



Application for Licence Amendment

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

Licence Number	L9335/2022/1
Licence Holder	Thunderbird Operations Pty Ltd
ACN	611 351 743
File Number	DER2022/000219
Premises	Thunderbird Mineral Sands Project Legal description – Part of mining tenements M04/459, L04/82; L04/83, L04/84; L04/85 and L04/86 As defined by the coordinates in Schedule 2 of licence
Date of Report	23 March 2023
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 Amendment summary	1
2.2.1 Proposed Category 54 Sewage Facility Activities.....	1
2.3 Part IV of the EP Act.....	4
3. Risk assessment.....	5
3.1 Source-pathways and receptors	5
3.1.1 Emissions and controls	5
3.1.2 Receptors.....	7
3.2 Risk ratings.....	9
4. Consultation	11
5. Conclusion	11
5.1 Summary of amendments.....	11
References	12
Appendix 1: Summary of Licence Holder's comments on risk assessment and draft conditions	13
Appendix 2: Application validation summary.....	14
 Table 1: Proposed throughput capacity changes.....	 1
Table 2: WWTP2 Effluent Specification.....	4
Table 3: Licence Holder controls	5
Table 4: Sensitive human and environmental receptors and distance from prescribed activity.	7
Table 5. Risk assessment of potential emissions and discharges from the Premises during operation.....	9
Table 6: Consultation	11
Table 7: Summary of licence amendments	11
 Figure 1: WWTP2 General arrangement.....	 2
Figure 2: WWTP2 Spray field plan	3
Figure 3: Distance to sensitive receptors.....	8

1. Decision summary

Licence L9335/2022/1 is held by Thunderbird Operations Pty Ltd (Licence Holder) for the Thunderbird Mineral Sands Project (the Premises), located at within Part of mining tenements M04/459, L04/82; L04/83, L04/84; L04/85 and L04/86.

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 operation of the Premises. As a result of this assessment, Revised Licence L9335/2022/1 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 Amendment summary

On 10 November 2022, the Licence Holder submitted an application to the department to amend Licence L9335/2022/1 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The following amendments are being sought:

- Approval to operate Wastewater Treatment Plant 2 (WWTP2) which was constructed under works approval W6088/2017/1 and incorporating changes to the authorised throughput of Category 54 swage facility into the existing licence L9335/2022/1.

This amendment is limited only to changes to Category 54 activities from the existing Licence. No changes to the aspects of the existing Licence relating to Category 8 and 89 have been requested by the Licence Holder. Table 1 below outlines the proposed changes to the existing Licence.

Table 1: Proposed throughput capacity changes

Category	Current throughput capacity	Proposed throughput capacity	Description of proposed amendment
54	100 m ³ /day	117.5 m ³ /day in aggregate	WWTP1 is currently authorised by the licence L9335/2022/1. The Licence Holder is now seeking approval to include WWTP2, which has a design capacity of 17.5m ³ per day, into the current licence. This will increase the total category 54 throughput up to 117.5 m ³ per day.

2.2.1 Proposed Category 54 Sewage Facility Activities

WWTP2 is a containerised liquid wastewater treatment process which also consist of a control room and with an external irrigation tank (Figure 1). Treated effluent is discharged to a spray field with an area of 0.7 hectares (ha) via above ground HDPE piping and impact sprinklers (Figure 2). The WWTP2 irrigation area has been fenced and signposted, and the vegetation within the spray field has not been cleared. The total throughput of the WWTP2 is designed to be 17.5 m³ per day.

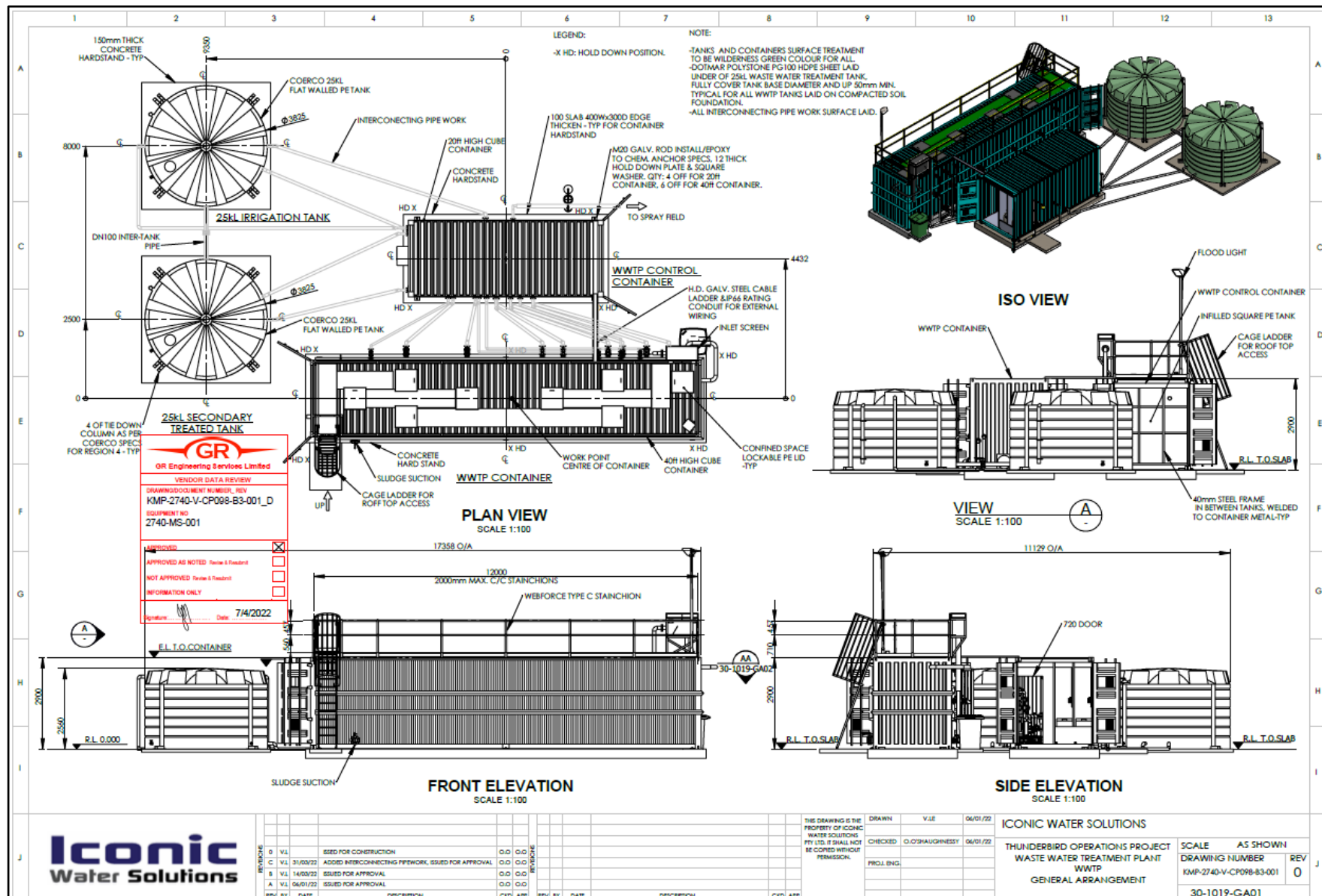


Figure 1: WWTP2 General arrangement

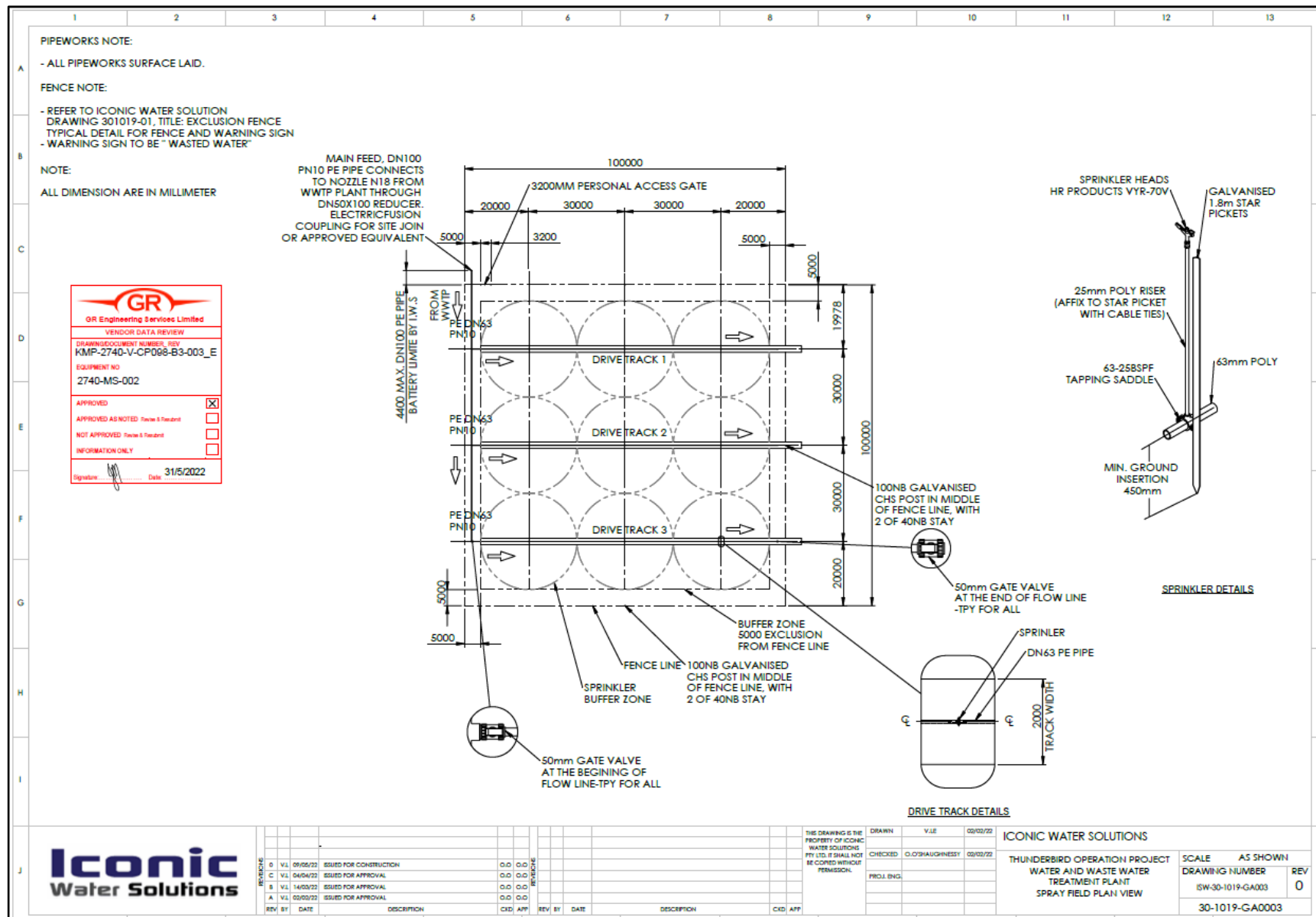


Figure 2: WWTP2 Spray field plan

The treated effluent from the WWTP2 will be discharged to the spray field and will allow effluent to infiltrate or evaporate whilst preventing surface ponding or runoff from the irrigation area. The spray field disposal area has been designed to cater for nutrient load limits of 180.0 kg/ha/year for nitrogen and 20.0 kg/ha/year for phosphorus. The WWTP2 has been designed to generate low risk effluent which will be containing the effluent quality of Class A effluent criteria. The resultant effluent quality that is to be disposed of via the irrigation field is provided in Table 2 below.

Table 2: WWTP2 Effluent Specification

Analyte	Units	Value
Biochemical Oxygen Demand (BOD)	mg/L	<20
Total Suspended Solids (TSS)	mg/L	<30
Total Nitrogen	mg/L	<20
Total Phosphorous	mg/L	<2
Free Chlorine	mg/L	0.5 - 2.0
pH	pH units	6.5 – 8.5
E. coli	cfu/100 ml	<10

Construction of WWTP2 has been undertaken in accordance with Condition 2 of Works Approval W6088/2017/1. A Construction compliance report for WWTP2 was provided to the department on 03 November 2022. On 07 March 2023 it was determined that sewage treatment system design is compliant with the construction conditions of the works approval W6088/2017/1 except for infrastructure for storage of environmentally harmful materials and its containment / bunding requirements. On 16 March 2023 supplementary information was provided to the department demonstrating compliance with these outstanding matters.

2.3 Part IV of the EP Act

The Thunderbird Mineral Sands Project has been assessed under Part IV of the EP Act by the Environmental Protection Authority (EPA). It is subject to the requirements of Ministerial Statement 1080 (MS 1080) and was published on 10 August 2018. The EPA's assessment is provided in EPA Report 1606.

There are no conditions directly related to management or control of emissions and discharges. MS 1080 contains conditions related to terrestrial fauna management including greater bilby and Dampier Peninsula goanna, aboriginal heritage, direct and indirect impacts from groundwater abstraction, and greenhouse gas reporting.

MS 1080 provides requirements in relation to clearing of native vegetation within the mine site development envelope. Clearing activities have therefore not been duplicated within the licence amendment assessment. However, uncleared vegetation remains a receptor of discharges and emissions from activities regulated under the licence within the licence amendment application environmental risk assessment.

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 Amendment Report are detailed in Table 3 below. Table 3 also details the proposed control measures the Licence Holder has proposed to assist in controlling these emissions, where necessary.

Table 3: Licence Holder controls

Emission	Sources	Potential pathways	Proposed controls
Contaminated influent	Operation of WWTP 2	Overtopping of infrastructure to soil/sediment and/or infiltration to groundwater Storage infrastructure leak/rupture and discharge to soil/sediment and/or infiltration to groundwater Pipeline leak/rupture and discharge to soil/sediment and/or infiltration to groundwater	<ul style="list-style-type: none">• fitted with alarms and has the ability to be shut down if a plant failure should occur.• regularly inspections, and discharge will be suspended if it is discovered to be operating below the required standard.• Pump pits transferring sewage to the plant are controlled by pre-set level floats.• balance tank has sufficient capacity to contain peak flows over 12 hours.• Sludge removed annually, or as required and disposed of at a registered waste site by an approved contractor.• Daily visual inspections when in operation to check the integrity of the tanks, pipelines, flow meters, alarm system (audible and visual) and stormwater drainage infrastructure.• A contingency storage capacity for up to two days of normal flow has been catered for in the event discharge is suspended.

Treated effluent (wastewater from WWTP 2)	Operation of WWTP 2	<p>Direct discharge to land, with infiltration to groundwater</p> <p>Irrigation spray field accessible to threatened/priority fauna, native fauna and/or livestock</p>	<ul style="list-style-type: none"> • Flow meter fitted on the WWTP outlet to the irrigation spray field monitors volumes discharged to irrigation spray field. • Spray field irrigation area includes a 5m buffer beyond the extent of the sprinklers range. • Irrigation via the spray irrigator will be even and spray irrigators operate as per manufacturers specification. • Fence erected around entire perimeter of spray field. • Irrigation managed to prevent ponding of effluent on the ground surface of the spray field. • Irrigation operations will not occur during significant rainfall events. • Daily visual inspections when in operation to check the integrity of the tanks, pipelines, flow meters, alarm system (audible and visual) and stormwater drainage infrastructure.
Contaminated stormwater – runoff of treated effluent (wastewater from WWTP 2)	Operation of WWTP 2	Overland flow to soil/sediment and/or infiltration to groundwater	<ul style="list-style-type: none"> • Irrigation operations will not occur during significant rainfall events. • Daily visual inspections daily when in operation to check the integrity of the tanks, pipelines, flow meters, alarm system (audible and visual) and stormwater drainage infrastructure.

3.1.2 Receptors

In accordance with the *Guideline: Risk assessments* (DWER 2020), 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 4 and Figure 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 2020)).

Table 4: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	Distance from prescribed activity
Town of Broome	Is approximately 70 km east of the Premises
Mt Jowlaenga pastoral station and homestead	The homestead is approx. 7 km from the WWTP
Environmental receptors	Distance from prescribed activity
Underlying groundwater	Canning -Kimberly proclaimed groundwater area is underlying the premises. The depth to groundwater is more than 20 m over most of the Premises. Total dissolved solids (TDS) is between 110mg/L to 200mg/L.
Surrounding Vegetation	most of the Premises comprises red sandy flats supporting pindan 3 vegetation, which is common and widespread through the broader Kimberley region.
Threatened and priority fauna	<i>Macrotis lagotis</i> – bilby. Vulnerable. Recorded several times across the premises. Thunderbird Mineral Sands Project has the requirement to develop a Terrestrial Fauna Environmental Management Plan under MS 1080 to ensure impacts on conservation significant terrestrial fauna are minimized.
Surface Water Drainage	The Fraser River is located approximately 7 km north of the Premises, with tributaries that extend down to the north of the Premises.

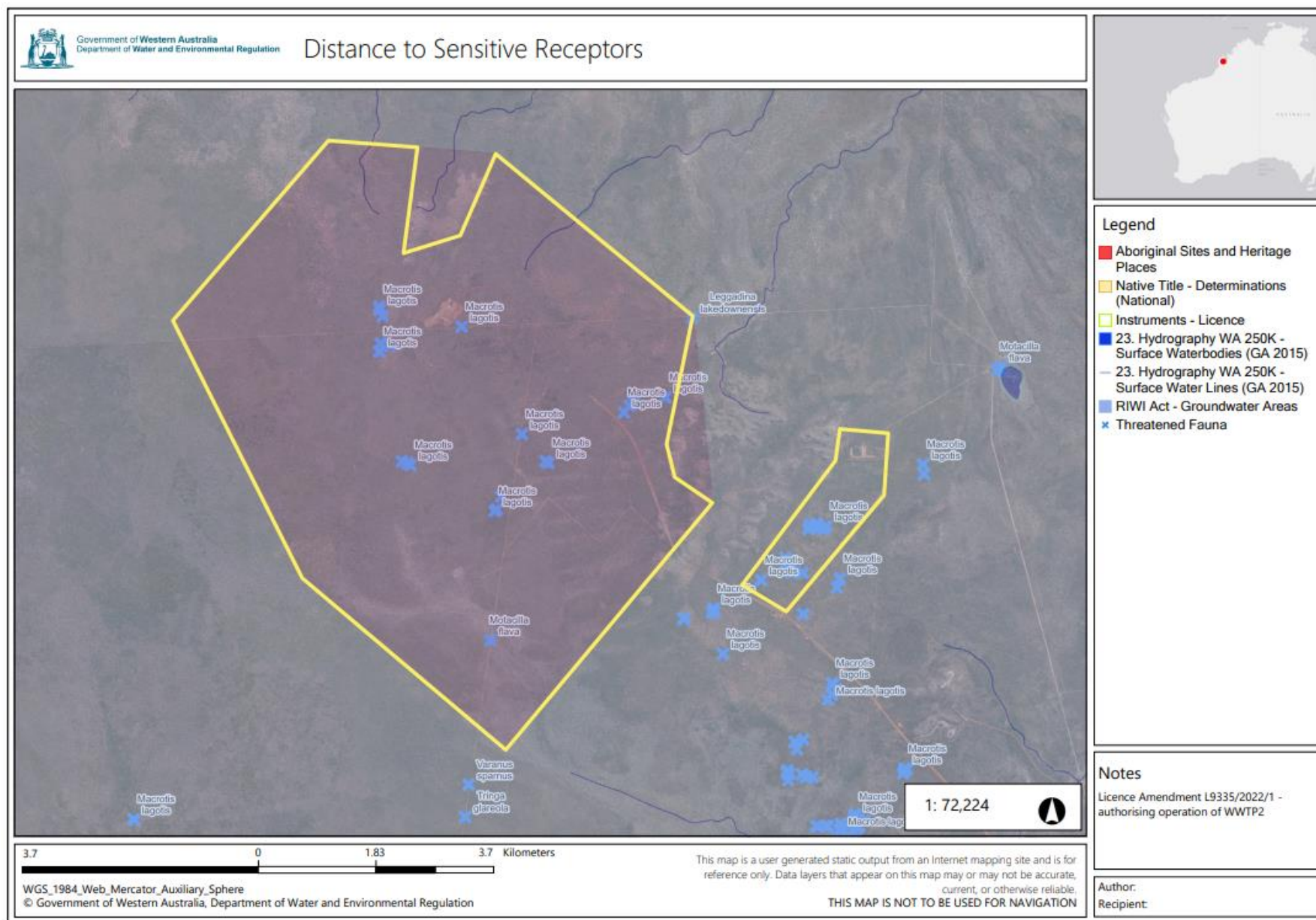


Figure 3: Distance to sensitive receptors

Licence: L9335/2022/1

IR-T15 Amendment report template v3.0 (May 2021)

3.2 Risk ratings

Risk ratings have been assessed in accordance with the Guideline: Risk Assessments (DWER 2020) 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 in-complete 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 5.

The Revised Licence L9335/2022/1 that accompanies this Amendment Report authorises emissions associated with the operation of the Premises i.e. Category 54 activities.

The conditions in the Revised Licence have been determined in accordance with Guidance Statement: Setting Conditions (DER 2015).

Table 5. Risk assessment of potential emissions and discharges from the Premises during 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				
Operation								
Category 54: Sewage plant – treatment of sewage and disposal of treated effluent through irrigation.	Contaminated Influent	Overland runoff potentially causing ecosystem disturbance to soil/land and/or impacting surface water quality and infiltration to groundwater due to Storage infrastructure leak/rupture, Overtopping of infrastructure, and Pipeline leak/rupture.	Local native and threatened flora. Soil/Land Groundwater	Refer to Section 3.1.1	C = Moderate L = Possible Medium Risk	Y	Condition 1 – Operational requirements	Additional regulatory controls are not required. The Delegated Officer determined that the applicant's proposed controls summarised in the section 3.1.1 including transferring sewage to the plant are controlled by pre-set level floats and daily visual inspection to ensure integrity of the infrastructure are deemed adequate to manage any potential risks to the environment from contaminated influent. These controls are already conditioned in the current licence L9335/2022/1 for WWTP1, and these have now conditioned in the revised licence for WWPT2 as well.
	Treated effluent (wastewater from WWTP 2)	Overland runoff potentially causing ecosystem disturbance or impacting surface water quality due to Storage infrastructure leak/rupture and/or and Pipeline leak/rupture. Ponding in irrigation field causing death of vegetation. Nutrient concentration causing native vegetation death and increased weed growth	Local native and threatened flora. Threatened/priority fauna/livestock. Soil/Land Groundwater	Refer to Section 3.1.1	C = Slight L = Possible Low Risk	Y	Condition 1 – Operational requirements Condition 2 – Irrigation emission limits Condition 4 – Emissions and discharge monitoring	No additional regulatory controls are required. Proposed controls summarized in the Section 3.1.1 are adequate to manage any potential impacts. Relevant controls have been conditioned within the licence in accordance with <i>Guidance statement: Risk Assessments (DER 2017)</i> to ensure that any potential risks to the environment are managed.
	Contaminated stormwater – runoff of treated effluent	Overland flow to soil/sediment and/or infiltration to groundwater	Local native and threatened flora. Soil/Land	Refer to Section 3.1.1	C = Slight L = Possible Low Risk	Y	Condition 1 – Operational requirements Condition 2 – Irrigation	No additional regulatory controls are required. Proposed controls summarized in the Section 3.1.1 are adequate to manage any potential impacts. Relavent controls have been conditioned within the licence

	(wastewater from WWTP 2)		Groundwater				emission limits Condition 4 – Emissions and discharge monitoring	in accordance with <i>Guidance statement: Risk Assessments (DER 2017)</i> to ensure that any potential risks to the environment are managed.
--	--------------------------	--	-------------	--	--	--	---	--

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

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 6 provides a summary of the consultation undertaken by the department.

Table 6: Consultation

Consultation method	Comments received	Department response
Local Government Authority advised of proposal 03 March 2023	No comments received.	N/A
Works Approval/Licence Holder was provided with draft amendment on 13 March 2023	Refer to Appendix 1	Refer to Appendix 1

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 7 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 7: Summary of licence amendments

Condition no. / Item	Proposed amendments
Condition 1 Table 1 – Wastewater treatment plants	Inclusion of WWTP 2 operational requirements
Condition 1 Table 1 – Irrigation Spray fields	Inclusion of Irrigation spray field 2 operational requirements
	Inclusion of the size of the irrigation spray field 1 and irrigation spray field 2
Condition 2 Table 2	Adding the irrigation spray field 2 discharge point and imposing the irrigation emission limits to treated water from WWTP 2
Condition 3 Table 3	Updated figure references.
Condition 4 Table 4	Adding the monitoring requirement and the monitoring location of the WWTP 2
Schedule 1 Figure 2	Inclusion of new site layout plan to clearly show the locations of the site infrastructure
Schedule 1 Figure 3	Numbering of the Bioremediation facility map has revised to match with the updated numbering system

References

1. Email titled “L9335/2022/1 - Thunderbird Operations Pty Ltd - Application to Amend Licence - Application form and supporting documents” dated 10/11/2022 authored by Orla Tone, available at DWER records (DWERDT685271).
2. Email titled “Response to RFI for Environmental Licence Amendment Application for Thunderbird Mineral Sands Project” dated 01/02/2023 authored by Kirsty Sell, available at DWER records (DWERDT720797).
3. Ministerial Statement 1080 - Thunderbird Mineral Sands Project accessed via <https://www.epa.wa.gov.au/1080-thunderbird-mineral-sands-project> on 08 March 2023
4. Department of Water and Environmental Regulation (DWER) 2019, *Guideline: Decision Making*, Joondalup, Western Australia
5. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
6. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
7. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.

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

Condition / Item	Summary of Licence Holder's comment	Department's response
Cover Page	Licence Holder pointing out that authorised throughput should be WWPT2 17.5 m ³ /day as per Table 1 of Attachment 3B of the supporting documents.	<p>Prescribed premises categories table on the cover page consist of assessed production capacities of each category that licence has authorised.</p> <p>Therefore, the total assessed capacity of Category 54 is 117.5 m³/day which makes 100 m³ per day from WWTP1 and 17.5 m³ per day from WWTP2. The cover page has been updated to reflect the assessed capacity of each WWTP.</p>
Page 13	Tenement number is incorrect in Schedule 2 Table 6. Correct tenement number is M04/459.	Noted and corrected as requested.

Appendix 2: 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 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:	L9335/2022/1		
		Relevant works approval number:		N/A	<input type="checkbox"/>
Registration	<input type="checkbox"/>	Current works approval number:		None	<input type="checkbox"/>
Date application received		10 November 2022			
Applicant and Premises details					
Applicant name/s (full legal name/s)		Thunderbird Operations Pty Ltd			
Premises name		Thunderbird Operations Pty Ltd			
Premises location		Within mining tenements M04/459, L04/82, L04/83, L04/84, L04/85, and L04/86			
Local Government Authority		Shire of Broome and Shire of Derby and West Kimberley			
Application documents					
HPCM file reference number:		DER2022/000219~2			
Key application documents (additional to application form):		Attachment 2 – Location and site layout Attachment 6 – Emissions Sheffield Thunderbird Coordinates			
Scope of application/assessment					
Summary of proposed activities or changes to existing operations.		Licence amendment Operation of wastewater treatment plant (WWTP2)			

Category number/s (activities that cause the premises to become prescribed premises)

Table 1: Prescribed premises categories

Prescribed premises category and description	Proposed production or design capacity	Proposed changes to the production or design capacity (amendments only)
Category 54: Sewage facility	17.5 m ³ /day	117.5 m ³ per day

Legislative context and other approvals

Has the applicant referred, or do they intend to refer, their proposal to the EPA under Part IV of the EP Act as a significant proposal?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Referral decision No: N/A 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: 1080 EPA Report No: 1606
Has the proposal been referred and/or assessed under the EPBC Act?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Reference No: EPBC 2016/7648 issued on 27/9/18
Has the applicant demonstrated occupancy (proof of occupier status)?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Other evidence <input checked="" type="checkbox"/> Licence already exists – no changes to premises boundary.
Has the applicant obtained all relevant planning approvals?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>	Approval: Expiry date: If N/A explain why?
Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	CPS No: N/A A valid Ministerial Statement applies: MS 1080
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 An exemption applies. A valid Ministerial Statement applies: MS 1080
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: GWL201977

Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Name: Canning-Kimberley Groundwater area Type: Proclaimed Groundwater Area Has Regulatory Services (Water) been consulted? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/> Regional office: Northwest
Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Name: N/A Priority: N/A Are the proposed activities/ landuse compatible with the PDWSA (refer to WQPN 25)? Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
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"/>	<i>Environmental Protection and Biodiversity Conservation Act 1999 (Commonwealth)</i> <i>Mining Act 1978</i> <i>Rights in Water and irrigation Act 1914</i>
Is the Premises within an Environmental Protection Policy (EPP) Area?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	N/A
Is the Premises subject to any EPP requirements?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	N/A
Is the Premises a known or suspected contaminated site under the <i>Contaminated Sites Act 2003</i> ?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Classification: N/A Date of classification: N/A