



Application for Works Approval

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

Works Approval Number	W6425/2020/1
Applicant	Robe River Mining Co. Pty Limited
ACN	008 694 246
File Number	DER2020/000158
Premises	Mesa J and Mesa K Iron Ore Mine Fortescue, Western Australia 6716 Within Mining Lease AML248SA
Date of Report	26 October 2020
Decision	Works approval granted

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A/MANAGER RESOURCE INDUSTRIES

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

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1. Decision summary

This decision report documents the assessment of potential risks to the environment and public health from emissions and discharges during the construction of the premises. As a result of this assessment, works approval W6425/2020/1 has been granted.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this Decision 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 and overview of premises

Robe River Mining Co. Pty Limited (applicant) operates the Mesa J and K Iron Ore Mine (premises) under *Environmental Protection Act 1986* (EP Act) Part V licence L6820/1993/12 for prescribed categories 5 (processing or beneficiation of metallic or non-metallic ore), 6 (mine dewatering), 12 (screening), 54 (sewage facility), 61A (solid waste facility) and 64 (class II or II putrescible landfill). The premises is located approximately 10 km south-west of Pannawonica in the Robe Valley, in the Pilbara region.

On 30 March 2020, the applicant submitted an application for a works approval (application) to the department under section 54 of the EP Act.

The application is to undertake construction works relating to the modification and addition to processing facilities for current category 5 activities, and the construction of a new landfill for inert and putrescible waste under category 64. Additionally, a new fuel storage is proposed to be constructed. The operation of the fuel storage does not trigger the prescribed category 73 (bulk storage of chemicals etc.) as set out in Schedule 1 of the *Environmental Protection Regulations 1987*. The applicant proposes the inclusion of controls for the construction of the fuel storage.

Ore from mining of the existing Mesa J and Mesa K mines is processed in existing processing facilities located at Mesa J. The existing Mesa J processing facilities include two wet scrubbing and screening plants; processing plant 1 (PP1) and processing plant 2 (PP2), an in-pit primary sizing circuit (IPS) and a primary sizing circuit at the train load out (TLO) primary sizer. PP1 and PP2 currently have a primary sizer feeding into 2 wet scrubbers, and material is then discharged to a double deck screen where ore product (>1 mm) and waste fines (<1 mm) are separated. The ore product is stockpiled via conveyors and radial stackers and waste fines are pumped into the existing waste fine storage facilities (TSF3, TSF4 and TSF5).

2.2.1 Proposed activity for category 5

The applicant proposes additional infrastructure and modification of current infrastructure to meet product sizing requirements and to increase water recovery. No change to the current throughput (L6820/1993/12) of ore processing for category 5 of 13,000,000 tonnes per annual period is proposed.

Modifications of dry processing includes:

- a new secondary sizer for the TLO primary circuit to reduce primary sized material from PP1, PP2 and TLO sizer from 350 mm to 200 mm,
- decommissioning of the IPS,
- relocation of the current IPS stacker;

Modifications of wet processing includes:

- new rescreening facility downstream of PP2 (scavenger feed tank, scavenger screens, rescreened product transfer conveyor and transfer station)
- new waste fines transfer pipe from PP1 to PP2 and from PP2 to existing TSF
- new process water return pipeline from PP2 to PP1
- new tailings thickener facility which deposits to existing TSFs
 - thickener feed tank, thickener feed lines, transfer pumps
 - flocculent dosing plant with flocculent storage tank, mixing tank, mixed flocculent storage tank, transfer pump, dosing pump
 - process water tank
- new bottom deck aperture of existing wet scrubbers to change from 1 mm to 2.8 mm
- screen underflow from PP1 and PP2 pumped to rescreening facility scavenger feed tank and pumped to two single deck scavenger screens with 0.5 mm aperture;
 - oversized material is discharged onto rescreening product transfer conveyor and deposited on PP2 stockpile
 - underflow from scavenger screens (PP1 and PP2) pumped to thickener feed tank

The proposed location of additional activities and infrastructure is shown in Figure 1. The current existing TSFs are shown in Figure 2.

2.2.2 Proposed activity for category 64

The applicant proposes the construction of another inert landfill (Figure 1) at the premises for the disposal of up to 2,000 tonnes of waste per year. No changes to the current approved throughput (L6820/1993/12) is proposed. The landfill is classified as class II and will accept the following:

- clean fill
- inert type 1 waste including: conveyor belts, screen mats, concrete rubble, unrecoverable steel products
- inert type 2 waste including: tyres, plastics
- putrescible waste (wooden packaging and pallets only)

Surface water management structures (i.e. bunding) to divert surface water flows away from the landfill, and sumps or bunding to collect any surface water which may be in contact with waste will be constructed.

The approval of subsequent landfills upon completion of above described inert landfill is proposed by the applicant. New cells may be constructed within the proposed landfill area as set out in Figure 1, subject to conditions of this works approval and following licence amendment.

2.2.3 Other proposed construction

The applicant proposes the construction of additional fuel storage and refueling facilities at the premises. The throughput does not trigger a prescribed activity, and therefore category 73 is not included in this works approval and following licence amendment.

Following infrastructure will be constructed:

- 110 kL diesel storage tank
- New heavy vehicle refuelling bay and fuel arm to suit AHS fleet and associated bunds as per AS 1940-2004
- Diesel delivery pumps/line
- Storage and dispensing for lubricants
- Spillage drive-in collection sump
- Oily water collection and treatment system, associated evaporation pond

2.2.4 Proposed stages of works

The applicant proposes construction, commissioning, and time limited operations to be included in the works approval. An overview of the relevant activities is set out in Table 1.

Table 1 Proposed works

Category/works	Proposed activities	Timeframe
Construction		
64	Construction of landfill	N/A
5	Construction of infrastructure	
Fuel storage/refuelling facilities	Construction of infrastructure	
Commissioning		
5	<ol style="list-style-type: none"> 1) Construction verification 2) Pre-commissioning- functional testing of equipment 3) No-load commissioning 4) Load commissioning 5) Care custody and control 6) Performance verification Plant 1 – PP2 Rescreening plant works <ul style="list-style-type: none"> • construction start November 2020 • Stages 1-3: April 2021 to September 2021 • Stages 4-6: October 2021 to April 2022 Plant 2- Secondary sizer, train load out primary sizer <ul style="list-style-type: none"> • construction start January 2021 • Stages 1-3: February 2021 to August 2021 • Stages 4-6: September 2021 to February 2022 	February 2021 to April 2022
Time limited operations		
64	Disposal of rubbish into new landfill	180 days
5	Operation of facilities	180 days

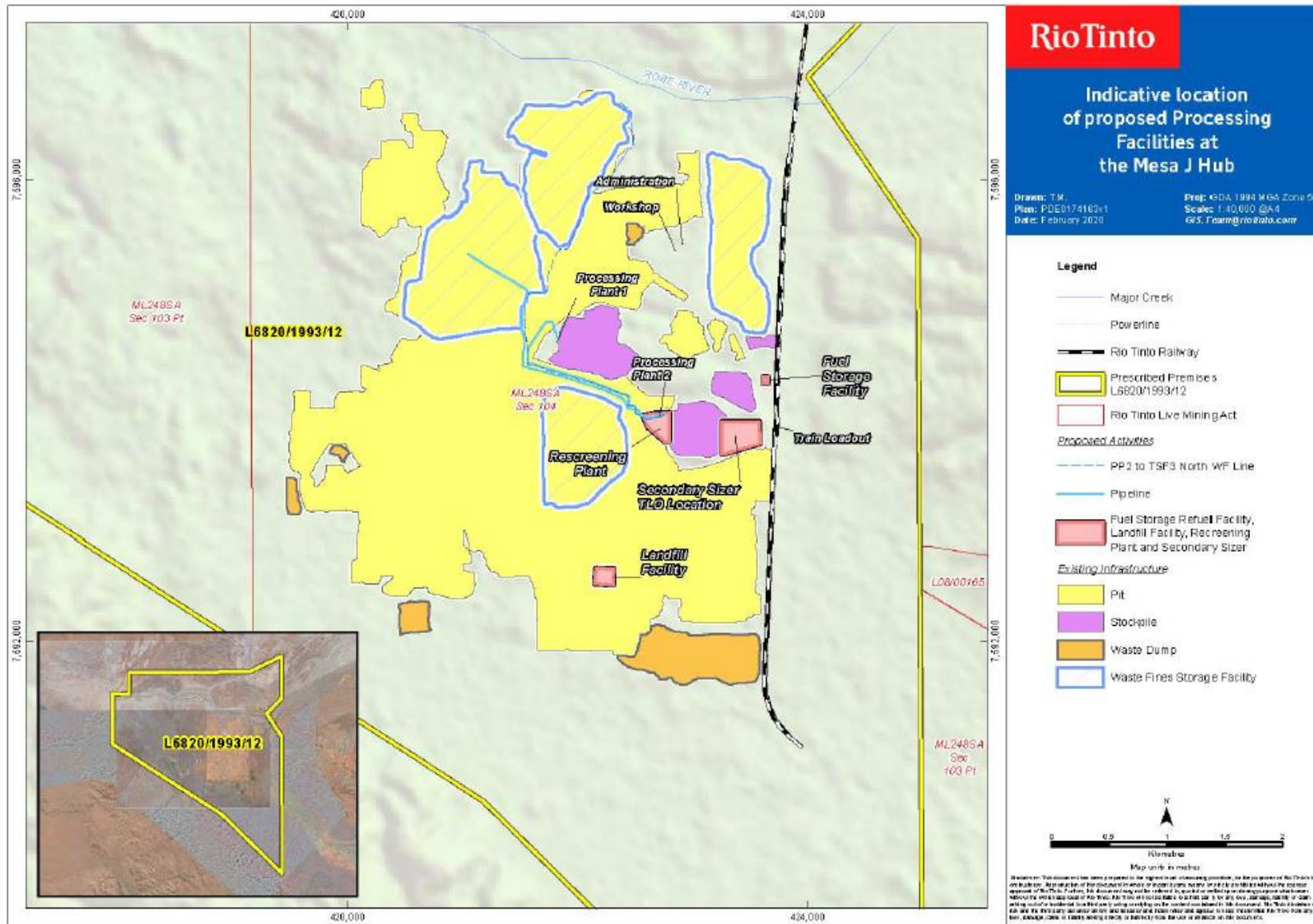


Figure 1 Location of additional processing facilities and landfill

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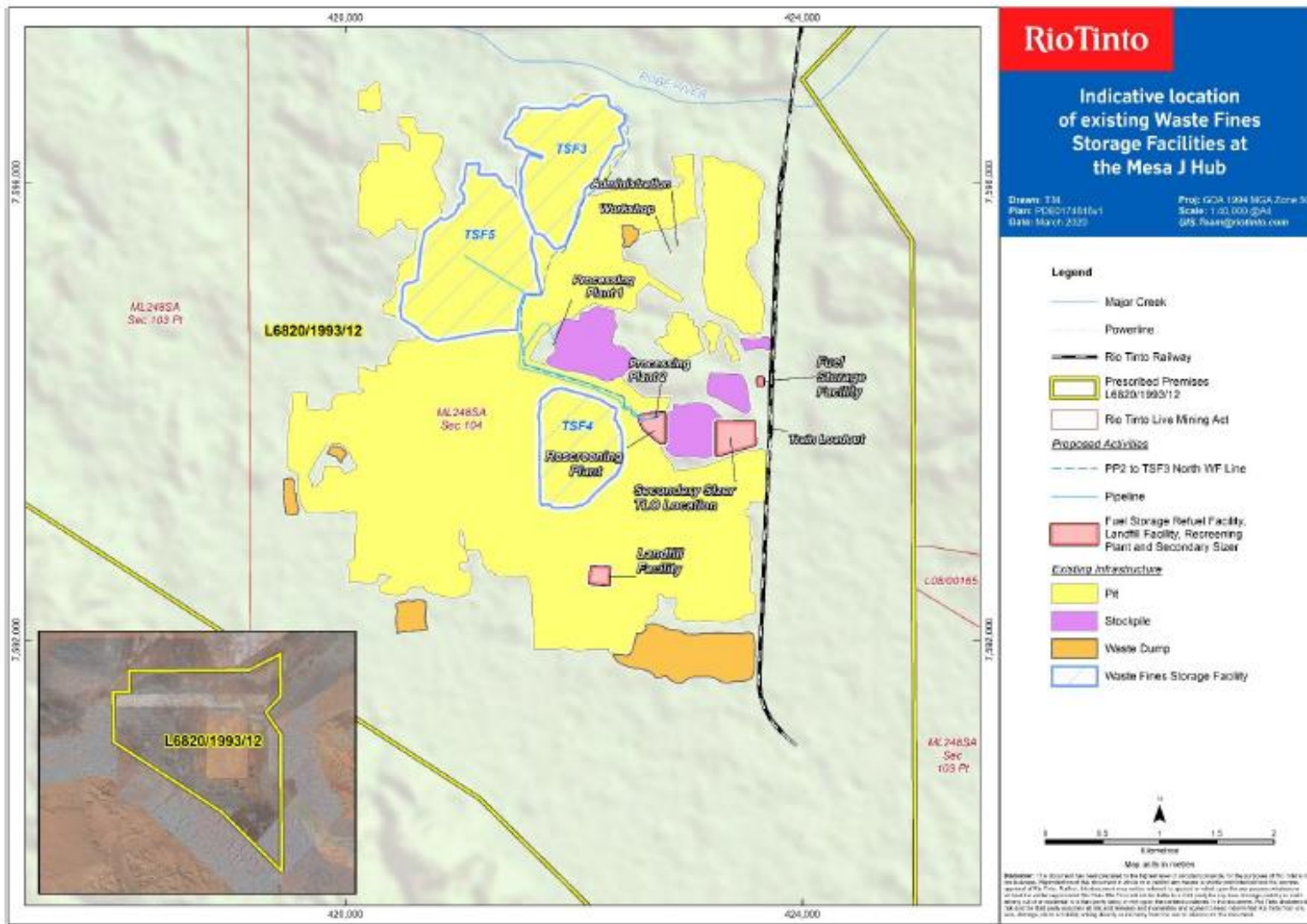


Figure 2 Indicative location of existing waste fines storage facilities

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2.3 Part IV of the EP Act

The existing Mesa J Iron Ore Development was assessed by the Environmental Protection Authority (EPA), and approved under Ministerial Statement (MS) 208 in June 1991. In 2017 the Mesa H Proposal was referred to the EPA which extends the life and ultimately replace the existing Mesa J Iron Ore Development. The revised proposal was published on 9 July 2020 under MS 1141.

MS 1141 sets out the following conditions relevant to this works approval:

- Inland waters and vegetation: no irreversible impact to the health of the Robe River, Robe River pools and Juimmawurrada Creek ecosystems, including associated riparian vegetation as result from groundwater abstraction and/or discharge of surplus water
- Subterranean fauna
 - Retaining minimum of 50% by volume of pre-mining troglofauna habitat
 - Protecting biological diversity and ecological integrity of troglofauna and stygofauna assemblages as far as practicable
- Terrestrial fauna- conservation significant fauna species: Northern Quoll (*Dasyurus hallucatus*), Ghost Bat (*Macroderma gigas*) and Pilbara Leaf-Nosed Bat (*Rhinonicteris aurantia* - Pilbara form)
 - No irreversible impact to breakaways and gullies habitat other than existing or authorised disturbance

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

3. Risk assessment

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the *Guidance Statement: Risk Assessments* (DER 2017).

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 which have been considered in this Decision Report are detailed in Table 2 below. Table 2 also details the proposed control measures the applicant has proposed to assist in controlling these emissions, where necessary.

Table 2: Proposed applicant controls

Emission	Sources	Potential pathways	Proposed controls
Construction			
Dust	Construction works, vehicle movements	Air/wind dispersion	<ul style="list-style-type: none"> Water trucks, control of vehicle movement/restricted speeds Controls currently set out in L6820/1993/12 (Condition 3, 4)
Noise			<ul style="list-style-type: none"> No additional controls proposed
Operation Category 5			
Dust	Operation of thickener plant, secondary sizer, rescreening facility, stacker, conveyors, stockpiles	Air/wind dispersion	<ul style="list-style-type: none"> Dust suppression sprays fitted at all material transfer points including: primary sizer discharge conveyor, secondary sizer, IPS stacker conveyor, TLO conveyor Regular inspection and maintenance to collect/remove material if potential dust risk Controls currently set out in L6820/1993/12 (Condition 3, 4)
Noise	Operation of thickener plant, secondary sizer, rescreening facility, stacker, conveyors		<ul style="list-style-type: none"> Processing facilities designed to achieve noise levels below 85 dB where achievable No specific controls proposed
Contaminated stormwater and process water	Runoff from equipment, leaks/pipe bursts	Seepage and infiltration through subsurface	<ul style="list-style-type: none"> Daily integrity inspections of pipelines, pit walls, embankments, discharge location Tailings delivery pipelines and return pipelines located within shaped/bunded corridor along the route between plant and TSF Concrete hardstand under facilities Concrete bunds to contain surface water flows and retain release (160 – 200 mm) surface water contained by bunds will be pumped to collection sumps or allowed to evaporate process water release collected by bunds is directed to collection sumps via concrete spillways potentially contaminated surface water is directed to oily water collection and treatment system collection sumps for sediment are designed to allow drive-in for sediment removal.
Contaminated runoff of thickened tailings material or flocculant,	Thickener plant		

Emission	Sources	Potential pathways	Proposed controls
Thickener seeping and migrating into groundwater/surface water	Tailings storage facilities	Seepage and infiltration through subsurface	<ul style="list-style-type: none"> • Deposition of waste fines at northern end of TSF3, decant pond located southern side (furthest from iron deposit geology representing hydraulic connection to Robe River) to reduce seepage • Monitoring during deposition to assess groundwater and pond water levels and quality, comparison to baseline conditions, compare with model predictions (section 4.2.4 supp doc) • Additional monitoring bores in TSF3 proximity (refer to Figure 3) • Additional parameters monitored annually in all monitoring locations: <ul style="list-style-type: none"> ○ Nutrients: NO3, Total Nitrogen ○ Metals/metalloids: Al, Ba, • Monthly inspection of decant pond location and level
Operation Category 64			
Dust	Landfill	Air/wind dispersion	<ul style="list-style-type: none"> • waste in waste dump covered on ad-hoc basis when required to at least 200 mm • Regular inspection and maintenance to collect/remove material if potential dust risk • Firebreak at least 3 m in width around putrescible landfill
Odour			
Stormwater runoff		Seepage and infiltration	<ul style="list-style-type: none"> • surface water management structures (bundling) will divert surface water flows away from landfill • sump or bunding to collect surface water which is potentially contaminated
Seepage of landfill leachate			<ul style="list-style-type: none"> • Vertical distance to groundwater more than 3 m below ground level for waste dump landfill and 10 m for putrescible landfill • Minimum of 100 m distance of landfill to permanent or perennial watercourse

Light spill	Lighting	Air pathway	<p>Lighting design will comply with Australian standards for safe work.</p> <p>Lighting design in areas that require permanent night lighting will ensure light is directed to work areas and minimal light spill occurs (including use of directional lighting and covered lenses).</p> <p>Appropriate design, management, inspection and maintenance of lighting at proposed processing facilities is expected to mitigate the risk of light spill during operation of the processing facilities.</p>
Operation fuel storage and refuelling facility			
Hydrocarbons, contaminated surface water runoff	Fuel storage and refuelling facility	Direct discharge into environment	<p>Fuel storage tanks designed, constructed and tested according to Australian Standard 1940-2004: The storage and handling of flammable and combustible liquids (AS 1940-2004)</p> <ul style="list-style-type: none"> • Fuel storage tanks above ground, self bunded or within bunded area/ secondarily contained to ensure any spills are contained • Concrete hardstand installed under proposed fuel storage and facilities where there is potential for hydrocarbon spills • Potentially contaminated surface water directed to oily water collection and treatment system

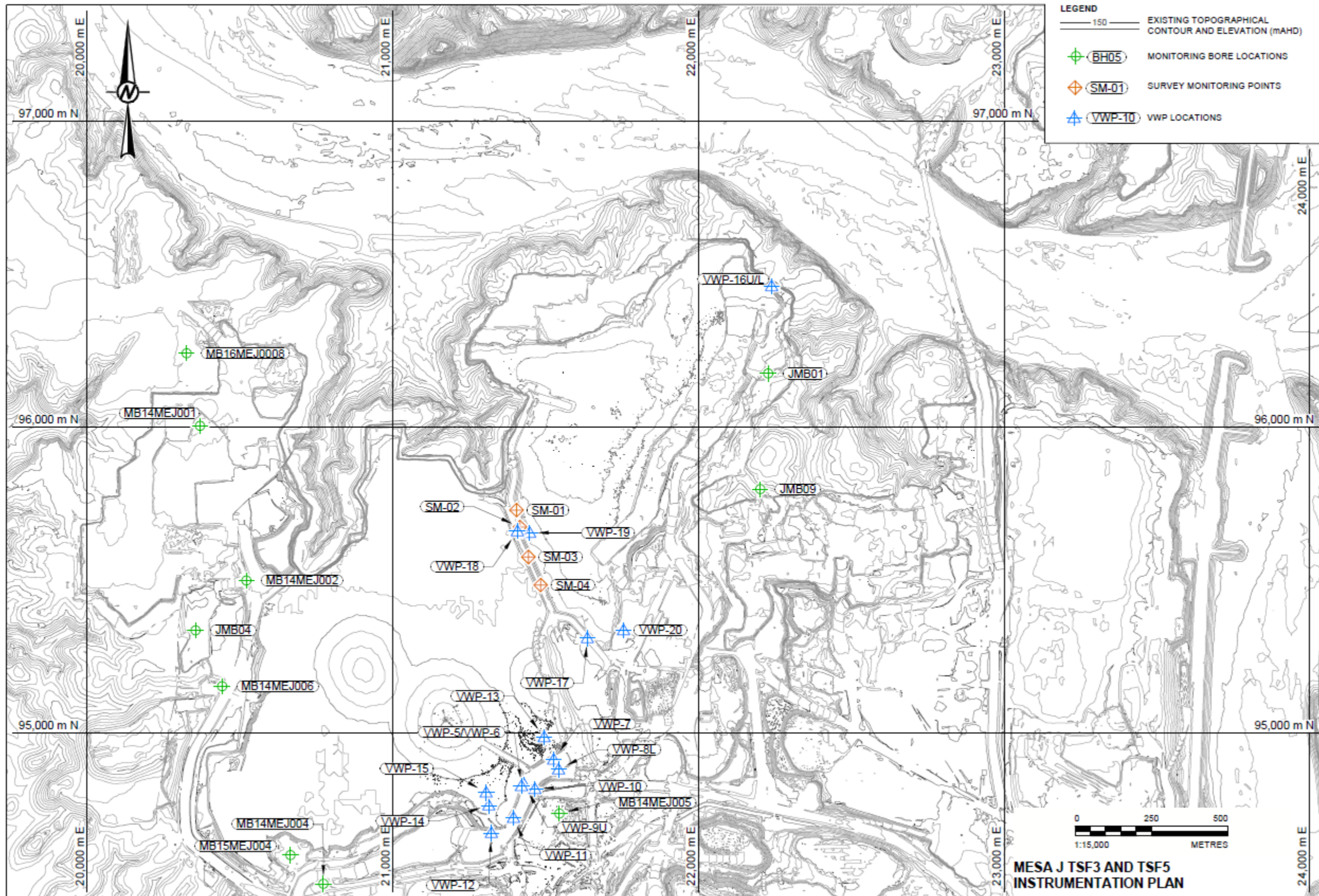


Figure 3 Indicative TSF monitoring bores

3.1.2 Receptors

In accordance with the *Guidance Statement: Risk Assessment* (DER 2017), the Delegated Officer has excluded employees, visitors and contractors of the applicant'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 (DER 2016 *Guidance Statement: Environmental Siting*).

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

Human receptors	Distance from prescribed activity
Aboriginal community Kuruma Marthudunera People	Springs and pools of the Robe River have significant value for the Kuruma Marthudunera People. Approximately 500 m from TSF3.
Township of Pannawonica Residential Premises/ Homesteads/ Hospitals (Pannawonica)	Approximately 7.5 km north-east of the premises (lease boundary) and 13.5 km north-east of the proposed facilities. The Delegated Officer considers it unlikely a risk event for dust or noise emissions will occur as a source pathway receptor linkage does not exist based on the distance from proposed activities. Therefore, this receptor is not further considered in the risk assessment below.
Environmental receptors	Distance from prescribed activity
Pilbara Groundwater (proclaimed under RIWI Act) Underlying groundwater (non-potable purposes)	The proposed facilities are located in areas where depth to groundwater is expected to be more than 5 m below ground level (bgl). Regional groundwater flows from south and southeast to the north and north-west towards Robe River (north of premises).
Public Drinking Water Source Area (PDWSA)	Bungaroo Creek Water Reserve (P1), intersects the premises (Figure 4); approximately 1.8 km from TSF3
Surface water	Significant watercourses intersect the premises. The Robe River passes adjacent to the north of the operations and intersects the premises. The Robe River is ephemeral and supports permanent springs and pools and is listed as 'Wetlands of Subregional Significance' (Kendrick 2001). The pool at Yeera Bluff has significant Aboriginal Heritage and social value. Robe River/Robe River pools used for drinking, cooking, swimming purposes by traditional owners and other visitors Jimmawurrada Creek is an ephemeral creek and passes adjacent to the east of the operations and intersects the premises.

	Prescribed activity	Distance to the Robe River	Distance to Jimmawurrada Creek
	Processing facilities	2.4 km	150 m
	Waste fines storage facility (existing TSF3)	550 m	2 km
	Fuel storage facilities	2.0 km	100 m
	Landfill facilities	3.8 km	1.4 km
	<p>Robe River and Jimmawurrada Creek are listed as environmentally significant areas within Ministerial Statement 1141 and the Statement notes that these water sources including their vegetation, water levels, water quality, and in particularly the permanent Robe River pools are to be protected.</p> <p>MS 1141 sets out that activities shall be managed to have no irreversible impact on Robe River and Jimmawurrada Creek ecosystems as well as riparian vegetation, from groundwater abstraction or discharge of surplus water.</p> <p>While MS 1141 covers impacts from groundwater abstraction and discharge of surplus water, adverse impacts from seepages from tailing storage facilities are regulated under Part V of the EP Act and are further assessed below.</p>		
Priority Ecological Communities, threatened fauna	<p>Multiple priority communities have been identified within the proposed activity.</p> <p>MS1141 considers and conditioned the protection of the relevant terrestrial fauna and will therefore not be further considered in this assessment.</p>		

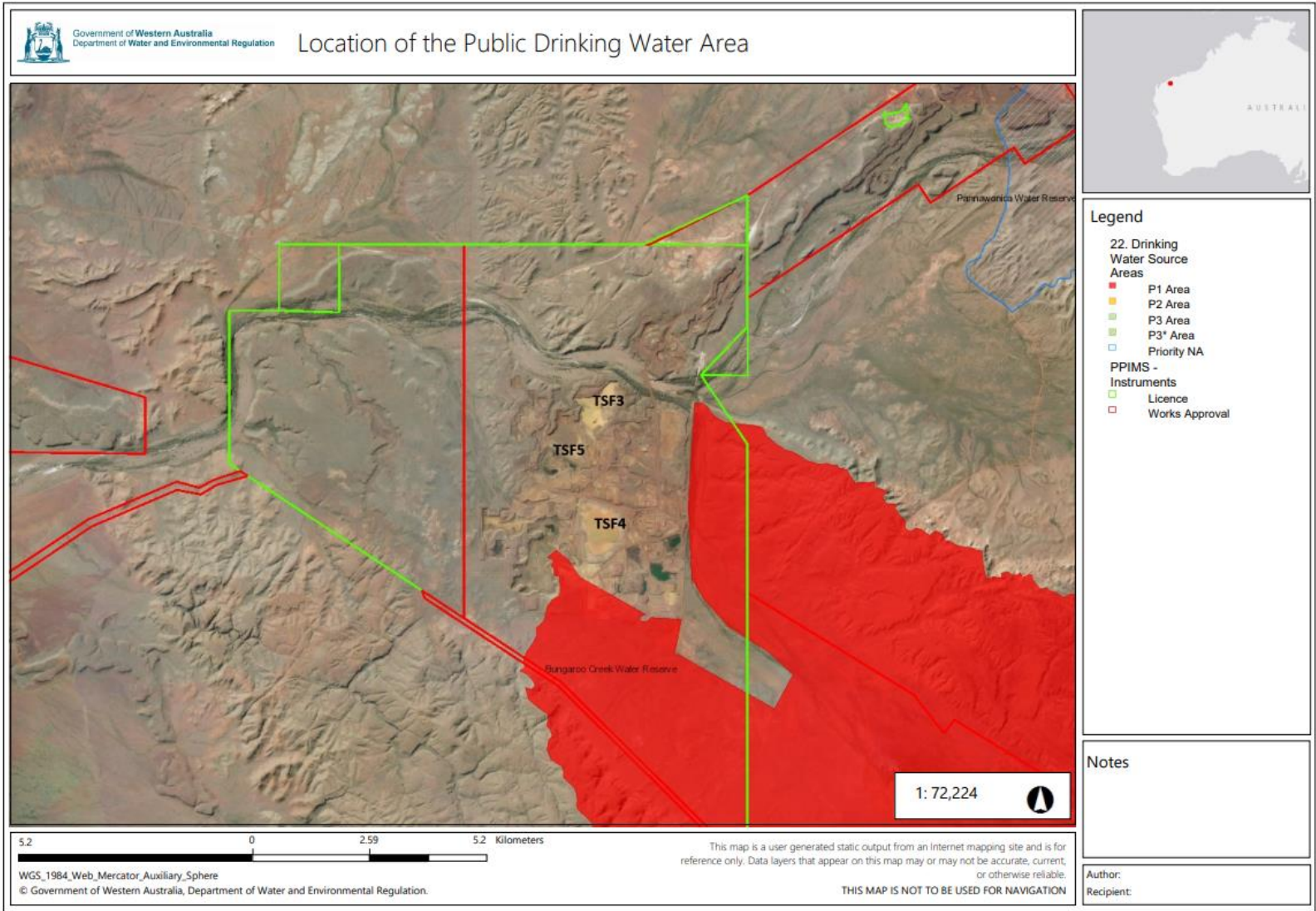


Figure 4 Distance from Tailings Storage Facilities to P1 Water Reserve

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3.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guidance Statement: Risk Assessments* (DER 2017) 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 4.

Works Approval W6425/2020/1 that accompanies this Decision Report authorises construction and time-limited operations. The conditions in the issued Works Approval, as outlined in Table 4 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

A licence is required following the time-limited operational phase authorised under the works approval to authorise emissions associated with the ongoing operation of the Premises i.e. processing of ore, deposition of tailings and operating a landfill. 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 4 Risk assessment of potential emissions and discharges from the Premises during construction and operations (including time limited operations)

Risk Event					Risk rating C = consequence L = likelihood	Conditions of works approval	Justification for additional regulatory controls
Source/Activities	Potential emissions	Potential pathways and impact	Receptors	Applicant controls			
Construction Category 5 & 64							
Construction activities for thickener plant, secondary sizer, relocation of IPS stacker, rescreening facility, vehicle movements, new pipelines, causeway, landfill, fuel storage	Dust	Air/wind dispersion and adverse health/amenity impacts Impacts to surface water quality (particulates from construction dust)	Kuruma Marthudunera People using Robe River/pools 500 m from TSF3 Surface water (Robe River, Pools), groundwater	Refer to section 3.1.1	C = Slight L= Possible Low risk	Proposed controls included as conditions on the works approval Condition 1	N/A
	Noise	Air/wind dispersion and adverse health/amenity impacts	Kuruma Marthudunera People using Robe River/pools 500 m from TSF3				
Commissioning & Time limited operations Category 5							
Secondary sized material processing, stockpiling	Dust	Air/wind dispersion and adverse health/amenity impacts Impacts to Surface water quality	Kuruma Marthudunera People 500 m from TSF3; PDWA, surface water (Robe River, Pools), groundwater	Refer to section 3.1.1	C = Moderate L= Possible Medium risk	Proposed controls included as conditions on the works approval Condition 1	N/A
	Contaminated stormwater and process water runoff from leaks/pipe bursts				C = Slight L= Possible Low risk		
Thickener plant	Contaminated runoff of thickened tailings material or flocculant	Seepage and infiltration through subsurface impacting the quality and ecology of surface water/groundwater; potential adverse health impacts as Robe River & pools which are also used as drinking/bathing source			C = Moderate L= Possible Medium risk	Conditions 1, 2, 8, 14, 15	Refer to section 3.3
Deposition of thickened tailings into TSF3,4,5	Thickener seeping and migrating into groundwater/ surface water				C = Major L = Likely High risk		

Commissioning & Time limited operations Category 64							
Operations of landfill facilities	Dust	Air/wind dispersion and adverse health/amenity impacts	Kuruma Marthudunera People 500 m from TSF3	Refer to section 3.1.1	C = Slight L= Unlikely Low risk	Proposed controls included as conditions on the works approval Conditions 1, 14, 19	N/A
	Odour	Impacts to Surface water quality	Surface water (Robe River, Pools)		N/A		
	Stormwater run off	Seepage and infiltration subsurface impacting the quality and ecology of surface water/groundwater; potential adverse health impacts as Robe River & pools which are also used as drinking/bathing source	Kuruma Marthudunera People 500 m from TSF3;		C = Minor L= Possible Medium risk		N/A
	Seepage of landfill leachate		PDWA, surface water (Robe River, Pools), groundwater		C = Moderate L= Unlikely Medium risk		N/A
	Windblown waste	Air/wind dispersion and amenity impacts, contaminating surrounding land	Surrounding land, surface water surface water (Robe River, Pools),		C = Moderate L= Unlikely Medium risk		N/A
	Air emissions/particulates as result from fire	Air/wind dispersion and adverse health/amenity impacts	Kuruma Marthudunera People 500 m from TSF3 Surface water (Robe River, Pools)		C = Major L= Rare Medium risk		Notification of the department of fires occurring within the landfill, including undertaken action to mitigate further impacts.
	Fire wastewater (from extinguishing fires)	Seepage and infiltration subsurface impacting the quality and ecology of surface water/groundwater and soil.	Groundwater and surrounding soil		C = Major L= Rare Medium risk		Fire wastewater is required to be contained on site, or contaminated soil is required to be removed.
	Commissioning & Time limited operations fuel storage and refuelling facility						
Operation of fuel storage and refuelling facility	Hydrocarbons, contaminated surface water runoff	Direct discharge and infiltration subsurface impacting surrounding soil and groundwater	PDWA, surface water (Robe River, Pools), groundwater	C = Slight L= Possible Low risk	Proposed controls included as conditions on the works approval Condition 1	N/A	

3.3 Risk event- Seepage containing flocculant

To reduce currently occurring seepage from the TSFs operated at the site, tailings are proposed to be thickened to reduce the volume of water deposited. Deposition of thickened tailings into the TSFs can result in seepages containing flocculant impacting surface water such as Robe River, Robe River pools and associated creeks.

3.3.1 Identification and general characterisation of emission

Current operations regulated under L6820/1993/12 authorise the discharge of tailings into TSF3, TSF4 and TSF5 (Figure 2). Seepage of decant water from TSF3 with a flux northerly towards Robe River has been previously identified (Golder, 2018).

While the decant water seepage from the TSFs has been previously assessed and is outside of the scope of this works approval, the flocculant and potential adverse impacts on the receiving environment has not yet been assessed.

The applicant proposes the use of Flopam AN934, which is a mixture with the main ingredient to be 2-propenoic acid, sodium salt polymer with 2-propenamide (Chemical Abstract Service Registry Number CASNR 25987-30-8). This product is classified as an anionic polyacrylamide which refers to a group of water-soluble molecules which are synthesised from acrylamide. Polyacrylamides can be manufactured to a variety of different molecular weights and charge densities, which can result in significant differences of binding properties.

The Safety Data Sheet (SDS) for Flopam AN934 was provided to the department but has no chronic toxicity data available. Additionally, the SDS refers to the product as not being readily biodegradable. Another concerns of the use of these type of flocculants is the presence of residual acrylamide which is a precursor used for the synthesis of anionic polyacrylamide. Acrylamide is highly toxic, carcinogenic, reprotoxic and neurotoxic. In contrast to anionic polyacrylamide, acrylamide does not adsorb well to particles, favouring transfer in surface and groundwater systems. Therefore, manufacturer requirements for products to contain less than 0.1 % w/w of residual acrylamide are in place. Current guidelines for drinking water set out a value of 0.5 µg/L for acrylamide (WHO, 2011). An analysis of the proposed flocculant indicates residual acrylamide levels of 0 - 999 ppm.

In the supporting documentation the applicant provides findings from literature on the persistence, bioaccumulation and toxicity of anionic polyacrylamide. Limited information is available for the characteristics of 2-propenoic acid, sodium salt polymer with 2-propenamide, therefore findings were expanded to include (anionic) polyacrylamides.

Studies undertaken on the persistence of (anionic) polyacrylamides indicate biodegradation after photolysis under aerobic and anaerobic conditions.

However, information and potential risk of the flocculant to the environment is based on a literature review which may not be representative of actual used product. Previous published studies were undertaken on different forms of anionic polyacrylamide, and comparisons of results are therefore difficult.

3.3.2 Pathway and receptor

Seepages containing flocculant can infiltrate and contaminate the groundwater and impact surface water (Robe River, Robe River pools, Jimmawurrada Creek). A strong connection between Robe River surface water and groundwater within the underlying Robe River alluvial aquifer has been shown, and a pathway for seepage from the TSFs to the surface water has been confirmed in past assessments.

The surface water potentially affected by flocculant contamination has significant Aboriginal heritage and social value. The Robe River and associated pools are used for drinking, cooking,

and swimming purposes by traditional owners and other visitors. While the overall seepage is proposed to be reduced by thickening the tailings, the potential of some flocculant containing tailings migrating into the groundwater and reaching the surface water remains.

The applicant proposes to add 0.06 t/hr (1.44 t/day) of flocculant to the tailings. Based on modelling undertaken, the maximum estimated concentration of anionic polyacrylamide in the TSF water is 80 mg/L which results in a maximum of 0.08 mg/L acrylamide. The seepage rates from TSF3 are estimated to be 201 m³/d to the north and 2932 m³/d to the southern side. Based on these rates, a maximum loading of 16 kg/d and 0.016 kg/d of anionic polyacrylamide and acrylamide respectively, was estimated. This accounts for no dilution, and no dispersion of breakdown of the product along the flow path.

No modelling for the deposition into TSF4 and TSF5 is available. The applicant proposes to deposit thickened tailings mainly into TSF3, and into TSF4 and TSF5 as contingency measures. Elevated nitrate levels in groundwater monitoring bores have been identified previously and were inferred to be due to groundwater seepage from TSF3 and/or TSF5.

However, it is also noted the degree of absorption, degradation and persistence is dependent on various factors such as chemical characteristics of the specific flocculant, and environmental factors including soil and water chemistry, size and availability of soil particles, temperature and ambient light.

Due to the lack of site specific information, supporting documentation recommends to monitor flocculant in the TSF supernatant waters where thickened tailings have been deposited as well as in downgradient bores and selected pools of Robe River. Additionally, the consideration of an ecological screening value for polyacrylamide using information in aquatic ecotoxicology literature was advised (Golder, 2020).

3.3.3 Applicant controls

The applicant proposes to deposit waste fines at the northern side of the TSF3 and to have the decant pond located on the southern side to increase the distance to the hydraulic connection to Robe River. Additional monitoring bores (10 in total) are proposed (Figure 3) to capture potential adverse impacts from the flocculant containing seepage on the surface water.

Additional parameters are proposed to be measured in all monitoring bores, including NO₃, Total Nitrogen, Aluminum and Barium, as supporting documentation indicate these potentially to be leaching. Monitoring of parameters in monitoring bores is proposed by the applicant to be undertaken annually.

3.3.4 Rating of this risk event

Seepage is currently occurring and adverse impacts on surface water (including Robe River) have been identified. The thickening of tailings is proposed to reduce the overall volume of seepage, however the potential adverse impacts of the flocculant on surface water and uncertainties about the pathway remain.

The Delegated Officer considers the consequence of flocculant reaching sensitive receptors to be **Major**.

Seepage is currently occurring and a pathway has been identified from TSF3 to Robe River. While the tailings thickening will reduce the overall seepage volume, the Delegated Officer considers the likelihood of flocculant in seepage still reaching the sensitive receptor to be **Likely**.

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

3.3.5 Regulatory controls

In addition to the parameters proposed by the applicant, flocculant will be required to be monitored in the groundwater, in TSF supernatant water where deposition of thickened tailings have occurred, and in selected Robe River pools, to identify potential impacts to surface water during operations.

During commissioning and time limited operations, monitoring of groundwater quality will be required monthly to establish potential seepage and flocculant impacts. If flocculant is detected in the groundwater bores indicating movement of the flocculant towards the surface water, monitoring of selected Robe River pools potentially affected may be required. A contingency plan if flocculant is detected is required to be provided and implemented by the applicant prior commencement of TLO. Additionally, ecological and toxicity testing will be required and included as part of the following licence amendment if results indicate potential adverse impacts.

4. Regulatory controls

4.1 Works approval

Rationale and summary of conditions set out in W6425/2020/1 are listed in

Condition Ref	Reasoning
<u>Infrastructure and equipment</u> 1 - 2	<p>Proposed infrastructure for category 5, 64 and associated activities is required to be constructed in accordance with application specifications. Additional groundwater monitoring bores are required to be constructed in accordance with the conditions of the works approval.</p>
<u>Compliance reporting</u> 3 - 5	<p>Within 30 days of completion of infrastructure construction/installation, an Environmental Compliance Report is to be submitted to the department.</p> <p>Within 60 days of completion of the construction of the groundwater monitoring bores a well construction report is to be submitted to the department.</p>
<u>Environmental commissioning</u> Requirements 6 – 7 Monitoring 8 – 9 Reporting 10 - 11	<p>Commissioning is only authorised once the compliance and well construction reports have been received.</p> <p>Commissioning is authorised for category 5 related infrastructure only, for a maximum of 12 months.</p> <p>Groundwater monitoring is required during commissioning and is reported to the department as an Environmental Commissioning Report within 30 days of completion. A contingency plan is required to be developed and implemented in case of flocculant detection in groundwater during time limited operations.</p>
<u>Time limited operations</u> Commencement and duration 12 – 13 Monitoring 15 – 16 Reporting 17 - 19	<p>Time limited operations are authorised when the Environmental Compliance Report, Environmental Commissioning Report and well construction report has been submitted.</p> <p>A maximum of 180 days of time limited operations are authorised for category 5 and 64 related activities, and the fuel storage/refuelling facility.</p> <p>During time limited operations, groundwater and supernatant of receiving TSFs are required to be monitored and reported to the department within 60 days after completion of time limited operations.</p>

<u>Records and reporting (general)</u>	These conditions are valid and are necessary for administration and reporting requirements to ensure compliance.
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4.2 Proposed licence controls (by amendment to existing licence L5529/1988/12 following completion and compliance with this works approval)

Condition Ref	Reasoning
<u>Infrastructure and equipment</u>	Infrastructure is required to be located at the agreed location and is maintained/operated in accordance with corresponding requirements. Constructed infrastructure is included in the licence with location.
<u>Monitoring</u>	Groundwater quality monitoring is undertaken at new constructed bores with parameters as set out in the works approval. Frequency of monitoring may be reconsidered. Consideration if Robe River pools/surface water is required to be monitored if flocculant impacts are identified in the monitoring bores. Depending on potential impacts toxicity/ecotoxicological analysis/monitoring or trigger values for the flocculant may be considered.
<u>Compliance reporting</u>	Annual Environmental Report with monitoring data. Annual Audit Compliance Report to set out any noncompliance.
<u>Records and reporting</u>	These conditions are valid and are necessary administration and reporting requirements to ensure compliance.

5. Consultation

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

Table 5: Consultation

Consultation method	Comments received	Department response
Application advertised on the department's website & newspaper (24 August 2020)	No comments received	N/A
Shire of Ashburton (24 August 2020)	No comments received	N/A
Department of Mines, Industry Regulation and Safety advised of proposal (24 August 2020)	No comments received	N/A
Department of Jobs, Tourism, Science and Innovation (24 August 2020)	No comments received	N/A

Consultation method	Comments received	Department response
Department of Biodiversity, Conservation and Attractions (24 August 2020)	No comments received	N/A
Applicant was provided with draft documents on (25 September 2020)	Comments received 9 October 2020 Refer to Appendix 1	Refer to Appendix 1

6. Conclusion

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

References

1. Department of Environment Regulation (DER) 2016, *Guidance Statement: Environmental Siting*, Perth, Western Australia.
2. DER 2017, *Guidance Statement: Risk Assessments*, Perth, Western Australia.
3. DER 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
4. Rio Tinto March 2020, Works Approval Supporting Documentation Mesa J and Mesa K Iron Ore Mine – L6820/1993, Mesa J Hub Proposal. Perth Western Australia (DWERDT268240).
5. Golder 2020. Appendix 1 of Works Approval Supporting Documentation: Mesa J Thickened Tailings Storage Supporting Documentation for Part V Works Approval Application. Perth Western Australia (DWERDT336432)
6. Rio Tinto March 2019. Appendix 2 of Works Approval Supporting Documentation:: Occupational Hygiene Advice – Health implications associated with elevated nitrate levels in Robe River pools. Perth Western Australia (A1884187)
7. Golder 2018 Appendix H TSF3 hydrogeological seepage assessment reports (DWERDT268240)
8. Rio Tinto September 2020, Response to Further Information Request by DWER (DWERDT336432)
9. WHO 2017, Guidelines for Drinking-water Quality, Acrylamide

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

Condition	Summary of applicant's comment	Department's response
Decision report	<p>Table 1: Proposed works- to reflect two separate commissioning timeframes:</p> <ol style="list-style-type: none"> 1) Plant 1- PP2 – construction start November 2020 <ul style="list-style-type: none"> • Commissioning stages 1-3: April 2021 to September 2021 • Commissioning stages 4-6: October 2021 to April 2022 2) Plant 2- Secondary sizer, train load out primary sizer- construction start January 2021 <ul style="list-style-type: none"> • Commissioning stages 1-3: February 2021 to August 2021 • Commissioning stages 4-6: September 2021 to February 2022 <p>Request to commence TLO from February 2022 for 180 days.</p>	Amended to reflect the proposed stages in decision report and works approval (Condition 7, Table 3)
	Table 2: Proposed applicant controls- requested information on bund height provided	Information updated in table.
	Figure 3 and updated monitoring bore names.	Figure replaced with higher quality map in decision report and works approval. Label of monitoring bores updated to reflect labelling on map in works approval.
Condition 14, Table 4	<p>Request from applicant to allow deposition of thickened waste fines to existing TSFs (TSF4 and 5) licensed under L6820/1993</p> <p>Proposed change:</p> <p><i>Thickened tailings may be deposited into TSF4 and TSF5 as contingency storage only (e.g. embankment failure of TSF3).'</i></p>	Amended to reflect the deposition of thickened tailings into TSF4 or TSF5 as contingency.

Appendix 2: Application validation summary

SECTION 1: APPLICATION SUMMARY				
Application type				
Works approval	<input checked="" type="checkbox"/>	Relates to existing mining operation (Mesa J and K) under L6820/1993/12		
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 type="checkbox"/>	Current licence number:		
		Relevant works approval number:	N/A	<input type="checkbox"/>
Registration	<input type="checkbox"/>	Current works approval number:	None	<input type="checkbox"/>
Date application received		30 March 2020		
Applicant and Premises details				
Applicant name/s (full legal name/s)		Robe River Mining Co. Pty Limited		
Premises name		Mesa J and Mesa K Iron Ore Mine		
Premises location		Mining Lease AML248SA		
Local Government Authority		Shire of Ashburton		
Application documents				
HPCM file reference number:		DER2020/000158		
Key application documents (additional to application form):		<p>Rio Tinto March 2020, Works Approval Supporting Documentation Mesa J and Mesa K Iron Ore Mine – L6820/1993, Mesa J Hub Proposal. Perth Western Australia.</p> <p>Appendix 1 of Works Approval Supporting Documentation: Mesa J Thickened Tailings Storage Supporting Documentation for Part V Works Approval Application (Golder 2020)</p> <p>Appendix 2 of Works Approval Supporting Documentation:: Occupational Hygiene Advice – Health implications associated with elevated nitrate levels in Robe River pools (Rio Tinto 2019)</p>		
Scope of application/assessment				

<p>Summary of proposed activities or changes to existing operations.</p>	<p><u>Works Approval</u></p> <p><u>Category 5: Processing of ore (13,000,000 tonnes per annual period)</u></p> <p>Construction and commissioning of a tails thickening facility to facilitate the deposition of thickened tailings into three existing facilities at the Mesa J mine; TSF3, TSF4 and TSF5</p> <p>Ore from mining of the existing Mesa J and Mesa K mines is processed in existing processing facilities located at Mesa J. The existing Mesa J processing facilities include two wet scrubbing and screening plants; processing plant 1 (PP1) and processing plant 2 (PP2), an in-pit primary sizing circuit (IPS) and a primary sizing circuit at the train load out (TLO primary sizer).</p> <p>The existing Mesa J processing facilities are proposed to be modified to increase water recovery during processing, reducing operational water demand, but will not increase the design capacity of the processing facilities. Proposed modifications include:</p> <ul style="list-style-type: none"> • Dry processing facility modifications (including the addition of a new secondary sizer to the TLO primary sizer circuit and relocation of the existing IPS stacker); and • Wet processing facility modifications (including the addition of a new rescreening facility and installation of a waste fines thickener). <p><u>Category 64: Landfill facilities (2,000 tonnes per annual period)</u></p> <p>Construction and operation of a Class II putrescible landfill within a waste rock dump. The landfill is proposed for the disposal of approximately 2,000 tonnes of inert and putrescible waste annually to support the Mesa J operations.</p> <p><u>Category 73: Fuel storage and refueling facilities</u></p> <p>Upgrades to the existing Mesa J Refuelling Hub, including additional fuel storage and refuelling facilities, are also proposed. The cumulative fuel storage capacity on the Premises (630 cubic metres in aggregate) will not exceed the Category 73 threshold and is consequently not a Prescribed Premises. The risk profile of the proposed expansion has not changed. Part 5 Approval from DWER for the construction of the facility as proposed is not required.</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	production or design capacity	Proposed changes to the production capacity
Category 5: Processing or beneficiation of metallic or non-metallic ore.	13,000,000 tonnes per annual period	No
Category 64: Class II or III putrescible landfill site: premises on which waste is accepted for burial.	2,000 tonnes per annual period	No

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	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Referral decision No:
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significant proposal?		Managed under Part V <input type="checkbox"/> Assessed under Part IV <input type="checkbox"/>
Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Ministerial statement No: MS208 EPA Report No: Assessment 590, Bulletin 574, Statement 208.
Has the proposal been referred and/or assessed under the EPBC Act?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Reference No: A valid Ministerial Statement applies: Ministerial Statement 208
Has the applicant demonstrated occupancy (proof of occupier status)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Certificate of title <input type="checkbox"/> General lease <input type="checkbox"/> Expiry: Mining lease / tenement <input checked="" type="checkbox"/> Expiry: Other evidence <input type="checkbox"/> Expiry: State Agreement ML 248SA granted pursuant to the Iron Ore (Robe River) Agreement Act 1964. Expires 30 October 2033 Checked on Tengraph.
Has the applicant obtained all relevant planning approvals?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/>	Approval: Expiry date: Applicant advised approval for the proposed facilities will be sought from the Shire of Ashburton as required.
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: 6689 No clearing is anticipated. If required, clearing has been assessed and approved via Ministerial Statement 208 Clearing that is not approved via existing Ministerial Statements will continue to be managed via CPS 6689, and any amendments as required
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"/>	Application reference No: N/A Licence/permit No: N/A No clearing is anticipated.
Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Application reference No: Licence No: GWL 107678 allows for abstraction of 30,000,000 kL per annum from the mine borefield the purposes of exploration, construction, operations (dewatering, mineral ore processing, dust suppression) and potable water

		supply. Licence / permit not required for this proposal. The Premises is located in a designated surface water area proclaimed under the RIWI act.
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Name: N/A Type: Has Regulatory Services (Water) been consulted? Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Regional office:
Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Name: Bungaroo Creek Water Reserve Priority: P1 Are the proposed activities/ landuse compatible with the PDWSA (refer to WQPN 25)? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> The nearest PDWSA; is the Bungaroo Creek Water Reserve (P1), intersects the Premises (north western section of the reserve). It is 1.6km southeast of TSF 3. Panawanica Water Reserve (unassigned priority) is located 6.5km NW of the premises.
Is the Premises subject to any other Acts or subsidiary regulations (e.g. <i>Dangerous Goods Safety Act 2004, Environmental Protection (Controlled Waste) Regulations 2004, State Agreement Act xxxx</i>)	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Iron Ore (Robe River) Agreement Act 1964.
Is the Premises within an Environmental Protection Policy (EPP) Area?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Is the Premises subject to any EPP requirements?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	

<p>Is the Premises a known or suspected contaminated site under the <i>Contaminated Sites Act 2003</i>?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	<p>Classification: N/A Date of classification: N/A</p>
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