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Decision Report

Application for Licence

Part V Division 3 of the Environmental Protection Act 1986

Licence Number	L9446/2024/1
Applicant	Pilbara Iron Pty Ltd
ACN	107 216 535
File number	DER2024/000353
Premises	Ti Tree Rail Camp Wastewater Treatment Plant CHICHESTER
	Legal description -
	Miscellaneous Licence L47/47
	As defined by the coordinates in Schedule 2 of the licence
Date of report	15 November 2024
Decision	Licence granted

SENIOR ENVIRONMENTAL OFFICER INDUSTRY REGULATION

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 operation of the premises. As a result of this assessment, licence L9446/2024/1 has been granted.

2. Scope of assessment

2.1 Regulatory framework

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

2.2 Application summary and overview of premises

On 16 July 2024, the applicant submitted an application for a licence to the department under section 57 of the *Environmental Protection Act 1986* (EP Act).

The application is to seek a licence relating to the operation of a wastewater treatment plant (WWTP) and two irrigation spray fields at the premises. The wastewater treatment plant and irrigation spray fields were constructed under works approval W6555/2024/1, which was granted on 5 June 2022. Time limited operations of the wastewater treatment plant and spray fields commenced on 5 April 2024. The premises is approximately 97 km north of Tom Price.

The premises relates to the category and assessed design capacity under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) which are defined in licence L9446/2024/1. The infrastructure and equipment relating to the premises category and any associated activities which the department has considered in line with *Guideline: Risk Assessments* (DWER 2020) are outlined in licence L9446/2024/1.

2.2.1 WWTP and spray fields

The operational aspects as outlined within the licence application supporting document are detailed below:

The application details that the WWTP is a Modified Ludzack-Ettinger (MLE) Activated Sludge Process WWTP. The camp at full capacity (306 persons) will deliver around 95 kL per day of effluent to the WWTP.

Currently Ti Tree Camp has a 48-room capacity however the applicant is proposing to expand the camp with the addition of 258 new rooms, associated amenities and infrastructure. The expansion of Ti Tree Camp is to support the ongoing essential maintenance across Pilbara Iron's rail network.

The applicant is proposing to decommission the existing 13 kL WWTP which currently services the 48 rooms and will be replaced by the new Modified Ludzack-Ettinger WWTP. The existing spray field has been expanded.

Basic components and operation of the MLE system are shown in Figure 1 below and include:

- Raked Screen
- Balance Tank
- Anoxic Tank
- Aeration Tank

- Clarifier
- Effluent sterilization (chlorination) unit;
- Treated effluent tank; and
- A series of pumps, screens, diffusers, blowers and mixers to transfer and process the wastewater.

There is also a treated water discharge pipeline to the irrigation field and sewer pipelines from the camp buildings. A number of pump stations enable the wastewater to be pumped between the camp, WWTP and the irrigation field.

The combined area of the two spray fields is 5.5 ha and bunded to ensure no interaction with surface water. The spray fields consist of sprinklers spaced uniformly to provide an even distribution of wastewater across the entire area. The application rate of wastewater will be 3.5 mm – 4 mm/day. Wastewater will be treated to the Risk Category C specifications as outlined in *Water Quality Protection Notice 22: Irrigation of nutrient rich wastewater (2008)* prior to disposal.

Based on the soil type and location the maximum rate of nutrient application to control eutrophication risk would be 300 kg Nitrogen/ha/year and 50 kg Phosphorus/ha/year. The expected annual nutrient loading based on the information provided below in Table 1 and a spray field area of 5.5 ha will be 83.684 kg/ha/year for total nitrogen and 9.656 kg/ha/year for total phosphorus.

Item	Units	Value			
Nitrogen load					
Daily flow rate	m³/ day	97			
TN in effluent	mg/L	<13			
Total TN allowed per ha (soil category C)	kg TN/ha/year	300			
Irrigation area	ha	5.5			
Phosphorous load					
Daily Flow rate	m ³ / day	97			
TP in effluent	mg/L	1.5			
Total TP allowed per ha (soil category C)	kg P/ha/year	50			
Irrigation area required	ha	5.5			

Table 1: Effluent s	pecifications and	spray field sizing
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Figure 1: WWTP Process Flow Diagram

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3. Risk assessment

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

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

3.1 Source-pathways and receptors

3.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises operation which have been considered in this decision report are detailed in Table 2 below. Table 2 also details the control measures the applicant has proposed to assist in controlling these emissions, where necessary.

Sources Emission **Potential pathways Proposed controls** Operation The WWTP is a containerised system with an enclosed balance tank and treated effluent/ irrigation tanks to reduce fugitive odour emissions. Odour Air / windborne pathway WWTP will be appropriately operated in conditions that reduce odour generation. Inspection and maintenance will be undertaken to mitigate the risk of odour emissions. All pipelines are HDPE with welded joints. Operation of Pipelines will be inspected daily to identify leaks, WWTP: spills or failures. Acceptance The WWTP has remote monitoring and control and treatment capabilities. of sewage Standby pumps are available during Containment Sewage / emergencies. loss from partially pipes, WWTP The WWTP has been installed as per treated holding tanks, sewage / manufacturer specifications and tested to confirm Surface runoff storage tanks solid waste it is free from leaks. and geobags containing Soil seepage WWTP tanks are installed on an impermeable associated Storage of Seepage to pad. contaminants chemicals groundwater (nutrients, The WWTP includes process alarms and metals. volumetric meters to notify the operator of system pathogens, upsets. PoPs) Any incident involving a spill of untreated sewage will be responded to immediately with contaminated soil removed and taken by a licensed transporter to a licensed facility and remediation actions will be taken to minimise the risk of reoccurrence.

Table 2: Proposed applicant controls

Sources	Emission	Potential pathways	Proposed controls
			Sufficient freeboard will be maintained within each tank to ensure overtopping does not occur.
			The WWTP is located on a concrete pad within a concrete bund connected to an overflow pond with a minimum capacity of one day hydraulic loading.
			Sludge waste produced onsite will be directed to two geobags located on an impervious base with external and internal bund walls for sludge drying purposes.
			The dried sludge will be removed from site by a licensed contractor and disposed at a suitable licensed facility.
	Oblarias (The chlorination unit is housed within a 12 m container along with the chlorine storage container (2.5 m ³ poly tank);
	Chlorine/ treatment chemicals	Inhalation, ingestion and dermal contact Surface runoff	 The chemicals will be loaded using a forklift and placed on a spill containment tray within the enclosure; and
			 Procedures for bringing chemicals to site will be followed including ensuring a Materials Safety Data Sheet (MSDS) is available.
			Additional operational requirements under Ministerial Statement 514 and the <i>Robe River</i> <i>Mining Co Pty Ltd Robe River Agreement Act</i> <i>1964</i> .
Discharge to irrigation spray fields 1 and 2	Treated sewage containing associated contaminants (nutrients, metals, pathogens, PoPs)	Surface runoff Soil seepage Seepage to groundwater	Effluent from the WWTP will be treated to better than Risk Category C specification as outlined in <i>Water Quality Protection Notice 22: Irrigation of</i> <i>nutrient rich wastewater (2008)</i> prior to disposal and to comply with a Low Exposure Risk Level (level of human contact) in accordance with the Guidelines for the non-potable uses of recycled water in Western Australia (DoH, 2011), with effluent achieving the specifications detailed in Table 1.
			Spray field bunds are designed to withstand a 1 in 100 AEP flood event to ensure no interaction with surface water.
			Hydrogeological modelling shows groundwater flow will take 50 years to reach the Fortescue River from the irrigation area and contaminant migration is likely to take longer than 100 years.
			The modelling also showed limited groundwater flow towards the camp production bores, with particle tracking showing no flow-paths reaching more than half the distance to the bores.

3.1.2 Receptors

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

Table 3 and Figure 2 below provide a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises (*Guideline: Environmental Siting* (DWER 2020)).

Table 3: Sensitive	human and env	vironmental r	eceptors and	distance from	prescribed
activity					

Receptors	Distance from prescribed activity		
Human receptors			
Coolawanyah Station Lease LPL N049532 –	Approximately 21 km east of Ti Tree Camp.		
nomesteau	Not considered a viable receptor due to distance from the premises.		
Environmental receptors			
Public Drinking Water Source Area	Within the Priority 2 Millstream Water Reserve		
Surface water	Several surface water lines are located within the premises boundary.		
	The premises is also situated within the Pilbara Surface Water Area.		
Underlying groundwater	Groundwater is located 17.4 to 17.5 mbgl and flows in a south-westerly direction.		
	Groundwater abstraction bores for use on the premises are located 1.2 km north.		
Fortescue River	Approximately 670 m southwest of premises		
Threatened Ecological Community (TEC)	Approximately 3 km from premises boundary.		
	Impacts to TECs are managed under Ministerial Statement 514.		
Surrounding vegetation	Within and surrounding the premises. The surrounding vegetation supports conservation significant species due to known records in close vicinity.		
	Impacts to TECs are managed under Ministerial Statement 514.		

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Figure 2: Receptors surrounding the premises

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3.2 Potential impact to water resources and sensitive receptors

During assessment of works approval W6555/2021/1 the Delegated Officer sought internal Water Source Protection advice on the suitability of the proposal from DWER's Northwest Region, given its location within the Priority 2 Millstream Water Reserve, and advice from the Department of Health (DoH). As the proposed operation of the premises has not changed, the advice received is still relevant for the licence application assessment. The key findings are outlined below, and the full detailed consideration can be found in the works approval decision report on the department's website: <u>https://www.der.wa.gov.au/our-work/licences-and-works-approvals/current-licences</u>.

Key findings:

- 1. The proposal will operate under the requirements of Ministerial Statement 514 and the Robe River Mining Co Pty Ltd Robe River Agreement Act 1964.
- 2. The findings of the modelling and risk assessment report are reasonable and are accepted.
- 3. The following alternative options for disposing of treated effluent were investigated:
 - i. trucking the treated effluent from the camp to an offsite facility was not a feasible option due to costs and implementation.
 - ii. use of another facility such as Pelican Camp was not an option as it was being demobilised.
 - iii. moving the spray field outside of the P2 PDWSA area was difficult as there were no optimal sites within tenure. Option of moving the spray field northeast where a communications tower is located was not feasible as the land is sloped with the likelihood of the water flowing/draining in to the P2 PDWSA area. Moving the spray field to the southeast would move it in to a 1:100 AEP flood zone and increase risk to the P2 PDWSA.
- 4. A 2D hydraulic model was developed using the software TUFLOW to simulate rainfallrunoff across the study area using the rain-on-grid methodology to estimate probable concentrations of contaminants (*Escherichia coli*) reaching the receptors either through surface water or groundwater flow.
- 5. The range of annual exceedance probability (AEP) events were modelled to simulate the hydrology within the study area, extract peak flows and determine when and where overtopping of the proposed bunds would occur.
- 6. A modelling approach was implemented that involved the development of a threedimensional groundwater numerical model. The model was developed using FEFLOW modelling software.
- 7. Groundwater modelling simulation for 200 years indicate that the Contaminant movement within groundwater does track towards the south-west and mounds locally initially, however it is estimated to take over 100 years for seepage from the spray field to reach the Fortescue River. Furthermore, *E. coli* are expected to be attenuated after treated wastewater is discharged indicating unlikely impacts after 100 years.
- 8. Results from sensitivity analysis using low hydraulic conductivity and low storage coefficients indicated that groundwater flow would reach the Fortescue River in about 50 years.

- 9. Groundwater affected flow from the spray field is not expected to reach the abstraction bores within the short- or long-term operation of the spray field (the modelling showed limited groundwater flow towards the camp production bores, with particle tracking showing no flow-paths reaching more than half the distance to the bores).
- 10. Surface water modelling for a 1 in 50 annual exceedance probability (AEP) event that was used to identify bund heights to contain a 1 in 50-year flood event, indicated that several bunds at the spray field are at risk of overtopping, therefore bunds have been redesigned to withstand a 1 in 100 AEP flood event which would reduce the risk of treated wastewater discharging beyond the spray field.
- 11. Overtopping of bunds may cause bund failures leading to additional sediment and nutrient transport downstream therefore bunds should be monitored and may require regular maintenance.

3.3 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for each identified emission source and takes into account potential sourcepathway 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 licence 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.

Licence L9446/2024/1 that accompanies this decision report authorises emissions associated with the operation of the premises i.e. the operation of the wastewater treatment plant and irrigation to the spray fields.

The conditions in the issued licence, as outlined in Table 4 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 operation

Risk events				Risk rating ¹	Applicant controls		luctification for additional		
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood	Applicant controls sufficient?	Conditions ² of licence	regulatory controls	
Operation		•	•	·	•		•	•	
	Odour	Pathway: Air/windborne Impact: Amenity	No viable receptors	Refer to Section 3.1	Risk event not viable due to d	istance to sensitive rece	eptors.	_	
 Operation of WWTP: Acceptance and treatment of sewage Containment loss from pipes, WWTP holding tanks, storage tanks and geobags Storage of chemicals 	Sewage / partially treated sewage / solid waste containing	Pathway: Surface runoff Impacts: Soil contamination, eutrophication of waterways, reduction in terrestrial and aquatic ecosystem health waste containing	Surrounding vegetation that supports conservation significant species Surface water Fortescue River	Refer to Section 3.1	C = Moderate L = Unlikely Medium Risk		Conditions 1, 2, 3, 4, 5, 6, 7, and 8	Applicant proposed controls are considered sufficient and additional regulatory controls are already in place through the requirements of Ministerial Statement 514 and the <i>Robe River</i> <i>Mining Co Pty Ltd Robe River</i> <i>Agreement Act 1964.</i>	
	associated contaminants (nutrients, metals, pathogens, PoPs)	Pathways: Seepage to groundwater and groundwater migration Impacts: Reduction in groundwater quality and loss of beneficial use within the PDWSA	Underlying groundwater Priority 2 Millstream Groundwater Reserve		C = Major L = Rare Medium Risk	Tes			
	Chlorine/ treatment chemicals	Pathways: Surface runoff and seepage to groundwater Impacts: Terrestrial ecosystem health and groundwater quality	Surrounding vegetation Underlying groundwater	Refer to Section 3.1	C = Moderate L = Unlikely Medium Risk	Yes	Condition 1, 3, 4, 6, and 7	Applicant proposed controls are considered sufficient and additional regulatory controls are already in place through the requirements of Ministerial Statement 514 and the <i>Robe River</i> <i>Mining Co Pty Ltd Robe River</i> <i>Agreement Act 1964.</i>	
Discharge to irrigation spray fields 1 and 2	Treated sewage containing associated contaminants (nutrients, metals, pathogens, PoPs) Pathways: Seep groundwater and groundwater migr Impacts: Reduct groundwater qual of beneficial use of PDWSA	Pathway: Surface runoff Impacts: Soil contamination, eutrophication of waterways, reduction in terrestrial and aquatic ecosystem health	Surrounding vegetation that supports conservation significant species Surface water Fortescue River	Pefer to Section	Defer to Section	C = Moderate L = Unlikely Medium Risk	Vac		Applicant proposed controls are considered sufficient and additional regulatory controls are already in place
		Pathways: Seepage to groundwater and groundwater migration Impacts: Reduction in groundwater quality and loss of beneficial use within the PDWSA	Underlying groundwater Priority 2 Millstream Groundwater Reserve	3.1	Yes C = Major L = Rare Medium Risk	Conditions 1, 2, 3, 4, 5, 6, 7, and 8	Statement 514 and the Robe River Mining Co Pty Ltd Robe River Agreement Act 1964.		

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

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

4. 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 on 4 September 2024	None received	N/A
Local Government Authority (Shire of Ashburton) advised of proposal on 4 September 2024	None received	N/A
Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) advised of proposal on 4 September 2024DEMIRS responded on 18 October 2024 advising a Mining Proposal is currently being assessed that includes the expansion of the WWTP at the Ti Tree Rail Camp (Mining Proposal Reg ID 128521).DEMIRS had no comments on the licence application.		N/A
Department of Jobs, Tourism, Science and Innovation (JTSI) advised of proposal on 4 September 2024	JTSI responded on 9 September 2024 noting that a new wastewater treatment facility and spray field for Ti Tree Camp was approved as part of a State Agreement proposal by the Minister for State Development on 27 October 2020 under the <i>Iron Ore (Robe River) Agreement 1964.</i> JTSI had no further comment.	N/A
Department of Health advised of proposal on 4 September 2024	None received	N/A
The applicant was provided with draft documents on 14 October 2024The applicant responded on 8 November 2024. Refer to Appendix 1.		Refer to Appendix 1

5. Conclusion

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

References

- 1. Department of Health (DOH) 2011, *Guidelines for the non-potable uses of recycled water in Western Australia*, Perth, Western Australia.
- 2. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
- 3. Department of Water (DOW) 2008, *Water Quality Protection Note 22: Irrigation with nutrient-rich wastewater*, Perth, Western Australia.
- 4. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
- 5. DWER 2020, Guideline: Risk Assessments, Perth, Western Australia.

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

Condition	Summary of ap	plicant's comment	Department's response		
1, Table 1, Row 3 (a)	The applicant co overflow pond is	nfirmed the thickness of the HDPE liner in the emergency 1.50 mm.	N/A.		
6, Table 4	The applicant rea mg/L be remove	quested the minimum residual chlorine concentration limit of >0.2 d.	The Delegated Officer determined to keep the minimum residual chlorine concentration limit. There must be a minimum level of chlorine present in the treated wastewater to reduce the risk of microbial contamination after disinfection.		
7(b) and 13, Table 7	The applicant red be at least 15 da months. The app	quested the amendment or removal of the requirement that there ys in between the days on which samples are taken in successive licant proposed two options for amending the condition:	The Delegated Officer determined to keep the requirement that there be at least 15 days in between the days on which samples are taken, and accepted the inclusion of option 2 to		
Option 1 - Amend condition 7(b) to: The Licence holder must where practicable undertake the monitoring specified in Table 5 for each monthly period such that there are at least 15 days in between the days on which samples are taken in successive months.		d condition 7(b) to: The Licence holder must where practicable onitoring specified in Table 5 for each monthly period such that t 15 days in between the days on which samples are taken in hs.	require reporting of any monitoring events that don't meet the requirement.		
	Option 2: Amenc	reporting condition 13 (Table 7) second row only to:			
	Condition Requirement				
	1,2, 6 and 7Details of any licence limit exceedances observed during the reporting period and any action that were undertaken to resolve the exceedances.				
		Details of any monitoring event that occurred within 15 days of the prior monitoring event, along with an explanation as to why monitoring was not able to be completed at least 15 days apart.			
12(b)	The applicant rec Compliance Rep	quested 30 April as the submission due date for the Annual Audit ort.	Accepted.		
13(b)	The applicant rec Environmental R	quested 30 April as the submission due date for the biennial eport, beginning 30 April 2026.	Accepted.		

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Condition	Summary of applicant's comment	Department's response
13, Table 7, 7 (a)	The applicant requested the removal of the requirement to report daily volumes applied to the irrigation spray fields.	The Delegated Officer accepted the removal of the requirement to report daily cumulative volumes, and instead included the requirement to report the average daily application rate calculated for each month.
13, Table 7, 7 (b)	The applicant requested the removal of the requirement to provide all the treated effluent monitoring data in graphical form, in addition to table format.	The Delegated Officer partly accepted the removal of the requirement to provide treated effluent monitoring data in graphical form. The intent of this requirement was to have a graphical representation of historical trends and plant performance for nutrient and pathogen removal. To meet this intent and remove unnecessary parameters, the requirement to graphically present all treated effluent monitoring data was removed and replaced with the requirement to include total nitrogen, total phosphorus and <i>E. coli</i> monitoring data in graphical form for the current and preceding two reporting periods.
13, Table 7, 7 (e)	The applicant requested the removal of the requirement to provide laboratory sample analysis reports.	The Delegated Officer determined to keep the requirement to provide laboratory sample analysis reports so that the department is able to assess the quality of interpreted as required when reviewing the environmental reports.
Table 8: Definitions	The applicant requested the annual period be the calendar year.	Accepted.
Schedule 1, Figure 2	The applicant provided an updated site plan as requested.	N/A.