



Application for Licence

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

Licence Number	L9373/2023/1
Applicant	Coburn Resources Pty Ltd
ACN	165 036 537
File number	DER2022/000583
Premises	Coburn Mineral Sands Project Legal description - Part of Mining Lease 09/105 and Mining Lease 09/106 As defined by the coordinates in Schedule 2 of the licence
Date of report	28 April 2023
Decision	Licence granted

**MANAGER WASTE INDUSTRIES
REGULATORY SERVICES**

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

Table of Contents

1. Decision summary	2
2. Scope of assessment	2
2.1 Regulatory framework	2
2.2 Application summary	2
2.3 Overview of premises	2
2.3.1 WWTP	3
2.3.2 Irrigation sprayfield	7
2.3.3 Landfill	7
2.4 WWTP Commissioning	7
2.5 Part IV of the EP Act	9
3. Risk assessment	9
3.1 Source-pathways and receptors	9
3.1.1 Emissions and controls	9
3.1.2 Receptors	12
3.1.3 Pathways	14
3.2 Risk ratings	15
4. Consultation	18
5. Conclusion	19
References	20
Appendix 1: Summary of applicant's comments on draft documents	21
Appendix 2: Application validation summary	23
Table 1: Prescribed premises categories and capacities	2
Table 2: Key features of the WWTP	3
Table 3: Summary of final effluent quality during extended commissioning	8
Table 4: Proposed applicant controls	10
Table 5: Sensitive human and environmental receptors and distance from prescribed activity	12
Table 6: Pathways and site characteristics relevant to the Premises	14
Table 7: Risk assessment of potential emissions and discharges from the premises during commissioning and operation	16
Table 8: Consultation	18
Figure 1: WWTP layout	5
Figure 2: WWTP process flow	6
Figure 3: Distance to sensitive receptors	13

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 L9373/2023/1 has been granted.

2. Scope of assessment

2.1 Regulatory framework

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

2.2 Application summary

On 25 October 2022, Coburn Resources Pty Ltd (the Applicant) submitted an application for a licence to the department under section 57 of the *Environmental Protection Act 1986* (EP Act). Coburn Resources Pty Ltd is a wholly owned subsidiary of Strandline Resources Ltd.

The application is seeking a licence to operate a sewage facility (Category 85) and putrescible landfill (Category 89) at the premises. The sewage facility consists of a wastewater treatment plant (WWTP) with a 75 m³/day maximum design capacity and the putrescible landfill has a design capacity of up to 2,700 tonnes of waste per annual period. The WWTP and landfill were constructed under Works Approval W6258/2019/1.

2.3 Overview of premises

The WWTP and landfill premises services the accommodation facilities of the Coburn Mineral Sands Project (the Project), which includes the excavation and processing of up to 23.4 million tonnes per annum of low-grade heavy mineral sand deposits. Construction of the mineral sands mining facility is authorised under Works Approval W6475/2020/1 and has not yet been completed. Accordingly, the premises and scope of this assessment includes only the infrastructure and locations required to operate the WWTP and landfill. The premises is located approximately 45 km east of Wannoo, in the Shire of Shark Bay.

Table 1: Prescribed premises categories and capacities

Category description	Maximum design capacity	Expected throughput
<u>Category 85</u> Sewage facility: premises — (a) on which sewage is treated (excluding septic tanks); or (b) from which treated sewage is discharged onto land or into waters.	75 cubic metres per day	35 cubic metres per day
<u>Category 89</u> Putrescible landfill site: premises (other than clean fill premises) on which waste of a type permitted for disposal for this category of prescribed premises, in accordance with the Landfill Waste Classification and Waste Definitions 1996, is accepted for burial	2,700 tonnes per year	2,700 tonnes per year

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 L9373/2023/1.

2.3.1 WWTP

The WWTP is located at the Project’s accommodation camp, which has a capacity to house 200 people. The Licence Holder expects that simultaneous occupancy of the camp will generally be below 116 people at one time.

The WWTP is comprised of fully modular Fixed Film Media Bio Modules with the features listed in Table 2 and shown in Figure 1 and Figure 2.

Occasional sludge removal from the primary treatment tanks will be required.

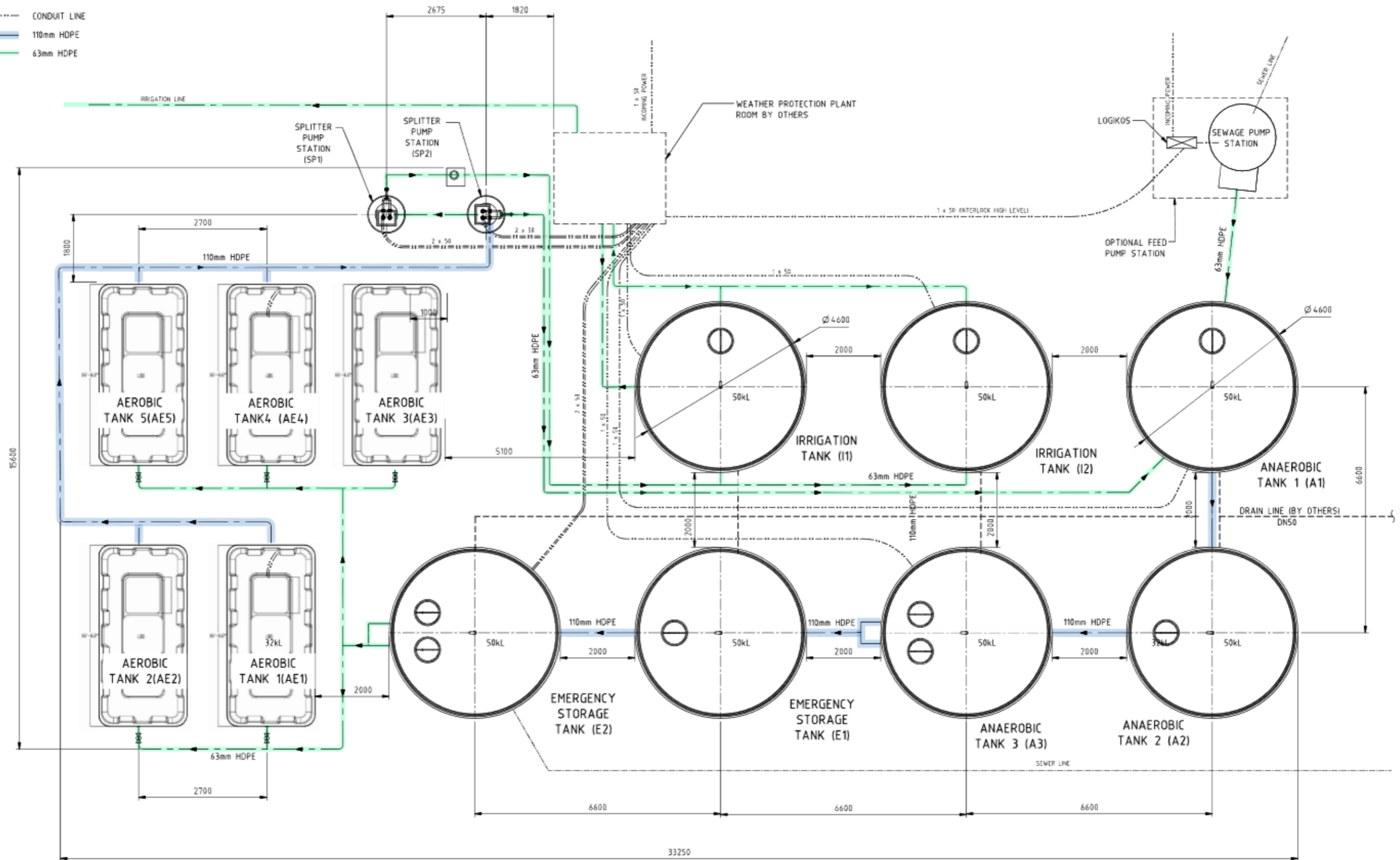
Table 2: Key features of the WWTP

Key features	Description																
Capacity	75 m ³ /day of domestic strength sewage																
Treated effluent quality	Designed to treat wastewater to a secondary standard with the following specifications:																
	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Expected effluent quality</th> </tr> </thead> <tbody> <tr> <td>pH</td> <td>6.5 – 8.5</td> </tr> <tr> <td>Biological Oxygen Demand (BOD)</td> <td>< 20 mg/L</td> </tr> <tr> <td>Total Suspended Solids (TSS)</td> <td>< 30 mg/L</td> </tr> <tr> <td>Total Nitrogen (TN)</td> <td>50 mg/L</td> </tr> <tr> <td>Total Phosphorus (TP)</td> <td>4 mg/L</td> </tr> <tr> <td><i>E. coli</i></td> <td>< 1,000 CFU /100mL</td> </tr> <tr> <td>Residual Free Chlorine (Cl)</td> <td>0.2 – 2 mg/L</td> </tr> </tbody> </table>	Parameter	Expected effluent quality	pH	6.5 – 8.5	Biological Oxygen Demand (BOD)	< 20 mg/L	Total Suspended Solids (TSS)	< 30 mg/L	Total Nitrogen (TN)	50 mg/L	Total Phosphorus (TP)	4 mg/L	<i>E. coli</i>	< 1,000 CFU /100mL	Residual Free Chlorine (Cl)	0.2 – 2 mg/L
	Parameter	Expected effluent quality															
	pH	6.5 – 8.5															
	Biological Oxygen Demand (BOD)	< 20 mg/L															
	Total Suspended Solids (TSS)	< 30 mg/L															
	Total Nitrogen (TN)	50 mg/L															
	Total Phosphorus (TP)	4 mg/L															
	<i>E. coli</i>	< 1,000 CFU /100mL															
Residual Free Chlorine (Cl)	0.2 – 2 mg/L																
Treatment process flow	<p><u>Chemical treatment</u></p> <p>Raw sewage from the accommodation camp is pumped to the WWTP via a HDPE pipeline with an attached flow meter, at which point the influent is dosed at an approximate rate of 10 L/d of liquid aluminium sulphate (alum) solution (8% w/w Al₂O₃). This encourages removal of dissolved phosphorus as the aluminium ions react with phosphate to form insoluble aluminium phosphate.</p> <p>The 8% w/w Al₂O₃ solution is stored in a 200 L drum and dosed directly into the HDPE pipeline.</p>																
	<p><u>Primary (anaerobic) treatment</u></p> <p>After being dosed with alum solution the raw sewage is pumped into two 50 kL tanks operating in series for initial anaerobic digestion and settling (Anaerobic Tank 1 and 2). Sewage then inputs to a 50 kL tank fitted with Zabel filters used to further remove solids and sludge (Anaerobic Tank 3).</p> <p>The base of all three tanks is fitted with a 50 mm ball valve drain.</p>																

Key features	Description
Treatment process flow (cont.)	<p><u>Flow balance tanks</u></p> <p>After sewage has passed through the anaerobic tanks, it inputs into two 50 kL tanks operating in series (Emergency Storage Tank 1 and 2). Emergency Storage Tank 2 is fitted with three raw water pumps. These tanks provide a flow balancing function for sewage and effluent being re-circulated through the system.</p> <p>The base of both tanks is fitted with a 50 mm ball valve drain.</p>
	<p><u>Secondary (aerobic) treatment</u></p> <p>Partially treated sewage is pumped from the final flow balance tank to five 32 kL tanks operating in parallel (Aerobic Tanks 1 to 5). Each tank contains a helical spray nozzle that distributes sewage inputs evenly over a foam media contained within the tank. The sprinklers operate in discrete doses to allow for sufficient contact time with microbial bacteria attached to the foam media.</p>
	<p><u>Splitter pump station</u></p> <p>Effluent from the aerobic tanks input to a splitter pump station for either irrigation or recirculation through the system. Recirculation is designed to occur at a rate of 4:1, so that a minimum of 80% of the treated effluent from the aerobic tanks is returned to the primary treatment tanks.</p>
	<p><u>Irrigation storage tanks</u></p> <p>The remaining 20% of the treated effluent is input from the pump station to two 50 kL storage tanks operating in series (Irrigation Tank 1 and 2).</p> <p>Irrigation Tank 2 is fitted with level sensors and controllers to trigger the use of specific pumps. Outputs to irrigation are triggered when the tank reaches 50% capacity and ceases once levels in the tank reduce to 20%. The tank also continually outputs to the disinfection system if levels within the tank are above 10%.</p> <p>The base of both tanks is fitted with a 50 mm ball valve drain.</p>
	<p><u>Disinfection system</u></p> <p>Treated wastewater received from Irrigation Tank 2 is disinfected using a 12.5% w/v sodium hypochlorite solution that is dosed directly into the receiving pipeline. The dosed treated wastewater is then recirculated to Irrigation Tank 2. The continual dosing and recirculation process occurs to ensure that chlorine contact times are achieved and residual chlorine is retained in the range of 0.2 – 2 g/L.</p> <p>The system contains an in-line chlorine analyser and the sodium hypochlorite solution is stored in a 20 L drum.</p>
	<p><u>Final discharge pump</u></p> <p>Treated wastewater from Irrigation Tank 2 is pumped to the irrigation field for discharge once Irrigation Tank 2 reaches 50% capacity and ceases when levels in the tank reduce to 20%.</p>

LEGEND:

- CONDUIT LINE
- 110mm HDPE
- 63mm HDPE



PLAN VIEW
SCALE 1:50

Figure 1: WWTP layout

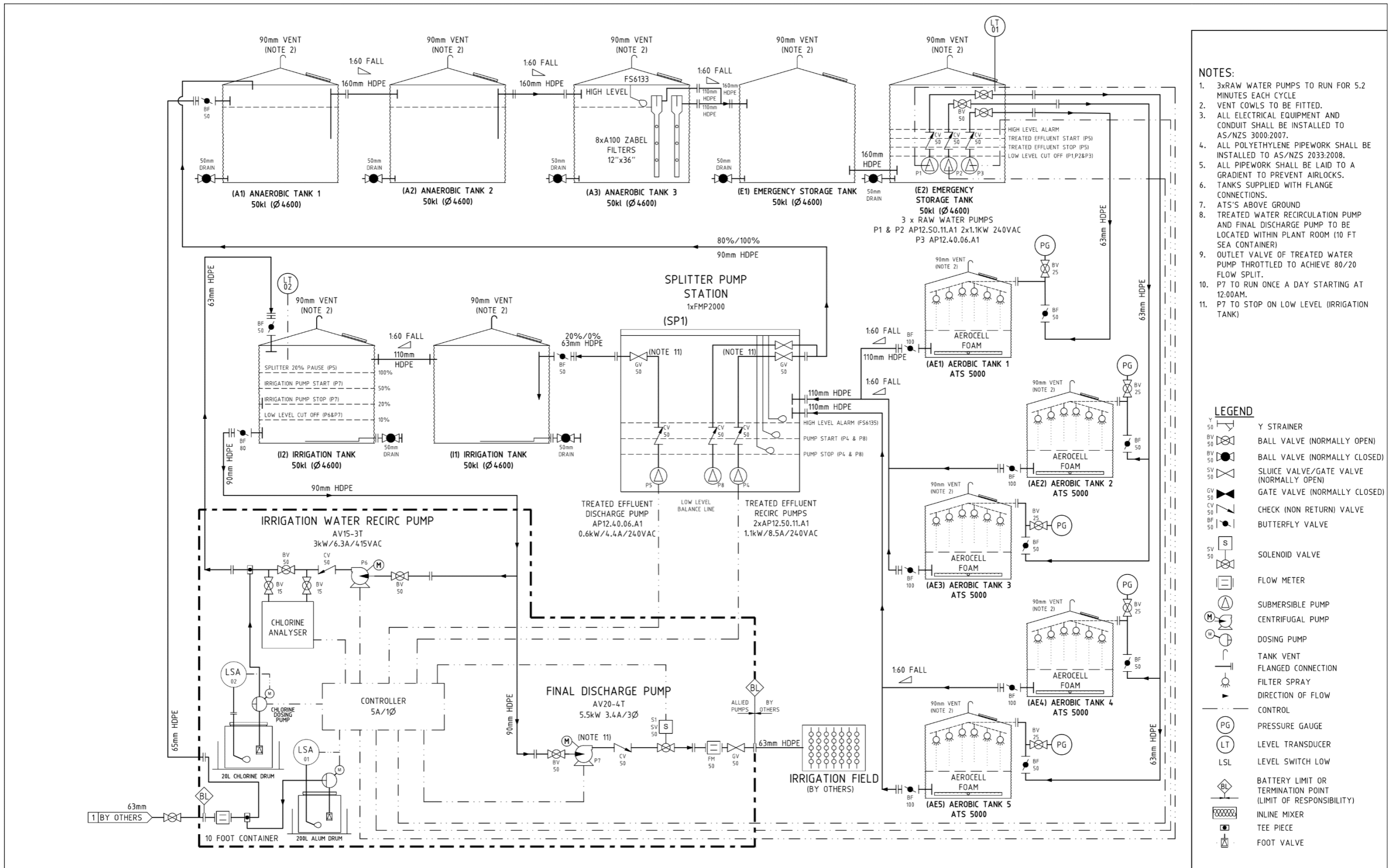


Figure 2: WWTP process flow

2.3.2 Irrigation sprayfield

Treated wastewater from the WWTP is conveyed via an approximately 1 km long welded high-density polyethylene (HDPE) pipe to a 3.5 ha vegetation sprayfield, after which it is discharged via irrigation. Treated wastewater is discharged by sprinklers arranged in a grid pattern with a 30 m spray radius. The irrigation area is fenced to exclude access to people and livestock.

The Applicant considers that the area contains coarse grained soils with a low eutrophication risk for surface waters within 500 metres of the irrigation site. This corresponds to a Risk Category B soil in accordance with WQPN 22.

2.3.3 Landfill

The putrescible landfill facility will accept the domestic waste stream comprised of general refuse, green waste, paper and putrescibles, sourced from the accommodation village.

The landfill occupies an area of approximately 1.8 ha and is designed with a total lifetime capacity of 54,000 tonnes of waste, with operation occurring over approximately 23 years. The landfill design does not include an engineered basal lining and leachate collection system.

2.4 WWTP Commissioning

The Applicant submitted a commissioning report relating to the WWTP on 19 December 2022. Commissioning of the WWTP to achieve steady state operations has been ongoing from 1 October 2021. With the exception of pH, the WWTP was generally not producing a final effluent quality within the intended design parameters and limits proposed in Works Approval W6475/2020/1. Concentrations of TP and *E. coli* generally displayed the greatest and most consistent degree of elevation above the intended design parameters.

The Applicant has provided the following reasoning for the poor performance of the WWTP:

- High turnover of trained operators resulting in a slow rate of process refinements and accrual of operating knowledge;
- Insufficient skill sets to maintain the WWTP by the Applicant's appointed maintenance contractor;
- Inconsistent sampling methods and sample locations;
- Turnaround time for laboratory analysis.

Additionally, the following issues were identified by the WWTP manufacturer in their 25 October 2022 service report:

- There is no way to confirm sludge levels in primary tanks 1 and 2 and the tanks are likely to require pump out within the next six weeks;
- Spray nozzles within aeration tanks 1 to 5 were blocked due to not being cleaned regularly;
- Pump 8 had failed and required replacement. Pump 8 is one of two pumps used to recirculate 80% of the wastewater back to the primary tanks;
- The sodium hypochlorite storage tank was empty of solution;
- The system was found to be lacking in general housekeeping and maintenance;
- Zabel filters were pushed out of place due to excess sludge build up, allowing solids to bypass the filters and impact downstream system components;
- Zabel filters had not been receiving regular cleaning;
- Equipment to rinse and clean out the Zabel filters was insufficient due to being too low

pressure to wash out the filters, with drainage back to the sewage system occurring. The manufacturer recommended installation of a high-pressure hose setup with drainage back to an IBC.

- A better location for storage of chemicals is required. Chemicals stored in the current location were likely to be inert/ineffective when used in the system.

Due to the issues noted above, maintenance and operations of the WWTP were handed over to the Applicant's own staff from September 2022. Correct and consistent sampling methods were also established at this time to ensure reliable results. The Applicant notes that although operations have improved, insufficient consideration to the chlorine dosing instrumentation has occurred due to competing priorities with commissioning key mining infrastructure.

Table 3: Summary of final effluent quality during extended commissioning

	pH	TSS (mg/L)	BOD (mg/L)	Cl (mg/L)	TN (mg/L)	TP (mg/L)	<i>E. coli</i> (CFU/100ml)
Median (All)	7.99	28	28	0.115	48.25	8.74	61,000
Median (Jan-Aug)¹	7.69	66	60.65	0.030	53.90	9.91	480,000
Median (Sep-Dec)²	8.10	17.50	21	0.520	46.60	7.22	1,500

Note 1: Initial maintenance/operational contractor

Note 2: Change to maintenance/operational contractor

The Applicant has proposed the following measure for future operation of the WWTP:

- Maintenance logs are to be kept in the WWTP and all maintenance tasks recorded in an ongoing spreadsheet;
- Parameter limits for on-site readings to be available for maintenance staff to adjust observed levels during daily checks;
- On-site chlorine testing to be completed during daily checks to confirm chlorine level compliance with the adopted screening criteria;
- Review all alarm systems to increase awareness of deficiencies and exceedances;
- Arrange for sludge removal (sanitary items) as necessary;
- Re-educate accommodation camp users that sanitary items are not to be disposed by flushing to the WWTP;
- A licensed plumber will be contracted on a monthly to bi-monthly basis to complete maintenance and cleaning of WWTP;
- An appropriate cleaning station will be established near the WWTP for filter cleaning;
- Non compliances during analytical testing will be investigated to identify the source of the exceedance;
- Weekly monitoring will continue for Q1 2023, or until 4 weeks after the design criteria is consistently achieved;
- Village spray field sprinklers to be checked regularly and alternate on a weekly basis (east and west banks); and
- Implement improved chemical storage at the WWTP.

2.5 Part IV of the EP Act

The larger Coburn Mineral Sands Project (sand mining) was assessed at the level of Public Environmental Review (PER) under Part IV of the *Environmental Protection Act 1986* (EP Act). It was also assessed and determined to be a “controlled action” under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The environmental assessment was conducted in accordance with the bilateral agreement between the Commonwealth of Australia and WA. The PER was issued in July 2005 for an eight-week public review period and the Report and Recommendations of the WA Environmental Protection Authority (EPA) was published as EPA Bulletin 1211 in December 2005.

Environmental approval for the Project was granted by the WA Minister for the Environment on 22 May 2006 (Ministerial Statement No. 723) and the Commonwealth Minister for Environment and Heritage in July 2006.

Ministerial Statement 723 (MS 723) includes:

- Approval for clearing.
- Conditions 8-1 to 8-10 for conservation of significant flora species and vegetation communities that occur in the vicinity of the Project area.
- Conditions 9-1 to 9-9 for preparation of a Threatened Fauna Management Plan for species that occur in the vicinity of the Project area.
- Condition 11-1 to 11-5 for preparation of a Bush Fire Management Plan that includes the Applicant’s fire suppression measures;
- Conditions 12-1 to 12-5 for preparation of a Dust Management Plan prior to commencement of ground-disturbing activities, and its implementation prior to ground-disturbing activity. The Dust Management Plan must include the prevention of visible dust in the Shark Bay World Heritage Property, preventative measures to minimise fugitive dust sources as part of daily operations and monitoring of deposited dust levels at the boundary of the proposal area and at Hamelin Pool.
- Conditions 13-1 to 13-8 for preparation of a Preliminary Closure Plan and Final Closure Plan relating to rehabilitation and after-care management of the sand mine and overall impacts of the project activities.

The Ministerial Statement does not contain any specific conditions relating to the operation and impacts of the WWTP.

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 4 below. Table 4 also details the control measures the applicant has proposed to assist in controlling these emissions, where necessary.

Table 4: Proposed applicant controls

Sources	Emission	Potential pathways	Proposed controls
Commissioning			
Process refinements and improvements to achieve steady-state operation of the WWTP and effluent design quality	Sewage / partially treated sewage containing contaminants Treated sewage containing contaminants (e.g. nutrients, pathogens, metals, PoPs)	Overland flow of spills and leaks	<ul style="list-style-type: none"> – Online monitoring, analysis, alarms and controls – Logging of maintenance activities – Maintenance staff to adjust operations based on observed levels during daily checks of parameter limits – On-site chlorine testing to be completed during daily checks to confirm chlorine level compliance – Review of all alarm systems – Removal of sludge as required – Maintenance and cleaning by a licensed plumber on a monthly to bi-monthly basis – Establishment of a cleaning facility for the Zabel filters – Investigation of non-compliances with design criteria – Weekly monitoring until four weeks after design criteria is consistently met – Improved chemical storage – Location of WWTP and sprayfield upgradient of future mining activities
		Subsurface seepage of spills and leaks	
		Migration of impacted groundwater to downgradient receptors	
	Odour	Air/windborne pathway	– Enclosure of WWTP systems
Noise	– Distance from receptors		
Operation			
Acceptance and disposal of putrescible waste via landfilling	Leachate / Contaminated stormwater	Overland flow	– Landfill area constructed so that stormwater runoff is directed away from the cell and rainfall falling in the cell is retained
		Subsurface seepage	<ul style="list-style-type: none"> – Depth to groundwater – Location of landfill upgradient of future mining activities
		Migration of impacted groundwater to downgradient receptors	

Sources	Emission	Potential pathways	Proposed controls																	
Acceptance and disposal of putrescible waste via landfilling	Disease vectors	Attraction of pests and vermin	<ul style="list-style-type: none"> – 1.8 m high chain link fencing – Landfill managed in accordance with the Environmental Protection (Rural Landfill) Regulations 2002 																	
	Windblown waste	Air/windborne pathway																		
	Dust																			
	Odour																			
	Noise																			
Acceptance and treatment of sewage	Sewage / partially treated sewage containing contaminants (e.g. nutrients, pathogens, metals, PoPs)	Overland flow of spills and leaks	– Online monitoring, analysis, alarms and controls																	
		Subsurface seepage of spills and leaks	– Location of WWTP upgradient of future mining activities																	
		Migration of impacted groundwater to downgradient receptors																		
	Odour	Air/windborne pathway	– Enclosure of WWTP systems																	
	Noise		– Distance from receptors																	
Disposal of treated sewage via irrigation	Treated sewage containing contaminants (e.g. nutrients, pathogens, metals, PoPs)	Overland flow and spray-drift	– Fixed Film Media Bio Module design parameters:																	
			Subsurface seepage of spills and leaks	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Expected effluent quality</th> </tr> </thead> <tbody> <tr> <td>pH</td> <td>6.5 – 8.5</td> </tr> <tr> <td>Biological Oxygen Demand (BOD)</td> <td>< 20 mg/L</td> </tr> <tr> <td>Total Suspended Solids (TSS)</td> <td>< 30 mg/L</td> </tr> <tr> <td>Total Nitrogen (TN)</td> <td>50 mg/L</td> </tr> <tr> <td>Total Phosphorus (TP)</td> <td>4 mg/L</td> </tr> <tr> <td><i>E. coli</i></td> <td>< 1,000 CFU /100mL</td> </tr> <tr> <td>Residual Free Chlorine (Cl)</td> <td>0.2 – 2 mg/L</td> </tr> </tbody> </table>	Parameter	Expected effluent quality	pH	6.5 – 8.5	Biological Oxygen Demand (BOD)	< 20 mg/L	Total Suspended Solids (TSS)	< 30 mg/L	Total Nitrogen (TN)	50 mg/L	Total Phosphorus (TP)	4 mg/L	<i>E. coli</i>	< 1,000 CFU /100mL	Residual Free Chlorine (Cl)	0.2 – 2 mg/L
				Parameter	Expected effluent quality															
		pH		6.5 – 8.5																
		Biological Oxygen Demand (BOD)		< 20 mg/L																
		Total Suspended Solids (TSS)		< 30 mg/L																
		Total Nitrogen (TN)		50 mg/L																
		Total Phosphorus (TP)		4 mg/L																
		<i>E. coli</i>	< 1,000 CFU /100mL																	
Residual Free Chlorine (Cl)	0.2 – 2 mg/L																			

Sources	Emission	Potential pathways	Proposed controls
Disposal of treated sewage via irrigation	Treated sewage containing contaminants (e.g. nutrients, pathogens, metals, PoPs)	Migration of impacted groundwater to downgradient receptors	<ul style="list-style-type: none"> – Online monitoring, analysis, alarms and controls – Monitoring of final effluent quality – 3.5 ha sprayfield sizing based on WQPN Risk Category B soil – Location of sprayfield upgradient of future mining activities
	Odour	Air/windborne pathway	– Enclosure of WWTP systems
	Noise		– Distance from receptors

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 5 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)).

Conservation significant flora, fauna and vegetation communities may be potential receptors to emissions from the Premises, however impacts to these receptors are managed through Ministerial Statement 375.

Table 5: Sensitive human and environmental receptors and distance from prescribed activity

Receptors	Distance from prescribed activity
Human receptors	
Closest sensitive receptor – Coburn Station homestead	Approximately 16 km east of the tenement boundary and 16.5 km east of the Premises. Potential impacts from odour and noise emissions have not been considered further due to distance to this receptor.
Environmental receptors	
World Heritage Area – Shark Bay	Adjacent to the west of the tenement boundary and approximately 3.9 km west of the Premises boundary.
DBCA legislated tenure – Zuytdorp Nature Reserve	Adjacent to the south of the tenement boundary and approximately 7.6 km south of the Premises.

Receptors	Distance from prescribed activity
<p>Underlying groundwater – Superficial aquifer</p>	<p>Groundwater is approximately 40 mbgl as determined by drilling and ground water modelling. Flow is to the northwest discharging through marine clay deposits into the Nilemah Embayment and Hamelin Pool which are approximately 30 km away.</p> <p>Groundwater in the superficial aquifer is saline and slightly acidic with pH 6.2 to 6.7. TDS ranges between 8,000 to 11,000 mg/L.</p> <p>The superficial aquifer beneath the Premises is predominantly formed of Tertiary and Quaternary terrestrial deposits of sands from the reworked Peron Sandstone. These deposits extend to near the shorelines of Shark Bay and are underlain by a palaeodrainage surface comprising weathered and locally re-worked sections of the thick clayey Toolonga Calcilutite Formation.</p> <p>Mineral resource delineation bore logs characterise the Toolonga Calcilutite as approximately 100 m thick and the uppermost unit that limits flow between the superficial aquifer and deeper confined aquifers. Based on this interpretation, the roof structures of the Toolonga Calcilutite form groundwater divides that potentially control local groundwater flows. The roof structures dip to the west and northwest, beneath the Premises.</p> <p>The Premises is located within the Gascoyne Groundwater Area proclaimed under the <i>Rights in Water and Irrigation Act 1914</i>.</p>

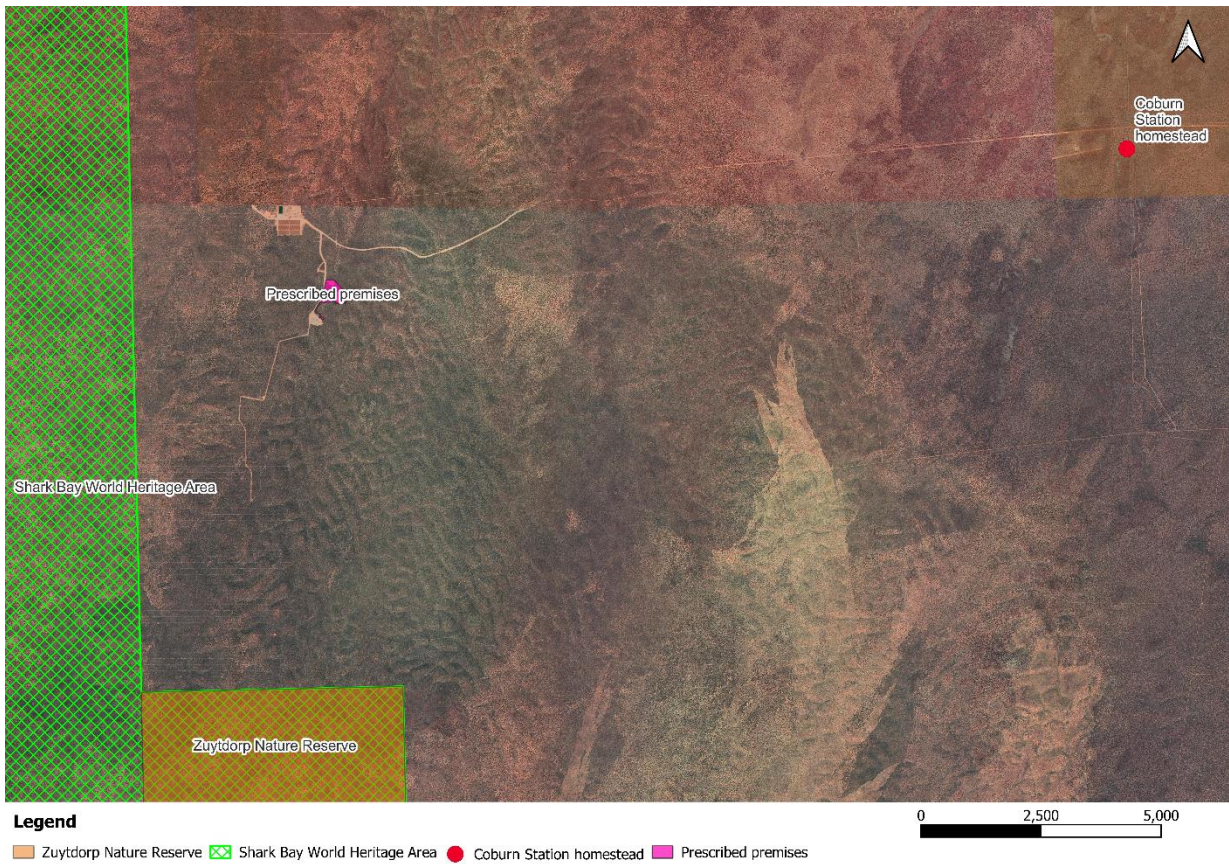


Figure 3: Distance to sensitive receptors

3.1.3 Pathways

Table 6 below provides a summary of the potential pathways and site characteristics that are considered relevant to emissions and discharges from the prescribed premises (*Guidance Statement: Risk Assessment* (DER 2017)).

Table 6: Pathways and site characteristics relevant to the Premises

Aspect	Details
Landform and topography	<p>The Premises is situated within a north-trending system of longitudinal parabolic dunes formed from unconsolidated windblown Nilemah Sands that overly the Peron Sandstone. The landform is typically undulating with dunes 40 to 60 m high, however the Premises is located within a less undulating dunal area of the system.</p> <p>Low resolution topographical information indicates that surface elevation at the Premises is approximately 105 mAHD.</p>
Geology and soil type	<p>The Premises area is comprised of calcareous soils typically reddish brown (2.5 YR4/8) to dark red (7.5 R3/6) in colour. The soil is predominately sandy throughout the profile and may contain colour changes, weak textural changes, some fabric development and weak development of soil horizons. The soils are considered to have undergone considerable leaching and have limited capacity to store water.</p> <p>Site investigations indicated that soil profiles typically had a surface layer of highly mobile sand (1 cm to 15 cm). The pH of soils ranged from 7.5 to 9.5. Particle Size Distribution tests indicated that the soils were dominated by the coarse fraction (coarse and medium-grained sands), with over 80% falling within the sand fraction. The soils had an average clay content of 5.8% and an average silt content of 1.4%.</p> <p>Field observations of the moisture retention capability of the soil profile indicates that moisture retention increases with increasing depth. The moisture content at the time of field testing was generally around 1%, while the dry density ratio was approximately 85%.</p> <p>Additional baseline soils investigations determined that the soils in the area are typically non-saline and dispersive, however spontaneous dispersion was not observed in any of the surface sands in the Premises area.</p>
Meteorology	<p>The nearest Bureau of Meteorology weather station is the Hamelin Pool station (No. 006025). The station provides the following information:</p> <ul style="list-style-type: none"> • Based on records from 1991 to 2020, rainfall in the region is sporadic with annual precipitation ranging from 90 mm to 453 mm and averaging 199 mm. The timing and magnitude of rain is highly influenced by cyclonic and thunderstorm activity. The majority of rain falls between May and August. • Based on information provided by the Hamelin pastoral lease manager, the Applicant considers that rainfall at the Premises area is likely to be appreciably higher than records from the BoM weather station. <p>The SILO database offered by the Queensland Department of Environment and Science provided the following information, based on records for the area from 2010 to 2022:</p> <ul style="list-style-type: none"> • Average daily pan evaporation and potential evapotranspiration is 7.33 mm and 6.7 mm respectively. • Average annual pan evaporation and potential evapotranspiration is 2669 mm and 2441 mm respectively.

Aspect	Details
Surface hydrology	<p>The wider tenement area is internally draining and has few surface water features due to low rainfall, high evaporative conditions and the inferred high soil infiltration capacity. There are no defined watercourses, permanent fresh-water bodies, or birridas (seasonally inundated, saline lakes) within the tenement or Premises area.</p> <p>The catchment area upstream of the Premises is relatively small and would produce limited runoff during storm events. Most rainfall typically ponds in depression areas and evaporates or quickly infiltrates.</p>

3.2 Risk ratings

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

Where the applicant has proposed mitigation measures/controls (as detailed in Section 3.1), these have been considered when determining the final risk rating. Where the delegated officer considers the applicant's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the 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 7.

Licence L9373/2023/1 that accompanies this decision report authorises emissions associated with the operation of the premises i.e. sewage treatment, irrigation of treated wastewater and landfilling activities.

The conditions in the issued licence, as outlined in Table 7 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

Table 7: Risk assessment of potential emissions and discharges from the premises during commissioning and operation

Risk events					Risk rating ¹	Applicant controls sufficient?	Conditions ² of licence	Justification for additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood			
Commissioning								
Process refinements and improvements to achieve steady-state operation of the WWTP and effluent design quality	Sewage / partially treated sewage containing contaminants	Overland flow causing impacts to soils and vegetation	Terrestrial ecosystems	Refer to Section 3.1.1	C = Moderate L = Unlikely Medium Risk	N	<u>23: Extending commissioning requirements and duration</u> <u>24 and 25: Extending commissioning monitoring</u> <u>26 and 27: Extending commissioning reporting</u>	The Delegated Officer has considered the information contained within the WWTP Commissioning Report and determined to require additional regulatory controls in-line with the recommendations within the report and the findings of the maintenance contractor. These additional controls relate to the monitoring of sludge levels and installation of a filter cleaning station. The Delegated Officer has also included provisions for an extended commissioning period in consideration of the design treated effluent quality from the plant not yet being achieved.
	Treated sewage containing contaminants (e.g. nutrients, pathogens, metals, PoPs)	Subsurface seepage causing impacts to soil and groundwater quality	Underlying groundwater (40 mBGL)	Refer to Section 3.1.1	C = Moderate L = Possible Medium Risk	N		
	Leachate and washwater from filter cleaning	Migration of impacted groundwater to downgradient receptors	N/A		The closest downgradient receptor for groundwater discharge is the Nilemah Embayment and Hamelin Pool, located 30 km northwest. Due to this substantial distance the risk event is not considered reasonably foreseeable.			
	Odour	Air / windborne pathway causing impacts to amenity	N/A		Distance to closest sensitive land use is sufficient to conclude there is no foreseeable risk from the emissions.			
	Noise							
Operation								
Acceptance and disposal of putrescible waste via landfilling	Contaminated stormwater	Overland flow causing impacts to soils and vegetation	Terrestrial ecosystems	Refer to Section 3.1.1	C = Minor L = Rare Low Risk	Y	6: Stormwater controls	N/A
	Leachate	Subsurface seepage causing impacts to soil and groundwater quality	Underlying groundwater (40 mBGL)	Refer to Section 3.1.1	C = Moderate L = Unlikely Medium Risk	N	2: Inert and putrescible waste types <u>2: Dried solid WWTP waste types</u> 3: Table 3 (Rows 2, 4)	As the Applicant has proposed to manage the landfill in accordance with the Environmental Protection (Rural Landfill) Regulations 2002, the controls from the regulations have been included in the licence as regulatory controls. Additional controls have also been included to allow for the disposal of dried sewage sludge to the putrescible landfill.
		Migration of impacted groundwater to downgradient receptors	N/A		The closest downgradient receptor for groundwater discharge is the Nilemah Embayment and Hamelin Pool, located 30 km northwest. Due to this substantial distance the risk event is not considered reasonably foreseeable.			
	Disease vectors	Attraction of pests and vermin	Terrestrial ecosystems Shark Bay World Heritage Area (3.9 km west)	Refer to Section 3.1.1	C = Minor L = Possible Medium Risk	Y	1: Table 1 (Rows 11, 12) 3: Table 3 (Row 4)	As the Applicant has proposed to manage the landfill in accordance with the Environmental Protection (Rural Landfill) Regulations 2002, the controls from the regulations have been included in the licence as regulatory controls.
	Windblown waste	Air / windborne deposition causing impacts to terrestrial ecosystems			C = Minor L = Possible Medium Risk	Y	4: Landfill cover 7 – 8: Rural landfill requirements	
	Dust				C = Minor L = Unlikely Medium Risk	Y	10: Rural landfill fire controls 22: Notification of fires	
	Smoke and particulate emissions							
	Odour	Air / windborne pathway causing impacts to amenity	N/A		Distance to closest sensitive land use is sufficient to conclude there is no foreseeable risk from the emissions.			
Noise								

Risk events					Risk rating ¹	Applicant controls sufficient?	Conditions ² of licence	Justification for additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood			
Acceptance and treatment of sewage	Sewage / partially treated sewage containing contaminants (e.g. nutrients, pathogens, metals, PoPs) Leachate and washwater from filter cleaning and sewage sludge	Overland flow of spills and leaks causing impacts to soils and vegetation	Terrestrial ecosystems	Refer to Section 3.1.1	C = Minor L = Unlikely Medium Risk	N	1: Table 1 (Rows 1, 3, 5, 6, 8, 9) 1: Table 1 (Rows 2, 4, 7, 10) 2: Sewage waste acceptance 3: Table 3 (Row 1) 3: Table 3 (Row 2) 5: Spill cleanup 6: Stormwater controls	The Applicant suggests that sludge removal does not need to occur from the WWTP, however the Delegated Officer considers this to be an inaccurate statement. Alum dosing of sewage occurs, with the dosed material inputting to the primary treatment tanks for settling. Zabel filters act to remove further solids from the down train process. The operations manual relating to the system states that occasional sludge removal is required and maintenance logs during commissioning indicates that this is also the case for this specific system. The Delegated Officer has included additional regulatory controls in consideration of the findings of the maintenance contractor outlined in the commissioning report. Additional controls have also been included to allow for the drying of sewage sludge.
		Subsurface seepage of spills and leaks causing impacts to soil and groundwater quality	Underlying groundwater (40 mBGL)		C = Moderate L = Unlikely Medium Risk			
		Migration of impacted groundwater to downgradient receptors	N/A		The closest downgradient receptor for groundwater discharge is the Nilemah Embayment and Hamelin Pool, located 30 km northwest. Due to this substantial distance the risk event is not considered reasonably foreseeable.			
	Odour	Air / windborne pathway causing impacts to amenity	N/A	Distance to closest sensitive land use is sufficient to conclude there is no foreseeable risk from the emissions.				
	Noise							
Disposal of treated sewage via irrigation	Treated sewage containing contaminants (e.g. nutrients, pathogens, metals, PoPs)	Overland flow and spray-drift causing impacts to soils and vegetation	Terrestrial ecosystems	Refer to Section 3.1.1	C = Moderate L = Unlikely Medium Risk	Y	1: Table 1 (Row 9) 3: Table 3 (Row 3) 11: Discharge limits 13 - 16: Effluent monitoring	The Delegated Officer considers the Applicant proposed controls to be sufficient and has included these as regulatory conditions within the licence.
		Subsurface seepage causing impacts to soil and groundwater quality	Underlying groundwater (40 mBGL)		C = Moderate L = Unlikely Medium Risk			
		Migration of impacted groundwater to downgradient receptors	N/A		The closest downgradient receptor for groundwater discharge is the Nilemah Embayment and Hamelin Pool, located 30 km northwest. Due to this substantial distance the risk event is not considered reasonably foreseeable.			
	Odour	Air / windborne pathway causing impacts to amenity	N/A	Distance to closest sensitive land use is sufficient to conclude there is no foreseeable risk from the emissions.				

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

Table 8: Consultation

Consultation method	Comments received	Department response
Application advertised on the department's website on 10 February 2023	None received	N/A
Local Government Authority advised of application on 10 February 2023	The Shire of Shark Bay replied on 13 February 2023 stating that the Shire of Bay is aware of the sewage facility for the mining village and supported their application to install a wastewater treatment system that was forwarded to the Department of Health WA in 2022 and which was granted approval to install. While the Shire has no knowledge of the putrescible landfill site, it is understandable that the village and mine site operations will require a waste disposal site. The Shire of Shark Bay has no objections to this application or the issuing of a licence for these facilities.	N/A
Department of Health (DoH) advised of application on 10 February 2023	<p>DoH replied on 27 February 2023 stating that in relation to the management of water and wastewater the DoH has no objection to the proposal subject to the proponent providing the following:</p> <p>Wastewater Management:</p> <ol style="list-style-type: none"> 1. To submit separate onsite wastewater treatment system applications to the department for each system. This includes proposed holding or storage ponds used for brine or other liquid wastes that may include blending or recycling for beneficial purposes; 2. It appears treated wastewater is intended to be recycled for beneficial purposes such as the reuse of blending brine for industry processing. A separate recycled water quality management plan (RWQMP) may be required in accordance with the "Application process for approval of a recycling water scheme": https://ww2.health.wa.gov.au 3. Pond construction and design criteria can be obtained from the DoH upon application; <p>Water Management:</p> <p>The proponent needs to ensure water sources and supply meets the potable water quality criteria as specified under the Australian Drinking Water Quality Guidelines, 2011. A drinking water quality management plan should be submitted to the department to protect public health safety and as identified, traces of thorium and uranium have been detected in the bulk ore.</p>	<p>The Delegated Officer notes the information provided by DoH and this will be provided to the Applicant for their information through this Decision Report.</p> <p>The Applicant has provided a copy of the onsite wastewater treatment system approval applicable to the WWTP within this application.</p> <p>The remaining matters raised by DoH are outside the scope of this application.</p>

Consultation method	Comments received	Department response
Department of Mines, Industry Regulation and Safety (DMIRS) advised of application on 10 February 2023	None received	N/A
Applicant was provided with draft documents on 22 March 2023	Comments were received on 21 April 2023. 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.

The Delegated Officer has included conditions for an extended commissioning period within the licence, due to the commissioning report submitted under Works Approval W6475/2020/1 indicating that final effluent from the WWTP was not yet achieving proposed effluent design parameters. An extended commissioning period of 180 calendar days has been authorised with the Applicant being required to submit a report on the outcomes of the commissioning period.

Should the Applicant be unable to achieve the application design parameters and the discharge limits in the granted licence, they are required to proposed additional measures that may be required. This may potentially include an increase to the size of the irrigation area to achieve nutrient and BOD loading limits. The Applicant should consider if any of the proposed measures will trigger additional approval requirements.

References

1. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
2. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
3. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.
4. Environmental Protection Authority (EPA) 2018, *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual*, Environmental Protection Authority, Perth, WA.

Appendix 1: Summary of applicant's comments on draft documents

Condition	Summary of applicant's comment	Department's response
1 - Table 1: Row 3(a) Flow balance tanks	<p>There is no telemetry in the installation associated with level sensors and pumps. Monitoring is done manually through daily checks and record keeping.</p> <p>Requested change: Remove the reference to telemetry system. If additional wording is required by DWER then add in monitoring to be done via local control through daily checks.</p>	Reference to telemetry has been removed.
1 - Table 1: Row 9(c) Sprayfield	<p>Coburn previously responded to a DWER Request for Information on this item in a letter dated 20 December 2022. The company acknowledged that the sprayfield for the mine village was not set up in accordance with the guidance provided in WQPN 22 – Irrigation with Nutrient-Rich Wastewater which recommends that fertigation of bare land is not undertaken. This occurred during the very early days of construction without sufficient consultation / communication between the clearing contractor and Strandline.</p> <p>Some regrowth has occurred since the original clearing of the sprayfield. Coburn commits to maintaining this re-growth as vegetative cover in between the irrigation infrastructure (i.e. lines and sprinklers).</p>	Noted.
1 - Table 1: Row 9(e) Sprayfield	<p>Design of the sprayfield has 20 sprinklers installed to achieve a 15 to 20m radius for each sprinkler. There is insufficient space in the design to achieve a 30m radius.</p> <p>Requested change: Sprinklers must have a minimum spray radius of 15m.</p>	The minimum spray radius for the sprinklers has been reduced to 15 m.
1 - Table 1: Row 11(a) Landfill cell	<p>Coburn will be adopting in pit dumping methods, whereby waste will be delivered to the pit down the ramp. Should a tipping method be used in the future, Coburn commits to meeting the operational requirement in the draft licence.</p> <p>Requested change: Include both methods in the licence.</p>	The requirement has been changed to also refer to an active dumping area within the cell.
1 - Table 1: Row 12(d) Fencing, site security and firebreaks	<p>Coburn confirms that this has been implemented as part of the installation. To clarify, Coburn is nominating the fence line surrounding the facility as the boundary for this firebreak measurement.</p> <p>No requested changes.</p>	Noted. For clarity in determining compliance, the reference to the boundary of the landfill has been changed to the landfill boundary fencing.

Condition	Summary of applicant's comment	Department's response
3 - Table 3: Row 4(a) Inert Waste Type 1, Inert Waste Type 2, Putrescible waste	This distance is not achievable for the size landfill that has been designed & installed for the project. There are 3 cells in the design. The distance ranges from 3m to 5m between the outer edge of the cells and the perimeter boundary fence which marks the edge of the firebreak. Request change: remove this condition or specify 3m.	The original requirement was sourced from the Rural Landfill Regulations. Given the siting of the facility and occupancy over the mining tenement, the requirement will be changed to 3 m.
11 - Table 5 (Discharge point)	The design consists of 20 sprinklers installed at the sprayfield. Request change: replace 42 with 20	The number of sprinklers has been reduced to 20 m.
13 - Table 7 (Monitoring location) and 24 - Table 11 (Monitoring location)	Samples are taken at the WWTP unit itself; in the final stage of treatment prior to being released to the sprayfield. A suggested title is: • Treated Effluent Sampling Point / WWTP	Noted and implemented.

Appendix 2: Application validation summary

SECTION 1: APPLICATION SUMMARY						
Application type						
Works approval	<input type="checkbox"/>					
Licence	<input checked="" type="checkbox"/>	Relevant works approval number:	W6258/2019/1	None	<input type="checkbox"/>	
		Has the works approval been complied with?	Yes <input checked="" type="checkbox"/>	No	<input type="checkbox"/>	
		Has time limited operations under the works approval demonstrated acceptable operations?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	N/A	<input type="checkbox"/>
		Environmental Compliance Report / Critical Containment Infrastructure Report submitted?	Yes <input checked="" type="checkbox"/>	No	<input type="checkbox"/>	
		Date Report received: 30/11/2021 RFI received on 26 September 2022				
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		25 October 2022				
Applicant and Premises details						
Applicant name/s (full legal name/s)		Coburn Resources Pty Ltd				
Premises name		Coburn Mineral Sands Project				
Premises location		Mining tenements – M09/105 and M09/106				
Local Government Authority		Shire of Shark Bay				
Application documents						
HPCM file reference number:		DER2018/001042-8-34				
Key application documents (additional to application form):		Licence Supporting Document MS723 Mining Proposal Health Act Approval Validation RFI documents (DWERDT702909)				
Scope of application/assessment						
Summary of proposed activities or changes to existing operations.		<p>Licence</p> <p>Operation of a 75 m³/day wastewater treatment plant and 2,700 tonnes per annual period putrescible landfill (54,000 tonnes total capacity). The WWTP and landfill were constructed under W6258/2019/1.</p>				

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 85: Sewage facility	75 m ³ /day	
Category 89: Putrescible landfill site	2,700 tonnes per annual period	

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 checked="" type="checkbox"/> No <input type="checkbox"/>	Referral decision No: 1491 Managed under Part V <input type="checkbox"/> Assessed under Part IV <input checked="" 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: 723 EPA Report No: 1211
Has the proposal been referred and/or assessed under the EPBC Act?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Reference No: EPBC 2003/1221
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:
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? Mining proposal
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 Clearing is covered under the Ministerial Statement
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 Not a CAWS Act area
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"/>	Application reference No: Licence/permit No: GWL159157(5)

<p>Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?</p>	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>	<p>Name: Gascoyne 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: Mid-West Gascoyne</p>
<p>Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	<p>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"/></p>
<p>Is the Premises subject to any other Acts or subsidiary regulations (e.g. <i>Dangerous Goods Safety Act 2004</i>, <i>Environmental Protection (Controlled Waste) Regulations 2004</i>, <i>State Agreement Act xxxx</i>)</p>	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>	<p>Environmental Protection (Controlled Waste) Regulations 2004</p>
<p>Is the Premises within an Environmental Protection Policy (EPP) Area?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	
<p>Is the Premises subject to any EPP requirements?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	
<p>Is the Premises a known or suspected contaminated site under the <i>Contaminated Sites Act 2003</i>?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	<p>Classification: N/A Date of classification: N/A</p>