs.</p>
Environmental receptors	Distance from prescribed activity
Aboriginal cultural places	<p>Four registered Aboriginal heritage places were identified south-west of the premises, including:</p> <ul style="list-style-type: none"> • Kurkuthutana (Place ID 3009) – Ceremonial, mythological , camp, meeting place, plant resource and water source; located 1.2 km from the premises boundary; • Kurrkurti (Place ID 1475) – Ceremonial, water source; located 2.2 km from the premises boundary; • Coolgardie Stones (Place ID 1568) – Ceremonial, man-made structure, mythological; located 3.3 km from the premises boundary; and • Two Trees (Place ID 1698) – Mythological; located 4 km from the premises boundary. <p>Two Aboriginal heritage places were also lodged:</p> <ul style="list-style-type: none"> • Kurlkuli/Coolgardie Lookout (Place ID 32759) – Ceremonial, rock shelter, camp, hunting place, meeting place, named place, plant resource and water source; located 3.1 km south-west from the premises boundary; • Roundhead/Ngumarn (Place ID 32761) – Ceremonial, mythological, rock shelter, birthplace, camp, hunting place, meeting place, natural feature and plant feature; located 2 km west of the premises boundary.

3.2 Risk ratings

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

Where the Licence Holder 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 Licence Holder's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the licence as regulatory controls.

Additional regulatory controls may be imposed where the Licence Holder's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 4.

The revised licence L4680/1988/13 that accompanies this Amendment Report authorises emissions associated with the construction and operation of the premises i.e., construction of embankment raises, tailings deposition (Category 5 activities).

The conditions in the revised licence have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

Table 4. Risk assessment of potential emissions and discharges from the premises during construction and operation

Risk Event					Risk rating ¹ C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions ² of licence	Justification for additional regulatory controls
Source/ Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls				
Construction								
Construction of TSF4 Stage 2 and Stage 3 embankment raises	Dust	Pathway: Air / windborne pathway Impact: Impact to human and ecological health, as well as amenity	Coolgardie township and pastoral activities; Native vegetation	Refer to Section 3.1	C = Minor L = Unlikely Medium risk	Y	Condition 7 – Construction requirements	The Delegated Officer has determined that the proposed controls for managing dust, noise, and sediment laden stormwater from the construction of the proposed infrastructure to be adequate. No additional regulatory control is required.
	Noise		Coolgardie township and pastoral activities	None	C = Minor L = Rare Low risk	N/A	None	
	Sediment laden stormwater	Pathway: Overland runoff during rainfall events Impact: Impact to ecological health	Native vegetation	Refer to Section 3.1	C = Slight L = Unlikely Low risk	Y	None	
Operations								
Deposition of tailings into TSF4 Stage 2 and Stage 3 embankment raises	Dust	Pathway: Air / windborne pathway Impact: Impact to human and ecological health, as well as amenity	Coolgardie township and pastoral activities; Native vegetation	Refer to Section 3.1	C = Minor L = Unlikely Medium risk	Y	None	The Delegated Officer has determined that the proposed controls for managing dust and sediment laden stormwater from the operation of the proposed infrastructure to be adequate. No additional regulatory control is required. The Delegated Officer has determined that the proposed
	Sediment laden stormwater	Pathway: Overland runoff during rainfall events Impact: Impact to ecological health	Native vegetation	Refer to Section 3.1	C = Slight L = Unlikely Low risk	Y	Condition 7 – Construction requirements	
	Tailings	Pathway: Vertical infiltration and lateral	Native vegetation	Refer to	C = Moderate	Y	Condition 1 –	

Licence: L4680/1988/13

Risk Event					Risk rating ¹ C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions ² of licence	Justification for additional regulatory controls
Source/ Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls				
	seepage	migration Impact: Mounding of local water table and potential surface expression of groundwater, resulting in impacts to ecological health, as well as deterioration of groundwater quality	and soil; Groundwater aquifer	Section 3.1	L = Possible Medium risk		Embankment height limit Condition 3 – Operational requirements Condition 5 – Supernatant pond and seepage management Condition 6 – Inspection requirements Condition 7 – Construction requirements Condition 14 – Process monitoring Condition 15 – Groundwater and supernatant pond monitoring Condition 16 to 18 – Seepage Management Plan in response to standing water level target exceedance	controls for managing tailings seepage from the operation of the proposed infrastructure to be adequate. The Delegated Officer has considered information from the supporting documentation of this application, as well as the most recent annual TSF audit and management review and seepage management plan. The Delegated Officer understands that the Licence Holder will continue to implement the recommendations from the seepage management plan and is required to report the actions taken in the Annual Environmental Report. No additional regulatory control is required.
	Tailings slurry; Dried tailings	Pathway: Embankment failure, resulting in loss of containment and discharge of tailings slurry to land Impact: Impact to human and ecological health (with potential for loss of life), as well as amenity	Coolgardie township and pastoral activities; Native vegetation and soil; Surface water bodies; Aboriginal heritage places	Refer to Section 3.1	C = Major L = Rare Medium risk	Y	Condition 1 – Embankment height limit Condition 3 – Operational requirements Condition 5 – Supernatant pond and seepage management Condition 6 – Inspection requirements Condition 7 – Construction requirements Condition 14 – Process	Based on technical advice from DEMIRS, the Delegated Officer has determined that the proposed controls for managing the risk of embankment failure (resulting in a release of tailings slurry and dried tailings to the environment) is adequate. Controls recommended by DEMIRS have been previously conditioned in the existing licence. No changes to these conditions were recommended by DEMIRS for the proposed

Risk Event					Risk rating ¹ C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions ² of licence	Justification for additional regulatory controls
Source/ Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls				
							monitoring Condition 27 – Annual TSF audit and review	activities. No additional regulatory control is required.
	Tailings slurry	Pathway: Overtopping of TSF4, resulting in loss of containment and discharge of tailings slurry to land Impact: Impact to ecological health	Pastoral activities; Native vegetation and soil	Refer to Section 3.1	C = Moderate L = Unlikely Medium risk	Y	Condition 4 – Freeboard requirements Condition 6 – Inspection requirements	The Delegated officer has determined that the proposed controls for managing tailings slurry and hypersaline return water (as a result of overtopping and pipeline failure) from the operation of the proposed infrastructure to be adequate. No additional regulatory control is required.
		Pathway: Pipeline leak or rupture, resulting in loss of containment and discharge of tailings slurry/ hypersaline return water to land Impact: Impact to ecological health		Refer to Section 3.1	C = Minor L = Unlikely Medium risk	Y	Condition 2 – Pipeline requirements Condition 6 – Inspection requirements	
	Hypersaline return water	Refer to Section 3.1		C = Minor L = Unlikely Medium risk	Y	Condition 2 – Pipeline requirements Condition 6 – Inspection requirements		

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

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

4. Consultation

Table 5 provides a summary of the consultation undertaken by the department.

Table 5: Consultation

Consultation method	Comments received	Department response
Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) advised of proposal on 19 December 2023.	<p>As requested by the department, DEMIRS responded on 15 February 2024 with advice on the geotechnical and safety aspects of the proposed activities.</p> <p>In assessing the Design Report, DEMIRS had indicated several concerns to the department in their advice. The department sought further information from the Licence Holder on 23 February 2024, based on the data gaps highlighted by DEMIRS.</p> <p>A response was provided by the Licence Holder on 28 February 2024. Following further consultation, DEMIRS had indicated no further issues with the information on 12 April 2024.</p>	The department has considered the advice provided by DEMIRS in the risk assessment.
Licence Holder was provided with draft amendment on 22 April 2024.	The Licence Holder responded on 24 April 2024 with no comments, waiving the remainder of the consultation period.	Noted.

5. Conclusion

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

5.1 Summary of amendments

Table 6 provides a summary of the proposed amendments and will act as record of implemented changes. All proposed changes have been incorporated into the revised licence as part of the amendment process.

Table 6: Summary of licence amendments

Condition no.	Proposed amendments
Condition 1	<p>Updated Table 1 to:</p> <ul style="list-style-type: none"> increase authorised embankment stage for TSF4 from Stage 1 to Stage 3; increase authorised construction height for TSF4 from RL 403.0 m to RL 408.0 m; increase authorised operating height for TSF4 from RL 402.5 m to RL 408.0 m; and include note on the requirement to submit the relevant environmental compliance report (in accordance with condition 25) prior to operating an item of infrastructure at the corresponding embankment stage in Table 1.
Condition 7	<p>Updated Table 1 to:</p> <ul style="list-style-type: none"> include construction of Stage 2 embankment raise (Item 3) and Stage 3 embankment raise (Item 4), with design and construction requirements.
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Condition no.	Proposed amendments
	Updated Schedule 2: Construction drawings to: <ul style="list-style-type: none"><li data-bbox="491 293 1353 356">• include Figures 8 to 11 – design drawings for the TSF4 Stage 2 and Stage 3 embankment raises.

References

1. Australian National Committee on Large Dams (ANCOLD) 2019, *Guidelines on Tailings Dam – Planning, Design, Construction, Operation and Closure*.
2. CMW Geosciences (CMW) 2023, *Tailings Storage Facility No. 4 (TSF4) Stages 2 & 3 Design Report*, Ref: PER2023-0023AB Rev2, Western Australia.
3. CMW 2024a, *Tailings Storage Facility 3 (TSF3) and Tailings Facility 4 (TSF4) Annual Audit & Management Review*, Ref: PER2023-0272AB Rev 0, Western Australia.
4. CMW 2024b, *Tailings Storage Facility 4 Seepage Management Plan*, Ref: MEL2023-0232AB-Rev2, Western Australia.
5. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
6. Department of Mines and Petroleum (DMP) 2013, *Tailings storage facilities in Western Australia – code of practice*, Resources Safety and Environment Divisions, Perth, Western Australia.
7. Department of Water and Environmental Regulation (DWER) 2020a, *Guideline: Environmental Siting*, Perth, Western Australia.
8. DWER 2020b, *Guideline: Risk Assessments*, Perth, Western Australia.
9. DWER 2023a, *Licence L4680/1988/13 Amendment Report, granted 28 March 2023*, Perth, Western Australia.
10. DWER 2023b, *Licence L4680/1988/13 Amendment Report, granted 3 November 2023*, Perth, Western Australia.

Appendix 1: Application validation summary

SECTION 1: APPLICATION SUMMARY (as updated from validation checklist)				
Application type				
Works approval	<input type="checkbox"/>			
Licence	<input type="checkbox"/>	Relevant works approval number:		None <input type="checkbox"/>
		Has the works approval been complied with?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Has time limited operations under the works approval demonstrated acceptable operations?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	
		Environmental Compliance Report / Critical Containment Infrastructure Report submitted?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Date Report received:		
Renewal	<input type="checkbox"/>	Current licence number:		
Amendment to works approval	<input type="checkbox"/>	Current works approval number:		
Amendment to licence	<input checked="" type="checkbox"/>	Current licence number:	L4680/1988/13	
		Relevant works approval number:	N/A	<input checked="" type="checkbox"/>
Registration	<input type="checkbox"/>	Current works approval number:	None	<input type="checkbox"/>
Date application received	8 November 2023			
Applicant and Premises details				
Applicant name/s (full legal name/s)	FMR Investments Pty Ltd			
Premises name	Greenfields Processing Site			
Premises location	Lot 102 on Plan 40393 Mining tenement M15/1836			
Local Government Authority	Shire of Coolgardie			
Application documents				
HPCM file reference number:	2013/003899-1~14			
Key application documents (additional to application form):	<ul style="list-style-type: none"> Attachment 1A – Proof of Occupier Status Attachment 2 – Premises Maps Attachment 3B – Proposed Activities (TSF4 Stages 2 and 3 Design Report) Attachment 7 – Siting and Location Attachment 9 – Category Checklist (Tailings storage facilities) 			
Scope of application/assessment				

Summary of proposed activities or changes to existing operations.	<p><u>Licence amendment</u></p> <p>Construction of the TSF4 Stage 2 and 3 embankment raises, comprising a 3.0m and 2.5m raise, respectively. The total embankment raise is 5.5 m. Maximum embankment height at Stage 2 and 3 is 13.5 m and 16.0 m, respectively.</p> <p>Operation of TSF4 Stage 2 and 3 embankment raises. Tailings deposition will rotate between the single-cell TSF4 and the three-cell TSF3.</p>
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Category number/s (activities that cause the premises to become prescribed premises)

Table 1: Prescribed premises categories

Prescribed premises category and description	Assessed production or design capacity	Proposed changes to the production or design capacity (amendments only)
Category 5: Processing or beneficiation of metallic or non-metallic ore	1,400,000 tonnes per annual period	No change.

Legislative context and other approvals

Has the applicant referred, or do they intend to refer, their proposal to the EPA under Part IV of the EP Act as a significant proposal?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	N/A
Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	N/A
Has the proposal been referred and/or assessed under the EPBC Act?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	N/A
Has the applicant demonstrated occupancy (proof of occupier status)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Certificate of title <input checked="" type="checkbox"/> Lot 102 on Plan 40393 (Certificate of Title provided)
Has the applicant obtained all relevant planning approvals?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	Planning Application PA 21/23 approved by Shire of Coolgardie on 7 July 2021.
Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	CPS No: 9319/1
Has the applicant applied for, or have an existing CAWS Act clearing licence in relation to this proposal?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	N/A
Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Licence/permit No: GWL 173070(7)

<p>Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?</p>	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>	<p>Name: Goldfields Groundwater Area Type: Proclaimed Groundwater Area Has Regulatory Services (Water) been consulted? Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/></p>
<p>Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	<p>N/A</p>
<p>Is the Premises subject to any other Acts or subsidiary regulations?</p>	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>	<p>Mine Safety and Inspection Act 1994</p>
<p>Is the Premises within an Environmental Protection Policy (EPP) Area?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	<p>N/A</p>
<p>Is the Premises subject to any EPP requirements?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	<p>N/A</p>
<p>Is the Premises a known or suspected contaminated site under the <i>Contaminated Sites Act 2003</i>?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	<p>N/A</p>