



Application for Licence

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

Licence Number	L9393/2003/1
Applicant	Oasis @ Newman Pty Ltd
ACN	612 951 710
File number	DER2023/000353
Premises	Oasis @ Newman 44 Great Northern Highway NEWMAN WA 6753 Legal description - Lot 44 on Deposited Plan 171724
Date of report	4 December 2023
Decision	Licence granted

Abbie Crawford

A/MANAGER WASTE INDUSTRIES

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

[Licence: L9393/2023/1](#)

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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 L9393/2003/1 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 and overview of premises

On 29 May 2023 the Applicant (Oasis @ Newman Pty Ltd) submitted an application for a licence to the department under section 57 of the *Environmental Protection Act 1986* (EP Act). The application is for the operation of a Category 54 sewage facility at the premises. The premises is approximately 5.6 km south of Newman.

The Applicant holds a current Registration R2504/2020/1 for a smaller sewage facility designed to treat up to 70 m³ per day of wastewater generated from the accommodation facility and associated amenities at the Premises. The Applicant is in the process of expanding its short-term accommodation facility from 374 rooms to 677 rooms for approximately 900 people, requiring an upgrade of its existing Wastewater Treatment Plant (WWTP). Treated effluent from the WWTP will be disposed for irrigation in garden beds and lawns within the site. The Applicant was granted works approval W6586/2021/1 on 22 March 2022 permitting construction and commissioning of the new WWTP.

The pump station and the three balance tanks from the original plant have been retained for the new WWTP. No modifications are required for this infrastructure.

The premises also encompasses:

- Groundwater Licence GW45976 – one groundwater bore is located within the premises abstracting from a depth of 77 metres;
- A Reverse Osmosis (Plant) – processing groundwater for drinking; and
- Generators located on site, currently supplying the existing accommodation village and WWTP – will also supply the upgraded WWTP. Fuel is stored onsite in bunded ponds.

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 L9393/2023/1 and Table 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 L9393/2023/1 .

Table 1: Prescribed Premises category and capacity

Prescribed Premises category description (Schedule 1, <i>Environmental Protection Regulations 1987</i>)	Assessed production capacity
Category 54 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.	250 m ³ per day

2.3 WWTP design

The Applicant has constructed an AquaSol branded, packaged, secondary wastewater treatment system that is designed to treat up to 250 m³ per day of wastewater using sequential batch reactors and bacteria to digest and break down organic waste. The WWTP will operate as follows:

- Sewerage is pumped from the existing main pump station to three 25kL existing balance tanks. Feed sewerage is initially screened by a rotating screen that is built into a 40-foot high-cube shipping container. The screen rotation is automatic and self-clearing which purges captured large solids into a 1000 litre bulker bag being used as a waste bin, which is then sent to landfill for disposal. The screen removes large solids down to 2 mm. The liquid sewerage feed that is purged of large solids is then directly fed into an aerobic tank;
- The aerobic tank will have a minimum volumetric capacity of 50kL where it acts as a buffer and break tank. A 2.2kW submersible aerator is installed to provide oxygen to bacteria and promote biodegradation;
- Two submersible sump pumps inside the aerobic tank pump aerated wastewater out to a sequential batch reactor (SBR) array. Pumped wastewater flow from the aeration tank is divided among the five tanks. Each tank is 50kL which gives an overall SBR capacity of 250kL. This increased batch volume allows for a 5-times increase in residence time. Further biodegradation is promoted by 2.2kW aerators in each tank and from the increased reaction time. Each SBR has its own dedicated submersible extraction pump which transfers aerated wastewater to two polish tanks;
- Polished water is then further treated through mechanical, chemical and UV sterilization modules in the Filtration and Disinfection Process Plant;
- The sludge tank is 32kL and draws from the base of each SBR tank. SBR tanks have actuated sludge drainage valves at the base of each tank which connect to a Return Activated Sludge (RAS) and Waste Activated Sludge (WAS) pump manifold. One sludge pump draws SBR tank sludge through a suction manifold and discharges to the sludge tank. A portion of this may be returned to the aerobic tank. Return and Waste diversion is controlled by two actuated valves (RAS and WAS). Flocculant is dosed into the RAS and WAS pump discharge to promote the formation of solid aggregates which improve solids settling in the sludge tank. A submersible sump pump is installed at height in the sludge tank which returns settled sludge water into the aerobic tank at the start of the process;
- Settled sludge is pumped from the sludge tank into a drying bag. This bag is constructed from woven polypropylene to meet AS 3668-1989 and housed in a reserved area inside the Filtration and Disinfection sea container;
- Pumps inside the filtration plant draw water from the polish tank in preparation for filtration and disinfection. Polyaluminium Chloride (PAC) and chlorine are stored in chemical storage dosing tanks which are in the sea container. PAC flocculant is dosed directly into the stream to promote solids aggregation. This improves the efficiency at which the media filters can capture solids. Chlorine is dosed to disinfect the water. A static inline mixer promotes turbulent mixing of water with PAC and chlorine;
- Chemically treated water is fed through five 450mm diameter media filters arranged in parallel. The media includes a mixture of coarse gravel, sand, and fine glass beads which remove particulates down to 3µm. Additionally, water is filtered through cartridge filters removing particles up to 1µm;
- Filtered water passes through two parallel UV sterilizers for further disinfection before being discharged to irrigation. A polish loop return line is provided for re-filtration. Irrigation and polish return is controlled by actuated valves;

- Online water analysis will be used to monitor the free available chlorine, pH, and turbidity before its final discharge to irrigation;
- All the alarms in the system will be recorded in the Programmable Logic Controller (PLC). All wiring will be completed to Australian standards. System control will be via Delta PLC & the Human Machine Interface (HMI).

The system shall treat the wastewater to meet AS/NZS 1547:2000 and defined process limits. The WWTP will treat wastewater to a secondary level, disinfect with chlorine and use liquid aluminium to flocculate and reduce phosphate levels. Aquasol are contracted to perform regular maintenance on the WWTP and undertake sampling on a monthly basis. The system treatment time is 2.5 days.

Process flow diagrams and WWTP schematics are included in Figures 1, 2 and 3 below.

2.4 Irrigation of blended effluent

Once treated, the wastewater will be disposed of via a subsurface drip-irrigation pipeline system which will be installed within the garden beds and lawns in the surrounding accommodation facility and around the perimeter of the premises. The Applicant has installed 67,200 m of pipeline at the premises for disposal of the treated wastewater via irrigation of the gardens.

Additional to the treated effluent, brine originating from the reverse osmosis plant (RO plant) will be incorporated into the effluent stream which will be disposed of via irrigation as a blended effluent. The RO plant is anticipated to produce 33 m³/day of brine, with this volume to be incorporated directly into the irrigation stream within the premises.

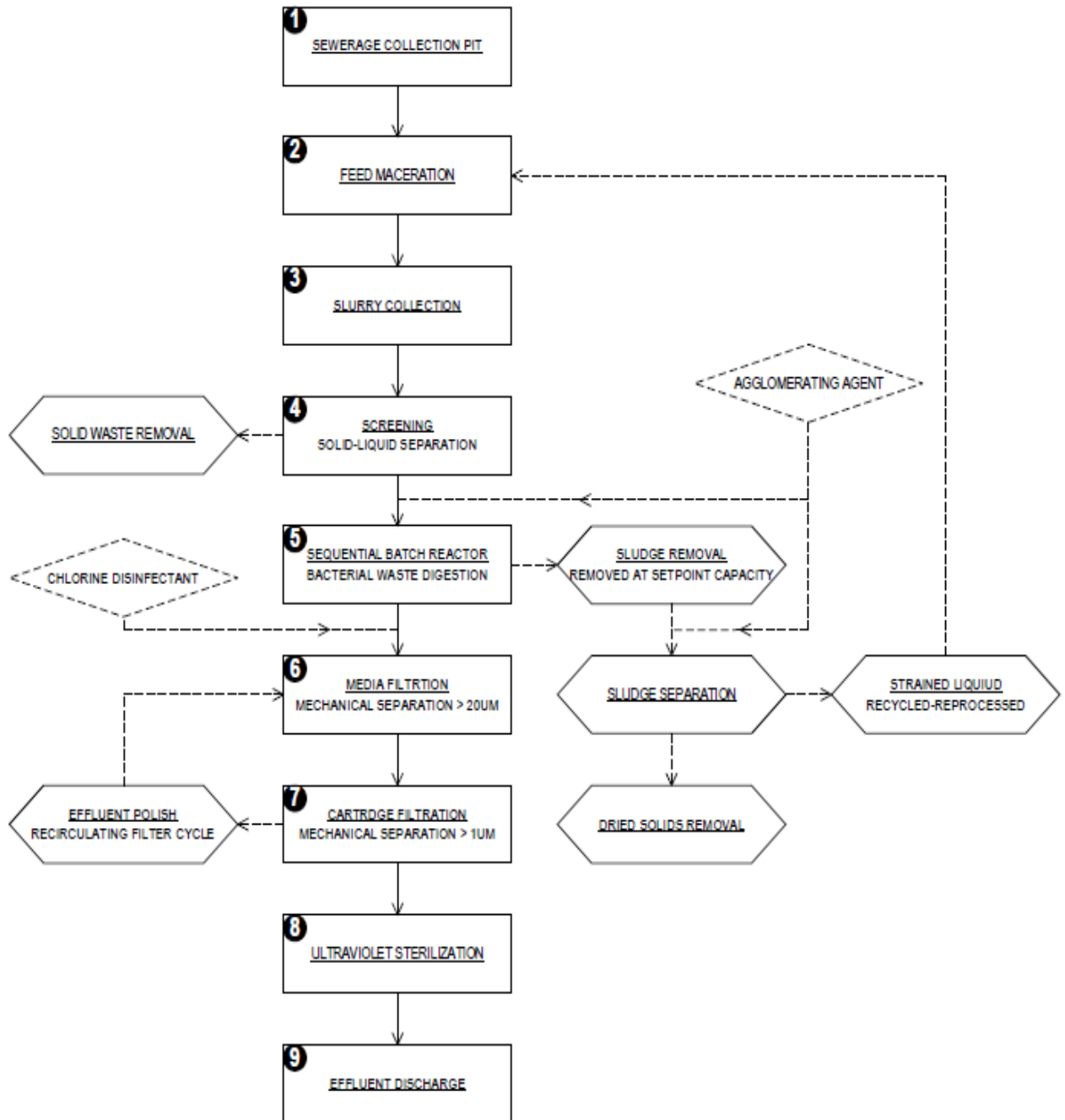


Figure 1: Process flow diagram

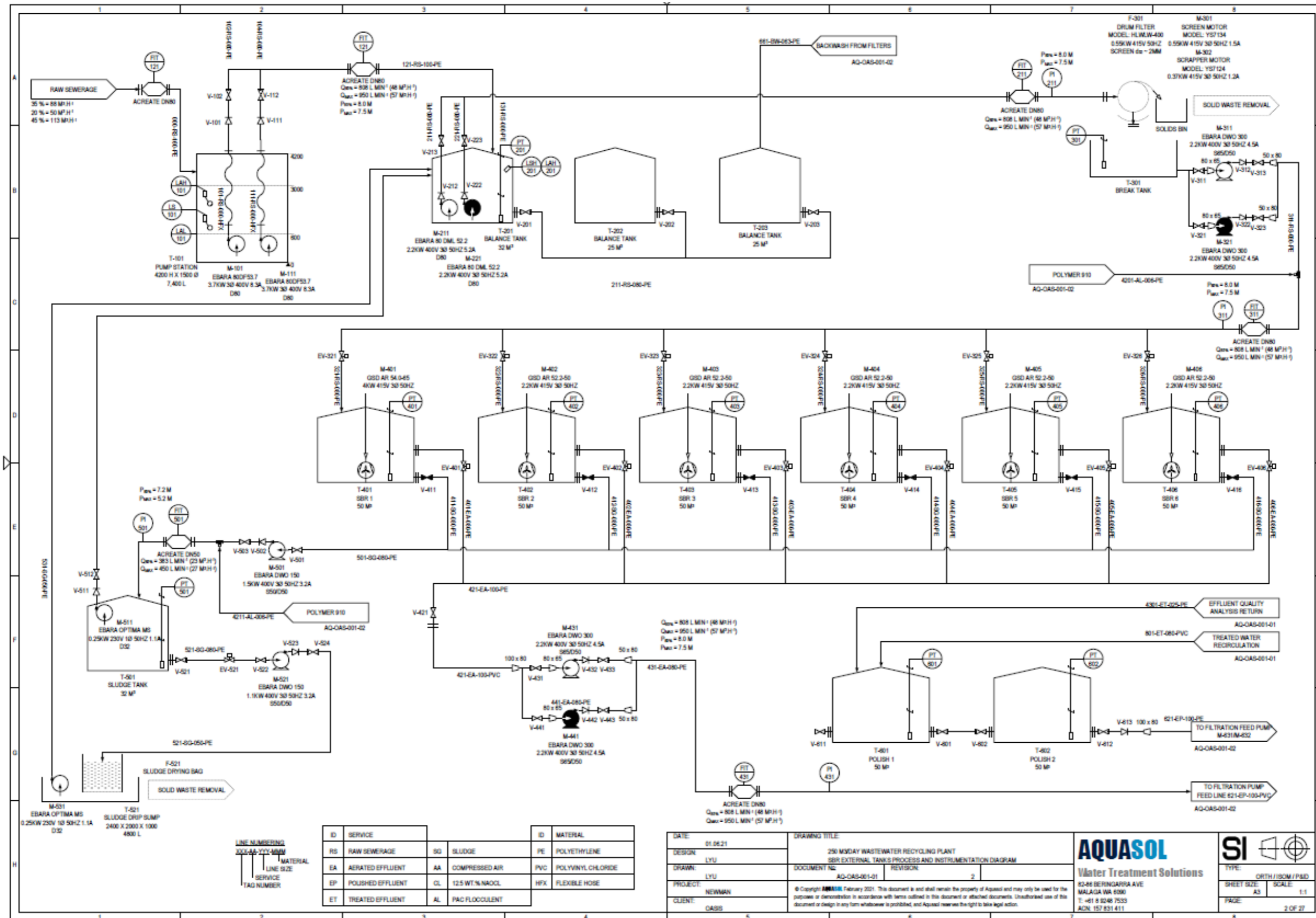


Figure 2: Oasis @ Newman WWTP schematic stage 1

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3. Legislative context

3.1 State Planning Policy

State planning policies provide the highest level of planning policy control and guidance in Western Australia. Prepared under Part 3 of the *Planning and Development Act 2005*, *State Planning Policy 1 State Planning Framework Policy* (SPP 1.0) brings together existing State and regional policies, strategies, plans and guidelines within a central State Planning Framework. It sets the context for decision-making on land use and development in Western Australia. Subsequent to Policy 1, draft *State Planning Policy 2.0 – Environment and natural resources policy* (SPP 2.0) defines the principles and considerations that represent good and responsible planning in terms of environment and natural resource issues within the framework of the State Planning Strategy. The objectives of the policy are to:

- Integrate environment and natural resource management with broader land use planning and decision-making.
- Protect, conserve and enhance the natural environment.
- Promote and assist in the wise and sustainable use and management of natural resources.

Specifically, the draft *State Planning Policy 2.9 Planning for Water* aims to deliver greater clarity around how water-related provisions are implemented. The draft SPP 2.9 and Guidelines incorporate improvements that will lead to better planning decision-making through consideration of appropriate management measures to achieve optimal water resource and development outcomes.

The Shire of East Pilbara is the responsible Planning Authority for the in granting of approvals in accordance with SPP requirements.

3.2 Shire of East Pilbara

The Shire of East Pilbara was invited to comment on the application on 4 July 2023 and advised the Shire issued development approval on 19 July 2023 for development of the additional 677 rooms for short-term accommodation for approximately 965 guests and staff.

A building permit for the WWTP infrastructure was issued in 2021. This building permit has a condition to the effect that construction of the treatment plant must not commence until Department of Health have issued approval to construct and install an apparatus for the treatment of sewage.

3.3 Department of Health

The Government Sewerage Policy (2019) provides guidance on the provision of sewerage services in Western Australia and is implemented under specific legislation as applied by various government departments including the Department of Health, the Department of Water and Environmental Regulation and planning and development processes of local government authorities.

On site sewerage disposal is detailed in the policy to ensure the premises is capable of accommodating the disposal without endangering public health or the environment. Requirements of the policy applicable to the premises are detailed in Table 2 below.

Table 2: Government Sewerage Policy 2019 requirements

Government Sewerage Policy
Subsection
<p>5.2 Onsite sewage disposal</p> <p>The premises size must exceed 4 hectares for onsite disposal</p>
<p>5.2.2 Separation from water resources</p> <p>An onsite sewage system is not to be located within:</p> <ul style="list-style-type: none"> • 100 metres of any bore used for public drinking water supply. • 100 metres of a waterway and not within a waterway foreshore area.
<p>5.2.3 Separation from groundwater</p> <p>The discharge point of the onsite sewage system should be at least two metres above the highest groundwater level, taking into account the range of seasonal groundwater conditions, when in public drinking water source areas.</p>
<p>5.2.4 Land application area</p> <p>Each lot should be of sufficient size to accommodate development and an unencumbered land application area for the disposal of sewage in accordance with Schedule 2 of this policy.</p>
<p>5.2.5 Type of on-site treatment system required</p> <p>Secondary treatment systems with nutrient removal will generally be required in public drinking water source areas and sewage sensitive areas.</p>
<p>6.2 Secondary treatment systems – maintenance requirements</p> <p>System providers are required to ensure that maintenance of the system is undertaken in accordance with the <i>Code of Practice for the Design, Manufacture, Installation and Operation of Aerobic Treatment Units</i>, which includes:</p> <ul style="list-style-type: none"> • Servicing at regular intervals as specified by Department of Health • Submission of maintenance reports to the local government and Department of Health.
<p>Definition: Secondary treatment system</p> <p>A sewage treatment system which produces treated sewage of secondary standard, i.e. 20 mg/L of Biochemical Oxygen Demand (BOD), 30 mg/L of Total Suspended Solids (TSS) and 10 cfu/100 mL of <i>Escherichia coli</i> (for example, an aerobic treatment unit).</p>
<p>Definition: Secondary treatment system with nutrient removal</p> <p>A secondary treatment system that discharges treated sewage with phosphorus and nitrogen concentrations of less than 1 mg/L and 10 mg/L respectively.</p>

The Department of Health (DoH) was invited to comment on the application on 4 July 2023. DoH advised on 12 July 2023 it has no objection to this proposal as approval for the Oasis Newman recycle water scheme with a peak capacity of 250 m³ per day was granted on 16 May 2023.

Conditions on the approval that relate to this assessment include:

- Limits for *E. coli*, turbidity, pH and free chlorine residual have been applied to the quality of recycled wastewater;
- One monthly sample of recycled wastewater to be submitted;
- Samples to be collected from a location that is representative of the effluent stream, from the final effluent tank outlet tap and coded H58/0001E;
- All samples to be analysed by a NATA registered laboratory in accordance with the current “Standard Method for Examination of Water and Wastewater – APHA-AWWA-WEF”;
- All above-ground recycled water fittings must be readily identifiable and distinguishable from potable water piping, with all water outlets to be labelled, coloured purple and fitted with locked, keyed or bayonet type locks;
- Irrigation is not to commence before 9:00pm and must cease at such time to provide a withholding period of nominally 1 hour or until the area is dry;
- Recycled water irrigation to only occur during dry weather conditions and regular inspections to be conducted to ensure ponding or runoff does not occur;
- Spray drifting onto public drinking fountains, into natural or artificial water bodies, onto buildings, playgrounds and barbeque and picnic table areas is not permitted;
- Spray drift is to be minimised by the selection of large droplet sprays and choice of spray height;
- The wastewater treatment plant compound shall be fenced, with a lockable access gate and posted with warning signs; and
- Where potable supply is used as top up water for the recycled water supply, a backflow prevention device must be installed in the potable supply where it enters the recycled water system. All backflow prevention devices must be installed and maintained by a licensed plumber following the current version of the AS/NZS 3500.

Key Findings:

1. The Delegated Officer notes the premises is larger than 4 hectares, the WWTP will be more than 100 metres from a drinking water bore and from the Fortescue River, and the depth to groundwater is estimated to be 10 metres below ground surface, all exceeding the minimum requirements of the Government Sewerage Policy (2019).
2. The Delegated Officer notes the Applicant has constructed a secondary treatment system as required by the Government Sewerage Policy (2019), therefore the treatment must meet the limits defined within the Government Sewerage Policy (2019).
3. The Delegated Officer notes the Applicant proposes to discharge treated sewage to land via irrigation, therefore the discharges must meet the limits for nutrient removal specified in the definition as required by the Government Sewerage Policy (2019).
4. The Delegated Officer notes the Applicant has obtained Department of Health approval to operate the WWTP at the full design capacity of 250 m³ per day, with associated operating conditions.

3.4 Country Areas Water Supply Act 1947

The *Country Areas Water Supply Act 1947* (CAWS Act) is used to inform government's land use planning framework in order to protect important surface water and groundwater sources. The application area is classified as a Priority 3 zoned Public Drinking Water Source Protection Area, and is surrounded by a Priority 1 zone.

Water Source Protection Planning Branch within DWER has confirmed the proposed land use of a WWTP is considered compatible with Water Quality Protection Note 25: Land use compatibility tables for public drinking water source areas (2021) with the application of conditions 13, 22, 24 and 28, and that the use of irrigating recycled water for waste management is considered compatible with the application of conditions 23, 25 and 28. Table 3 below details those conditions and the applicability to the premises thereby requiring controls to afford protection to the water sources.

Table 3: Water Quality Protection Note 25 conditions

WQPN 25 Conditions
Condition 13: The department does not support this activity within protection zones (WHPZs and RPZs) unless special circumstances apply.
Condition 22: Where organic materials and/or turbid wastewaters are stored, adequate bunding should prevent the escape of potential contaminants (such as pathogens and nutrients) into the environment, including planning for contingencies such as storms and floods.
Condition 23: A nutrient and irrigation management plan should be prepared. Additional note: The Applicant should ensure the irrigation area is and remains vegetated as this is part of the system. Fertiliser and pesticide use should be limited.
Condition 24: Hydrocarbons, chemicals and other toxic or hazardous substances should be stored so there is no discernible risk of contamination of groundwater or surface water. This should include effective secondary barriers to contain the system, such as double walled tanks and bunding. Restrictions apply for storage tanks. A contingency plan for managing and responding to spills should be in place.
Condition 25: The use of recycled water for irrigating vegetation needs to be in accordance with the Department of Health's <i>Guidelines for the non-potable use of recycled water in Western Australia</i> .
Condition 28: This land use/activity may require assessment under the <i>Environmental Protection Act 1986</i> .

Key Findings:

5. The Delegated Officer notes high priority groundwater and surface water resources are located within the vicinity of the premises which must be protected from potential risks during operation of the proposed WWTP and discharges via subsurface irrigation.
6. The Delegated Officer notes the WWTP needs to be consistently maintained and verified as achieving treatment to AS/NZS 1547:2012 standards.
7. The Delegated Officer notes groundwater sampling of the surficial aquifer is necessary to identify any potential degradation or nutrient impacts once the WWTP becomes operational. The Applicant has installed three monitoring bores at the premises to support this requirement.

3.5 Dangerous Goods (Storage and Handling of Non-explosives) Regulations 2007

Hazardous substances intended to be used in the WWTP include chlorine and sodium hypochlorite. The Applicant has committed to storing these substances in tanks constructed of HDPE and located within bunds. Storage is in accordance with AS 3780-2008 *Storage and Handling of Corrosive Substances*. The Applicant may be required to hold a Dangerous Goods Licence issued by the Department of Mines, Industry Regulation and Safety.

4. Modelling and monitoring data

4.1 Odour management plan

The Applicant has an Odour Management Plan in place to ensure the design, construction and operation of the WWTP manages potential impacts of odour emissions. Possible locations of odour source at the WWTP include the collection systems, in-system pump stations, water tank lids and the screen. Chemical dosing with sodium hypochlorite at the beginning of the treatment process aims to increase the pH of the sewage to above pH 8, reducing the odours emanating from sewage collection systems.

The treatment tanks on site will be also covered in order to prevent fugitive emissions of odorous gases. The covers are designed to minimise odour leakage and ensure negative pressure under the covers during normal operation.

Operational monitoring to determine excessive odour emissions is by onsite trained staff. Operators will be trained to reduce, or temporarily stop, the operations if they are unable to control odour impact to a satisfactory level.

4.2 Noise emissions

The Applicant has prepared a Noise Management Plan that advises noise emissions are not expected to be over the allowed limit. Acoustic boxes will be installed in specific equipment such as the sea containers if needed. Operational monitoring to determine excessive noise emissions is by onsite trained staff.

Noise emissions are reduced by pumps being enclosed inside sea containers and the use of submersible aerators to achieve noise emissions of 50 db. Additionally the WWTP is located away from the accommodation units to minimise impacts.

Key Finding:

8. The Delegated Officer notes there has been no noise modelling conducted to ensure compliance with the *Environmental Protection (Noise) Regulations 2004*.

4.3 Soil sampling and water balance modelling

The Applicant intends to dispose of treated wastewater via subsurface drip irrigation within the garden beds and lawns of the accommodation facility, and around the perimeter of the premises. On site soil testing conducted by the Applicant found soils were consistently sandy topsoil followed by sand, sandy/gravelly clay and calcrete with ferruginous pisolites (Table 4).

Table 4: Summary of Particle Size Distribution and Atterberg Limits

TP	Fill	Topsoil	Alluvium				TC
	Sand with gravels	Sandy gravels	Gravelly clay	Sandy clay	Gravelly clay with sand	Sandy clay with gravel	
	MD-D	D	H	H	VSTF-H	H	
TP02	-	-	0.0-0.3	0.3-0.9	0.9-2.0	-	2.0
TP03	-	0.0-0.1	0.1-0.3	0.3-1.0	1.0-2.0	-	2.0
TP04	0.0-0.9	-	-	-	0.9-2.0	2.0-2.6	2.6

At full capacity accepting up to 250 m³ per day of wastewater and incorporating RO brine into the effluent stream, the maximum volume of blended effluent that could be generated will require up to 42,212 m of irrigation pipeline for disposal. The applicant has installed 67,400 m of pipeline across an available area of 6.74 hectares (Figure 4).

The water balance model has indicated that with the total length of pipeline available for irrigation, it would be able to support the disposal of a total volume of blended effluent up to 400 m³ per day, should the Applicant wish to expand the WWTP in the future.

Pesticides and herbicides are not proposed to be used at the premises.

Nitrogen removal will occur by simultaneous nitrification-denitrification processes, where ammonium will be converted to nitrite and nitrate under aerobic conditions, and nitrate will be converted to nitrogen gas under anaerobic conditions. This will occur in the aerobic tank and the five sequential batch reactor tanks.

Phosphorus removal will occur with the addition of the flocculant poly aluminium chloride in the pipeline leading to the sludge tank to precipitate phosphates.

Key Finding:

- The Delegated Officer notes that the actual area necessary for disposal of the blended effluent stream (42,212 m) is less than the area of available irrigation pipeline (67,400 m).

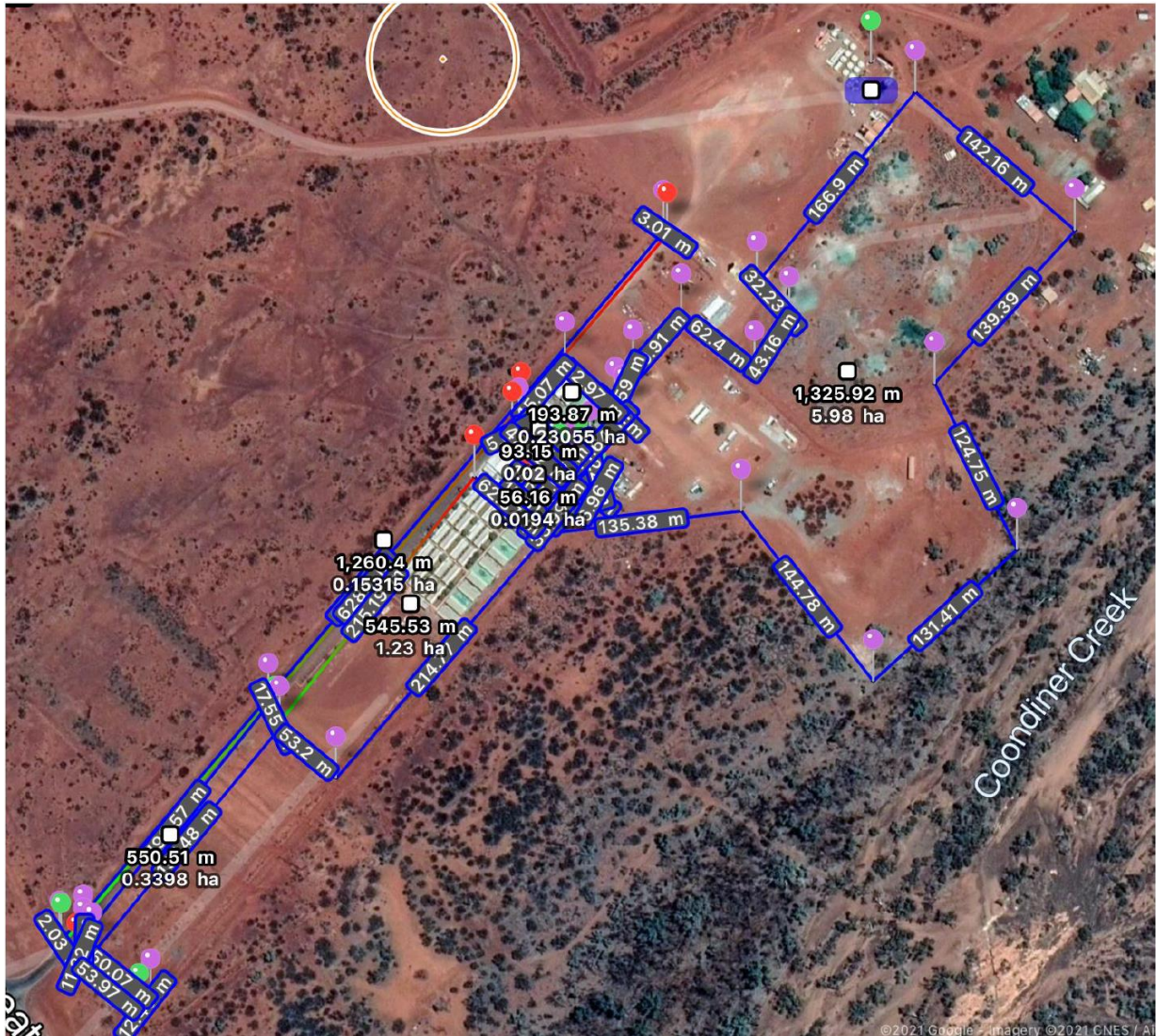


Figure 4: Total available area for disposal of blended effluent

4.4 Monitoring of discharges to land

The WWTP is designed to AS/NZS 1547:2000 to achieve specific processing limits in the treated wastewater output, as specified in Table 5 and consistent with Department of Health limits. The Applicant has committed to conducting ongoing monthly monitoring of the treated wastewater outputs to measure actual water quality against the expected design quality process limits. Turbidity, chlorine and pH will be monitored continuously via online systems. In addition, flow rates will be measured to determine volumetric flow outputs discharged to land.

Where non-compliance with discharge limits occurs, the Applicant has advised modifications will be made to the system within 24 hours for online alterations, 48 hours for onsite emergency alterations and 14 days for major system alterations, plus irrigation will be stopped if needed.

Table 5: Anticipated design process limits for treated wastewater quality

Parameter	Process Limit
pH	6.5 – 8.5
<i>E. Coli</i>	<10 cfu/110 mL
Biochemical Oxygen Demand (BOD)	<20 mg/L
Turbidity	<5 NTU
Total Nitrogen	<10 mg/L
Total Phosphorus	<1 mg/L
Chlorine	0.2 – 2.0 mg/L

Post construction the Applicant conducted commissioning testing of the treated wastewater to ensure the plant was operating effectively. The results are shown in Table 6 with non-compliant parameters shown in red. The Applicant has implemented corrections to the chemical dosing and treatment process during commissioning to meet the limits.

Table 6: Commissioning testing results

Sample date	Sample ID	<i>E. Coli</i>	BOD	TSS	TN	TP	pH (online)	Cl (online)
21-06-2022	900443	1	5	28	28	0.89	8	1.2
05-07-2022	905744	1	5	18	31	4.10	7.8	1.8
21-07-2022	907715	1	5	11	30	7.10	8	0.9
03-08-2022	911452	1	5	32	41	6.50	8.1	1.5
19-12-2022	951702	58	5	5	10	0.27	7.7	1.1
11-01-2023	954869	1	5	23	7.7	1.10	7.9	1.6
19-01-2023	956895	1	5	12	5.6	0.94	8	0.2
30-01-2023	959075/77	1	5	5	8.8	0.58	7.7	0.6
03-02-2023	960414/08	1	5	5	7.5	0.66	8.05	1.9
09-02-2023	962309	1	5	5	11	1.10	8.2	1.6
28-02-2023	967599	1	5	5	5.4	1.30	8.1	1.5
07-03-2023	969605	1	5	10	8	0.65	8.7	1.1
13-03-2023	971339	1	5	6	7.9	0.52	7.8	1.8

The Applicant has conducted nitrogen and phosphorus sampling of underlying soils across the premises, with samples collected from three locations within the irrigation area. Testing was conducted to determine the leachable concentrations of nitrogen and phosphorus (Table 7).

Table 7: Determination of leachable nitrogen and phosphorus in soil samples

Parameter	Sample BH1	Sample BH2	Sample BH3
Total Nitrogen	3.0 mg/L	0.31 mg/L	0.59 mg/L
Total Phosphorus	0.75 mg/L	0.21 mg/L	0.31 mg/L

Key Finding:

10. The Delegated Officer notes the design of the WWTP aims to achieve AS/NZS 1547:2012, consistent with the most recent Australian Standard.
11. The Delegated Officer notes the WWTP is achieving the specific processing limits, which are consistent with the Guidelines for the Non-Potable Uses of Recycled Water in Western Australia (Department of Health 2011).
12. The Delegated Officer notes the analytical suite of parameters proposed for monitoring of discharges to land will provide limited information on treatment quality associated with operational discharges.
13. The Delegated Officer notes when discharges exceed specified limits, the system will be modified to correct this exceedance within various time periods up to 14 days.
14. The Delegated Officer notes that the total phosphorus anticipated process limit from the WWTP, and hence anticipated application rate via irrigation, are comparable to the total phosphorus soil nutrient concentration, outlined within WQPN 22.
15. The Delegated Officer notes that no information has been provided regarding soil nutrient retention capacity, however the nitrogen and phosphorus concentrations within soil samples obtained prior to irrigation will provide a baseline for soil concentrations should any concerns with nutrient loading within soils be raised during operation of the WWTP.

4.5 Monitoring of groundwater

One bore was pre-existing at the premises which is primarily used for the purpose of drinking and human use at the premises after processing through the reverse osmosis plant. The Applicant collected one suite of groundwater samples from this bore, some in January 2021 and the remainder July 2021 to determine existing levels of groundwater parameters at the premises. Table 8 shows the results of that monitoring.

Table 8: Groundwater monitoring results

Parameter	Groundwater levels	Parameter	Groundwater levels	Parameter	Groundwater levels
pH	7.6	Ammonium-Nitrogen (NO _x -N)	3.1 mg/L	Copper	< 0.001 mg/L
<i>E. Coli</i>	< 1 cfu/110 mL	Total Nitrogen	3.1 mg/L	Iron	0.01 mg/L
Turbidity	0.5 NTU	Total Phosphorus	0.17 mg/L	Lead	< 0.001 mg/L
Total Dissolved Solids	580 mg/L	Aluminium	< 0.01 mg/L	Nickel	< 0.001 mg/L
Total Suspended Solids	<5 mg/L	Cadmium	< 0.0001 mg/L	Zinc	0.005 mg/L

The Applicant has installed three additional groundwater monitoring bores (Figure 5) and sampled a full suite of baseline groundwater data for February, March, April and May 2023. The Applicant will conduct an ongoing monthly groundwater monitoring program during operation of the WWTP. Table 9 below shows the groundwater data for February 2023.

Table 9: Groundwater monitoring data February 2023

Parameter	LOR	Unit	Monitoring Bore MW01	Monitoring Bore MW02
Ammonia-N	0.02	mg/L	<0.02	<0.02
Conductivity	10	uS/cm	1300	4100
Nox-N	0.01	mg/L	1.5	24
pH	0.1	pH Units	7.8	7.8
Total Dissolved Solids	5	mg/L	750	2600
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	<0.2
Total Nitrogen	0.2	mg/L	1.5	24
Total Phosphorus	0.01	mg/L	0.85	0.43
Total Suspended Solids	5	mg/L	540	5.0
Turbidity	0.1	NTU	890	3.2
Heavy Metals				
Aluminium	0.05	mg/L	2.9	<0.05
Cadmium	0.0001	mg/L	<0.0001	<0.0001
Copper	0.001	mg/L	0.006	<0.001
Iron	0.01	mg/L	4.4	0.01
Lead	0.001	mg/L	0.002	<0.001
Nickel	0.001	mg/L	0.010	0.002
Zinc	0.005	mg/L	0.019	0.012

Key Finding:

16. The Delegated Officer notes the Applicant's commitment to the requirements of the Works Approval to conduct baseline groundwater monitoring and commitment to an ongoing groundwater monitoring program.



Figure 5: Groundwater monitoring bore locations

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5. 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.

5.1 Receptors

5.1.1 Human 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 10 and Figure 6 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 10: Sensitive human receptors and distance from prescribed activity

Human receptors	Distance from prescribed activity
Residential Premises	<ul style="list-style-type: none">• Neighbouring commercial premises on the adjacent north eastern boundary, with the sensitive premises being located 130 metres from the WWTP location. <p>The Delegated Officer considers that due to the close proximity of this premises there is the potential for impacts to occur, so it is considered as a receptor in this assessment.</p> <ul style="list-style-type: none">• Township of Newman 5.6 km north <p>The Delegated Officer considers that due to distance there is no likely impact upon these residences, so it is not considered further as a receptor within this assessment.</p>

5.1.2 Environmental Receptors

Table 11 and Figure 6 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 11: Sensitive environmental receptors and distance from prescribed activity

Environmental receptors	Distance from prescribed activity
Threatened Fauna	<p>Vulnerable <i>Macrotis lagotis</i> (Bilby) 520m south east</p> <p>Protected under an International Agreement <i>Plegadis falcinellus</i> (Glossy ibis) 520m south.</p>
Groundwater	<p>The premises is located within a Priority 3 Public Drinking Water Source Protection Area with a Priority 1 area immediately surrounding the premises boundary, and within the Newman Water Reserve Proclaimed Groundwater Area.</p> <p>Depth to groundwater in the vicinity of site is likely variable, becoming shallower towards the Fortescue River. Bore logs from installation of bore MW03 at the premises in June 2022 shows the water table at about 8.5 metres below ground level.</p> <p>The Applicant holds a groundwater bore licence (GWL 204041) for 3,000 kL per annum, which is used for potable water supply at the premises. Abstraction from the bore occurs at 77 metres below ground level. This bore is 100m away from any discharge irrigation pipelines. The other nearest registered groundwater bore is 3 km away across the Fortescue River which will act as a hydraulic boundary to water movement through the surficial formations.</p> <p>According to DWER records, no groundwater degradation or nutrient impacts have been reported in the vicinity of the premises. Protection of these groundwater sources is a priority environmental outcome for the Delegated Officer.</p>
Surface water	<p>The proposed WWTP and irrigation field are located 104 m northeast of the Fortescue River. The river flows from the southwest to Ophthalmia dam in the north east, which is the recharge area for the town drinking water bore field. The river is ephemeral and only flows after heavy rainfall events.</p>

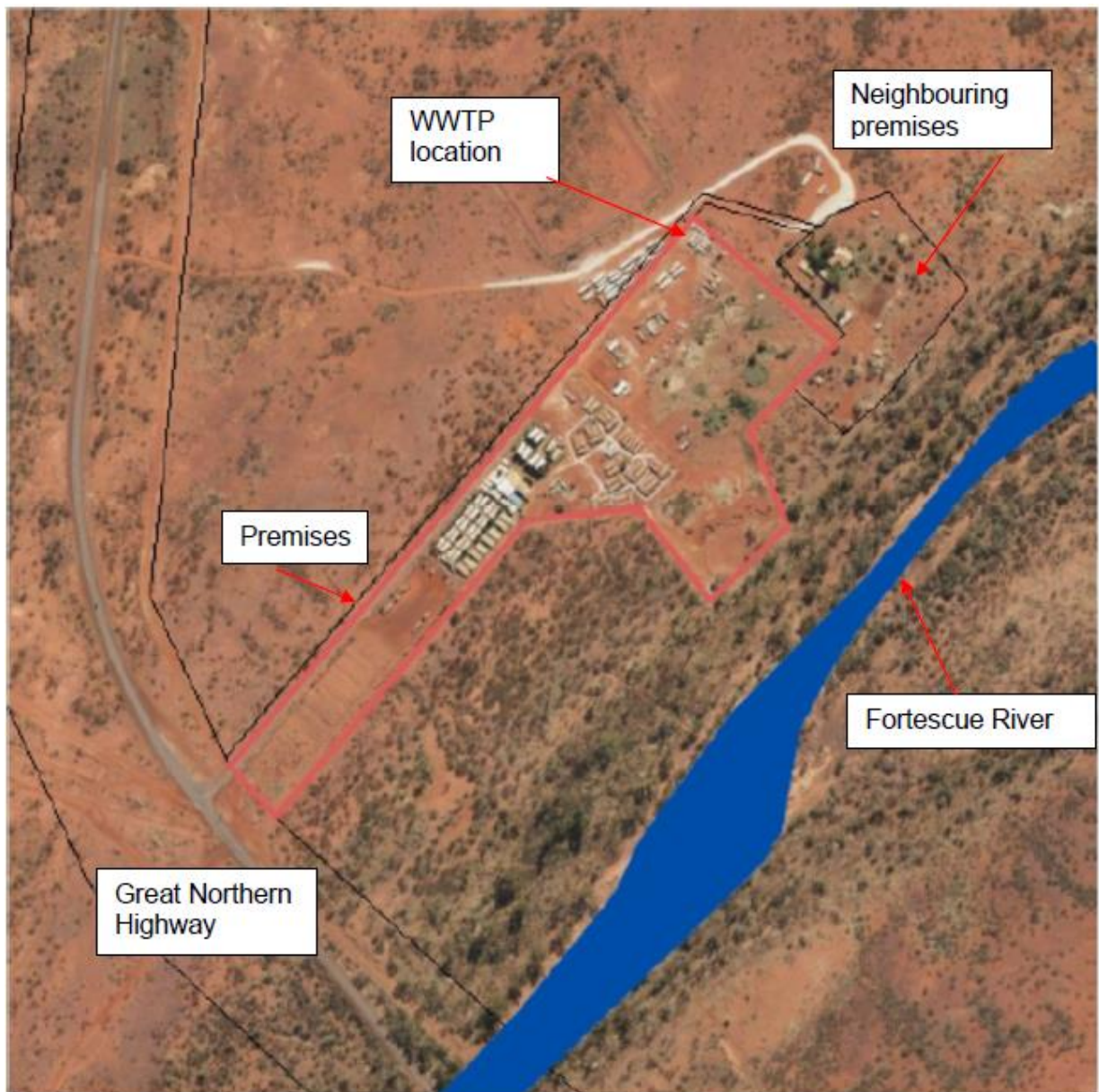


Figure 6: Premises boundary and distance to sensitive receptors

5.2 Pathways

5.2.1 Wind direction and strength

Prevailing wind patterns can provide a direct pathway for transmission of dust and odours by air, so prevailing wind patterns that may carry these emissions to sensitive receptors have been considered in this assessment. The closest Bureau of Meteorology (BoM) weather station which records wind frequency data is Newman Airport (BoM site 007176). Prevailing winds during mornings are on average from the east, north east and south east, and swing variably to the north, north east, east and south east during afternoons (Figure 7). This pathway has been considered in the risk assessment table in section 5.4.

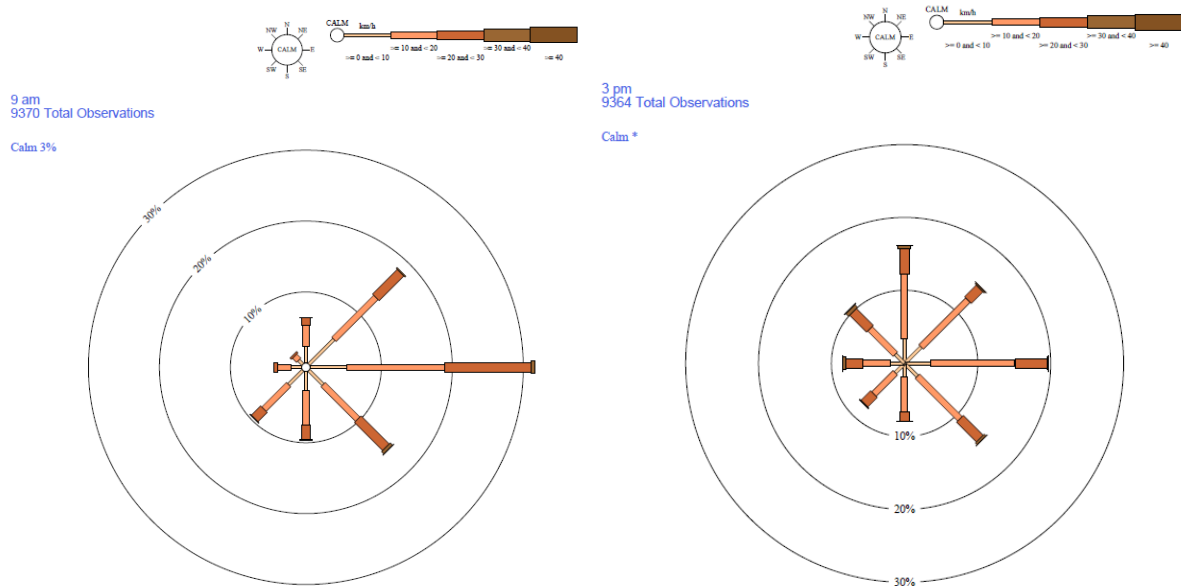


Figure 7: Wind roses for 9 am and 3 pm at Newman Airport (BoM site 007176)

Source: Bureau of Meteorology website www.bom.wa.gov.au

5.2.2 Groundwater movements

Groundwater movement can provide a direct pathway through subsurface seepage into soils for transmission of contaminants. Operation of the WWTP and subsequent irrigation of treated wastewater has the potential to alter the groundwater quality and subsequently impact the beneficial uses of groundwater, be that impacts to public health or the environment. DWER has reviewed the application to identify all high priority water sources located within the vicinity of the premises (Table 11) and what level of risks the operation of the WWTP poses to these resources.

The post drilling static water level for the onsite drinking water bore was measured at 10 metres below ground level and the existing water quality is fresh (~580 mg/LTDS) with a neutral pH (7.6).

Groundwater flow in the shallow surficial aquifer is likely to be towards the Fortescue River to the southeast of the premises and generally mimics the direction of surface water flows. Recharge occurs mostly by leakage from stream beds during runoff. Water quality and quantity is heavily influenced by the quality and quantity of surface water flows.

5.3 Emission sources and applicant 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 12 below. Table 12 also details the control measures the Applicant has proposed to assist in controlling these emissions, where necessary.

Table 12: Proposed applicant controls

Sources	Emission	Potential pathways	Proposed controls
Operation			
Treatment of sewage	Odour	Air / wind dispersion	<ul style="list-style-type: none"> Odour management plan for the addition of sodium hypochlorite to increase the pH of the sewage from pH 7 to pH 8.5.
	Noise		<ul style="list-style-type: none"> Acoustic equipment to be installed if needed.
	Seepage of untreated wastewater	Subsurface seepage	<ul style="list-style-type: none"> The WWTP is enclosed within sealed tanks and sea containers.
	Overtopping of plant	Overland flow	<ul style="list-style-type: none"> WWTP consists of sealed tanks. Tanks have a 'high level' warning once reached to stop further wastewater entering the tank and prevent overtopping. Automatic alarms on pumps to advise of malfunctions.
	Contamination of stormwater	Overland flow Subsurface seepage	<ul style="list-style-type: none"> The Applicant has installed a drainage system to divert stormwater away from the WWTP. The WWTP is enclosed within sealed tanks and sea containers.
	Spills of hydrocarbons and chemicals	Overland flow	<ul style="list-style-type: none"> Flocculants are stored in tanks designed to meet AS 3780.2008 and banded with polyethylene. Fuel for the generator is stored in banded pods.

Sources	Emission	Potential pathways	Proposed controls
Irrigation of treated wastewater and RO brine to gardens	Treated wastewater containing pathogens and nutrients at concentrations not fit for purpose	Direct contact with irrigation water Overland flow and runoff Subsurface seepage	<ul style="list-style-type: none"> • Treatment of wastewater to meet AS/NZS 1547:2000 and specific processing limits • Automatic chlorination system for accurate dosing. • Subsurface irrigation to prevent direct contact with irrigation water. • Buffer of 104m between irrigation pipeline and the Fortescue River. • Signage to warn recycled wastewater is used on lawns and is non potable.

5.4 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 5.1 and 5.2. 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 5.3), 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 13.

Licence L9393/2003/1 that accompanies this decision report authorises emissions associated with the operation of the premises.

The conditions in the issued licence, as outlined in Table 13 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

Table 13: Risk assessment of potential emissions and discharges from the premises during operation

Risk events					Risk rating ¹ C = consequence L = likelihood	Applicant controls sufficient?	Conditions ² of licence	Justification for additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
Operation								
Treatment of sewage	Odour	Air / wind dispersion Impacting amenity	Adjacent neighbouring premises located 130 m from the WWTP	Refer to Section 5.3	C = Minor L = Unlikely Medium Risk	No	Condition 15	<p>Proposed works will increase the current throughput of the WWTP from 70 m³/day up to 250 m³/day. The Odour Management Plan is limited to modification of pH levels only, which will not minimise all odours associated with the full process. The Applicant has not provided any odour modelling data to support the level of odour emissions anticipated. The potential for increased odour emissions from inflow infrastructure and the treatment process is possible.</p> <p>Prevailing winds are strong and generally from an easterly direction which will direct concentrated odours away from the neighbouring premises.</p> <p>The Delegated Officer considers the prevailing winds and a separation distance of 130m sufficient to ensure increased odour emissions will not result in a significant impact upon amenity.</p> <p>To determine if odour emissions are creating an impact upon amenity, the Delegated Officer has included conditions requiring the recording of complaints during operational activities and reporting these to the CEO.</p>

Risk events					Risk rating ¹ C = consequence L = likelihood	Applicant controls sufficient?	Conditions ² of licence	Justification for additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
Treatment of sewage	Noise	Air / wind dispersion Impacting amenity	Adjacent neighbouring premises located 130 m from the WWTP	Refer to Section 5.3	C = Minor L = Unlikely Medium Risk	No	Condition 15	<p>The Applicant has not provided any noise modelling data to support the level of noise emissions anticipated, however Delegated Officer considers the separation distance of 130m sufficient to ensure noise emissions will not result in a significant impact upon amenity.</p> <p>To determine if noise emissions are creating an impact upon amenity, the Delegated Officer has included conditions requiring the recording of complaints during operational activities and reporting these to the CEO.</p> <p>Noise emissions may be subject to the provisions of the <i>Environmental Protection (Noise) Regulations 2004</i>.</p>
	Seepage of untreated and treated wastewater	Subsurface seepage Impacts to the quality of groundwater	P1 and P3 Public Drinking Water Source Area (PDWSA)	Refer to Section 5.3	C = Major L = Unlikely Medium Risk	Yes	Condition 1	<p>The upgraded WWTP consists of sealed tanks, enclosed within sea containers and the floor of the sea containers painted with an impervious epoxy resin to prevent seepage of wastewater out of the WWTP.</p> <p>The Delegated Officer considers the controls proposed by the Applicant are sufficient to prevent an emission occurring under most circumstances.</p> <p>As this risk is mitigated by adequate implementation of these Applicant controls, the Delegated Officer shall enforce these controls via operational and maintenance conditions on the Licence.</p>

Risk events					Risk rating ¹ C = consequence L = likelihood	Applicant controls sufficient?	Conditions ² of licence	Justification for additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
Treatment of sewage	Overtopping of plant	Overland flow Impacts to the Fortescue River	Fortescue River	Refer to Section 5.3	C = Major L = Unlikely Medium Risk	Yes	Condition 1	<p>The upgraded WWTP consists of sealed tanks and has alarms to notify when tanks are nearing full capacity and for malfunctions to prevent overtopping of the WWTP.</p> <p>The Delegated Officer considers the controls proposed by the Applicant are sufficient to prevent an emission occurring under most circumstances.</p> <p>As this risk is mitigated by adequate implementation of these Applicant controls, the Delegated Officer shall enforce these controls via operational and maintenance conditions on the Licence.</p> <p>Any discharges may be subject to the provisions of the <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i>.</p>
	Contamination of stormwater	Overland flow Subsurface seepage Impacts to the Fortescue River and the P1 and P3 PDWSA	Fortescue River P1 and P3 PDWSA	Refer to Section 5.3	C = Moderate L = Unlikely Medium Risk	Yes	Condition 1	<p>The upgraded WWTP consists of sealed tanks, which will prevent stormwater entering the system. Contouring of the premises will ensure overland flow of stormwater is directed away from the WWTP, thereby preventing contamination.</p> <p>The Delegated Officer considers the controls proposed by the Applicant are sufficient to prevent an emission occurring under most circumstances.</p> <p>As this risk is mitigated by adequate implementation of these Applicant controls, the Delegated Officer shall enforce these controls via maintenance conditions on the Licence.</p>

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Risk events					Risk rating ¹ C = consequence L = likelihood	Applicant controls sufficient?	Conditions ² of licence	Justification for additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
Treatment of sewage	Treated wastewater containing pathogens at concentrations not fit for purpose	Direct contact with irrigation water Impacts to human health	Visitors to the accommodation village Adjacent neighbouring premises located 130 m from the WWTP	Refer to Section 5.3	See Section 5.7			
	Treated wastewater containing nutrients at concentrations not fit for purpose	Overland flow and runoff Subsurface seepage Impacts to the Fortescue River and the P1 and P3 PDWSA	Groundwater bore P3 & P1 Newman PDWSA Groundwater bore	Refer to Section 5.3	See Section 5.7			

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.

5.5 Consequence and likelihood of risk events

A risk rating will be determined for risk events in accordance with the risk rating matrix set out in Table 14 below.

Table 14: Risk rating matrix

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

DWER will undertake an assessment of the consequence and likelihood of the Risk Event in accordance with Table 15 below.

Table 15: Risk criteria table

Likelihood		Consequence		
The following criteria has been used to determine the likelihood of the Risk Event occurring.		The following criteria has been used to determine the consequences of a Risk Event occurring:		
		Environment	Public health* and amenity (such as air and water quality, noise, and odour)	
Almost Certain	The risk event is expected to occur in most circumstances	Severe	<ul style="list-style-type: none"> onsite impacts: catastrophic offsite impacts local scale: high level or above offsite impacts wider scale: mid-level or above Mid to long-term or permanent impact to an area of high conservation value or special significance[^] Specific Consequence Criteria (for environment) are significantly exceeded 	<ul style="list-style-type: none"> Loss of life Adverse health effects: high level or ongoing medical treatment Specific Consequence Criteria (for public health) are significantly exceeded Local scale impacts: permanent loss of amenity
Likely	The risk event will probably occur in most circumstances	Major	<ul style="list-style-type: none"> onsite impacts: high level offsite impacts local scale: mid-level offsite impacts wider scale: low level Short-term impact to an area of high conservation value or special significance[^] Specific Consequence Criteria (for environment) are exceeded 	<ul style="list-style-type: none"> Adverse health effects: mid-level or frequent medical treatment Specific Consequence Criteria (for public health) are exceeded Local scale impacts: high level impact to amenity
Possible	The risk event could occur at some time	Moderate	<ul style="list-style-type: none"> onsite impacts: mid-level offsite impacts local scale: low level offsite impacts wider scale: minimal Specific Consequence Criteria (for environment) are at risk of not being met 	<ul style="list-style-type: none"> Adverse health effects: low level or occasional medical treatment Specific Consequence Criteria (for public health) are at risk of not being met Local scale impacts: mid-level impact to amenity
Unlikely	The risk event will probably not occur in most circumstances	Minor	<ul style="list-style-type: none"> onsite impacts: low level offsite impacts local scale: minimal offsite impacts wider scale: not detectable Specific Consequence Criteria (for environment) likely to be met 	<ul style="list-style-type: none"> Specific Consequence Criteria (for public health) are likely to be met Local scale impacts: low level impact to amenity
Rare	The risk event may only occur in exceptional circumstances	Slight	<ul style="list-style-type: none"> onsite impact: minimal Specific Consequence Criteria (for environment) met 	<ul style="list-style-type: none"> Local scale: minimal to amenity Specific Consequence Criteria (for public health) met

[^] Determination of areas of high conservation value or special significance should be informed by the *Guideline: Environmental Siting*.

* In applying public health criteria, DWER may have regard to the Department of Health's *Health Risk Assessment (Scoping) Guidelines*.

"onsite" means within the Prescribed Premises boundary.

5.6 Acceptability and treatment of Risk Event

DWER will determine the acceptability and treatment of Risk Events in accordance with the Risk treatment Table 16 below:

Table 16: Risk treatment table

Rating of Risk Event	Acceptability	Treatment
Extreme	Unacceptable.	Risk Event will not be tolerated. DWER may refuse application.
High	May be acceptable. Subject to multiple regulatory controls.	Risk Event may be tolerated and may be subject to multiple regulatory controls. This may include both outcome-based and management conditions.
Medium	Acceptable, generally subject to regulatory controls.	Risk Event is tolerable and is likely to be subject to some regulatory controls. A preference for outcome-based conditions where practical and appropriate will be applied.
Low	Acceptable, generally not controlled.	Risk Event is acceptable and will generally not be subject to regulatory controls.

5.7 Detailed risk assessment: Irrigation of treated wastewater

5.6.1 Description of risk event

Untreated sewage from the Oasis @ Newman accommodation village is received at the WWTP for treatment, following which treated wastewater will be blended with RO brine and piped to irrigate the gardens and lawns surrounding the accommodation village.

Untreated or incorrectly treated wastewater may contain pathogens (including bacteria, viruses and protozoa), helminths (intestinal worms and worm-like parasites), elevated concentrations of nitrogen and phosphorus as well as metals, metalloids and persistent organic pollutants. During discharge of treated wastewater (source) the release of pathogens and contaminants in elevated concentrations (emission) by direct discharge to land via irrigation (pathway) may cause detrimental impacts to groundwater sources and humans (receptors) suffering public health concerns including gastroenteritis and other diseases (adverse impact).

Wastewater, if treated sufficiently, should contain very low levels of pathogens, helminths and contaminants at levels adequate for the receiving environment to appropriately buffer, thereby preventing or minimising adverse impacts to humans and the environment.

5.6.2 Criteria for assessment

Relevant land and surface water quality criteria include:

- Department of Planning, Lands and Heritage (2019) Government Sewerage Policy.
- Department of Health (2011) Guidelines for Non-Potable Uses of Recycled Water in Western Australia.
- Department of Health (2015) Code of Practice for the Design, Manufacture, Installation and Operation of Aerobic Treatment Units.
- AS/NZS 1547:2012 On-site domestic wastewater management.
- ANZECC & ARMCANZ (2000) – criteria for fresh water
- ANZECC & ARMCANZ (2000) – heavy metals criteria for irrigation use
- Monitoring bore data from bores MB01 and MB02 from February to May 2023.

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5.6.3 Applicant controls

- The WWTP is designed and constructed to treat wastewater to the AS/NZS 1547:2012 standard and to achieve specific processing limits.
- Treated wastewater sent through the irrigation system will be chlorinated and UV treated prior to release to manage concentrations of biological contaminants to levels acceptable for the irrigation scheme.
- Where non-compliance with discharge limits occurs, the Applicant has advised modifications will be made to the system within 24 hours for online alterations, 48 hours for onsite emergency alterations and 14 days for major system alterations, plus irrigation stopped if needed.
- Treated wastewater will be discharged from the irrigation system via subsurface drip pipelines and irrigation rates will be controlled to prevent the generation of surface pooling and runoff, preventing unintentional contact by humans.
- The onsite groundwater extraction bore is 100m away from any irrigation pipelines.
- Signage to be used around the accommodation village advising the irrigation water is not fit for human use or drinking.
- The Department of Health required the Applicant to conduct site-specific soil investigations to determine the actual volume of treated blended effluent that is capable of infiltration at the premises. The outcome is discussed in section 4.3. Subsequently DoH granted the operating licence for the full design capacity of 250 m³ per day on 16 May 2023.

5.6.4 Key findings

The Delegated Officer has reviewed the information regarding discharges of treated wastewater to land via irrigation and has found:

1. The ability to chlorinate and UV treat irrigation water prior to discharging to land will ensure sufficient management of pathogenic contaminants.
2. Discharging treated wastewater via subsurface irrigation pipelines and the prevention of surface pooling and runoff will ensure adequate separation of humans from pathogenic contaminants. Department of Health approval is appropriate for the regulation of public health impacts associated with irrigation of the gardens and lawns surrounding the Oasis @ Newman accommodation village.
3. The Applicant has completed site-specific soil investigations to determine the actual ability of treated wastewater to infiltrate the soils via irrigation and subsequently obtained approval from the Department of Health to operate the plant at the full design capacity of 250 m³ per day which includes limits to discharge water quality parameters.
4. The ability of the WWTP to achieve treatment within the specific processing limits is crucial to ensure discharges to land contain very low levels of pathogens, helminths and contaminants to prevent or minimise adverse impacts to humans and groundwater sources. As required by the works approval, the Applicant has provided:
 - a) certification by an engineer that the WWTP has been designed to achieve AS/NZS 1547:2012 standards;
 - b) certification by an engineer that the WWTP has been constructed in accordance with the design requirements;
 - c) monitoring during commissioning confirms the WWTP is accurately achieving the treatment process limits and nutrient removal limits.

5. The Delegated Officer will require ongoing operational monitoring of discharges from the WWTP to confirm that the WWTP is consistently achieving the treatment process limits and nutrient removal limits.
6. The intention of the Applicant to not correct the treatment system for up to 14 days when discharges exceed specified limits poses a high risk of detrimental impacts to groundwater sources and humans. The intention to cease irrigation, albeit without timeframe indicated, will ensure a minor level of mitigation of risk. The Delegated Officer will require ongoing operational monitoring of discharges from the WWTP on a monthly basis to ensure any exceedances of specified limits are identified timely, discharges are immediately ceased, and the system rectified to return treatment to within acceptable limits.
7. As required by the works approval, the Applicant has installed three groundwater monitoring bores. The Delegated Officer will require regular ongoing monitoring of groundwater to identify any potential degradation or nutrient impacts to groundwater sources during operation of the WWTP.

5.6.5 Consequence

If treated wastewater containing excessive concentrations of pathogens and/or nutrients is released during irrigation of the gardens and lawns surrounding the accommodation village, the Delegated Officer has determined that impacts could result in specific consequence criteria for public health being exceeded, and health effects requiring mid-level or frequent medical treatment. Specific consequence criteria for the environment include high level on-site impacts, mid-level off-site impacts at the local scale. Therefore, the Delegated Officer considers the consequence of the release of pathogens and/or nutrients during irrigation to be **Major**.

5.6.6 Likelihood

The Delegated Officer has determined that with the proposed level of treatment meeting AS/NZS 1547:2012, the use of chlorination and UV treatment methods and adequate separation from the onsite groundwater bore, the likelihood of excessive concentrations of pathogens and/or nutrients being discharged in treated wastewater will probably not occur in most circumstances. Therefore, the Delegated Officer considers the likelihood of pathogens being released during irrigation to be **Unlikely**.

5.6.7 Overall rating

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix and determined that the overall rating for the risk of treated wastewater containing excessive concentrations of pathogens and/or nutrients being released during irrigation of the gardens and lawns surrounding the accommodation village is **Medium**.

5.6.8 Justification for additional regulatory controls

A key control to prevent the discharge of excessive concentrations of pathogens and nutrients is to ensure construction and operation of the WWTP meets the AS/NZS 1547:2012 standards.

The Delegated Officer notes the overall risk of the release of pathogens and contaminants in elevated concentrations is directly related to the effectiveness of the Applicant controls put into place during construction and during ongoing operation. Regulatory controls were included in the Works Approval to ensure adequate construction, installation and commissioning of the WWTP system as designed, which the Applicant has achieved. Regulatory controls will be included in the Licence to ensure ongoing maintenance of the WWTP system occurs for the plant to operate as designed.

The Delegated Officer considers that the Department of Health is the authority responsible for

the regulation of the on-site irrigation of the treated sewage in accordance with relevant Health Legislation. The Delegated Officer will consider the conditions imposed by the DoH when determining appropriate conditions for the licence.

Discharge monitoring that was conducted during commissioning confirms the WWTP is accurately achieving the treatment process limits and nutrient removal limits. Ongoing discharge monitoring will be required to ensure continued operation of the WWTP is achieving these limits.

Regulatory controls were included in the Works Approval to require the construction of three groundwater monitoring bores at the premises. The Applicant has installed one bore up-hydraulic gradient to provide ongoing background parameter data and two bores down-hydraulic gradient to provide comparison data to determine the impact of emissions and discharges upon the health of the groundwater source. Once installed, the Applicant conducted baseline groundwater monitoring, plus will conduct ongoing groundwater monitoring during operation of the WWTP to monitor impacts to groundwater.

The Delegated Officer will require the reporting of all ongoing monitoring data on an annual basis during operation of the WWTP.

6. Consultation

The application was advertised on the department's website on 23 June 2023 and in the West Australian on 26 June 2023. No submissions were received.

The Applicant was provided with the draft Decision Report on 9 October 2023. Comments received from the Applicant on 1 December 2023 have been considered by the Delegated Officer as detailed in Appendix 1.

7. 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 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. Department of Planning, Lands and Heritage 2019, *Government Sewerage Policy*, Perth, Western Australia
5. Department of Health 2015, *Code of Practice for the Design, Manufacture, Installation and Operation of Aerobic Treatment Units*, Perth, Western Australia
6. Department of Health 2011, *Guidelines for the Non-Potable Uses of Recycled Water in Western Australia*, Perth, Western Australia
7. Standards Australia (2012) Australian Standard AS/NZS 1547-2012 On-site domestic wastewater management.

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

Condition	Summary of applicant's comment	Department's response
Decision Report	Provision of acronym definitions PAC: Polyaluminium Chloride PLC: Programmable Logic Controller HMI: Human Machine Interface	Definitions incorporated into section 2.3 of report
	Provision of further information that the brine waste originating from the reverse osmosis plant will be incorporated into the final effluent stream, which will be disposed of via irrigation as a blended effluent.	The clarification to the treatment process will be incorporated throughout the Decision Report and Licence conditions.
Licence	Registered business address to be amended to Australis Capital Management Pty Ltd, as per application package	Registered business address corrected.
Condition 4 Table 2	The Applicant provided clarification that the RO brine is not discharged into the WWTP.	Modification incorporated.
Condition 12 Table 5	The Applicant provided clarification that the RO brine is not discharged into the WWTP.	Modification incorporated.

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:	W6586/2021/1	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 type="checkbox"/> N/A <input checked="" type="checkbox"/>	
		Environmental Compliance Report / Critical Containment Infrastructure Report submitted?		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Date Report received:					
Renewal	<input type="checkbox"/>	Current licence number:			
Amendment to works approval	<input type="checkbox"/>	Current works approval number:			
Amendment to licence	<input type="checkbox"/>	Current licence number:			
		Relevant works approval number:		N/A	<input type="checkbox"/>
Registration	<input type="checkbox"/>	Current works approval number:		None	<input type="checkbox"/>
Date application received		29 May 2023			
Applicant and Premises details					
Applicant name/s (full legal name/s)		Oasis @ Newman Pty Ltd			
Premises name		Oasis @ Newman			
Premises location		44 Great Northern Highway Newman			
Local Government Authority		Shire of East Pilbara			
Application documents					
HPCM file reference number:		DER2023/000353			
Key application documents (additional to application form):		Cover letter Site master plan & WWTP location WWTP site Site Map WWTP Control Shire of East Pilbara Building Permit Department of Health email, permit and cover letter Site Classification Report			

	Wastewater Appraisal Report Construction Compliance certificate As-Built plans Environmental Compliance Report Water Quality Certification ASIC Company Statement Certificate of Title	
Scope of application/assessment		
Summary of proposed activities or changes to existing operations.	Licence Operation of Wastewater Treatment Plant and discharge of treated wastewater via irrigation	
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: premises — (a) on which sewage is treated (excluding septic tanks); or (b) from which treated sewage is discharged onto land or into waters.	250 m ³ per day	N/A
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"/>	
Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Has the proposal been referred and/or assessed under the EPBC Act?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Has the applicant demonstrated occupancy (proof of occupier status)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Certificate of title <input checked="" type="checkbox"/>
Has the applicant obtained all relevant planning approvals?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	Approval: Building permit 5878
Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	No clearing is proposed.
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"/>	No clearing is proposed.
Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Licence/permit No: GWL 20404

<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: Newman Water Reserve Type: Proclaimed Groundwater Area Has Regulatory Services (Water) been consulted? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Regional office: North West</p>
<p>Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?</p>	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>	<p>Name: Newman Water Reserve Priority: P3 Are the proposed activities/ landuse compatible with the PDWSA (refer to <u>WQPN 25</u>)? Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input 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>Health Act</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>	