



Application for Licence

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

| | |
|-----------------------|--|
| Licence Number | L9284/2021/1 |
| Applicant | Water Corporation |
| File Number | DER2020/000693 |
| Premises | <p>Karratha No.3 Wastewater Treatment Plant</p> <p>Legal description - Part of Lot 1935 on Deposited Plan 214092 Certificate of Title Volume LR3014 Folio 191 Reserve 35098 As defined by the coordinates in Schedule 2 of the Licence</p> |
| Date of Report | 01 June 2022 |
| Decision | Licence granted |

**MANAGER WASTE INDUSTRIES
REGULATORY SERVICES**
an officer delegated under section 20 of
the *Environmental Protection Act 1986* (WA)

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1. Decision summary

This Decision Report documents the assessment of potential risks to the environment and public health from emissions and discharges during the operation of the Premises. As a result of this assessment, Licence L9284/2021/1 has been granted.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this Decision Report, the department has considered and given due regard to its Regulatory Framework and relevant policy documents which are available at <https://dwer.wa.gov.au/regulatory-documents>.

2.2 Application summary and overview of Premises

On 23 December 2020, Water Corporation (the Applicant) submitted an application for a licence to the department under section 57 of the *Environmental Protection Act 1986* (EP Act).

The application is to seek a licence relating to sewage treatment at the Karratha No. 3 Wastewater Treatment Plant (WWTP) (the Premises). The Premises is approximately 400 m north and west of the Karratha Industrial Estate and is located on Reserve 35098, Lot 1935 on Deposited Plan 214092.

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 L9284/2021/1. The infrastructure and equipment relating to the premises category and any associated activities which the department has considered in line with the *Guideline: Risk Assessments* (DWER 2020b) are outlined in Licence L9284/2021/1.

2.2.1 Premises operation

The Karratha No. 3 WWTP is designed to treat up to 670 m³/day of sewage sourced from a sewer pressure main entering the Premises on the north-western boundary. Sewage received is from the Karratha light industrial area (located to the south and east of the site) and is treated to a secondary standard. There is no copper or aluminium dosing undertaken as part of treatment operations. Wastewater from the remaining catchment is treated at the Karratha No. 1 WWTP.

The Premises currently operates as a category 85 prescribed premises under registration R1009/1991/1. Inflow has increased to the plant and a newly installed flow meter has shown that sewage inflows have been above the category 54 threshold since at least July 2020. As a result, the Applicant is seeking to licence the Premises as a category 54 prescribed premises.

2.2.2 Premises infrastructure

The facility consists of two primary facultative ponds and two evaporation ponds in parallel. The facultative ponds provide waste stabilisation through a combination of aerobic and anaerobic treatment. The evaporation ponds provide a disposal mechanism for treated wastewater via evaporation and as a result there is no direct discharge to land or water at the Premises.

The Applicant has stated that the primary ponds were constructed in 1984 with a 220 mm thick in-situ clay liner and the evaporation ponds were constructed in 1992 with a 300 mm thick in-situ clay liner. It is understood that the clay used for lining typically has a permeability less than 1×10^{-9} m/s, however current information relating to the pond liners was not provided. The treatment and evaporation pond dimensions are provided in Table 1 and a schematic layout of the Premises is shown in Figure 1 below.

The Applicant considers that rainfall storage on the site is sufficient to contain a 72-hour duration 5% Annual Exceedance Probability (AEP) event. This assumes no evaporation during the rainfall event and all flow being directed to the evaporation ponds. This is equivalent to approximately 269 mm of rainfall over the 72-hour duration. The Applicant considers the evaporation ponds to be oversized for the requirements of the plant and are unlikely to build up any substantial water volume through a normal year, due to the high evaporation rate of the region.

There is no inlet screen at the WWTP, resulting in grit and screenings being manually removed by operators from the surface of the treatment ponds for offsite disposal. The Premises does not contain permanent desludging infrastructure and the Applicant has stated that pond desludging would use either the 'drain and dry' method, or a temporary sludge drying hardstand would be constructed when required. A hardstand is not required when using the 'drain and dry' method as this occurs by taking one pond offline with the sludge left to dry in-situ, prior to mechanical removal.

Table 1: Pond dimensions

| Pond | Length (m at top water level) | Width (m at top water level) | Depth (m) | Surface area (m ²) | Volume (m ³) | Freeboard (m) | Pond base elevation (mAHD) |
|--------------------|-------------------------------|------------------------------|-----------|--------------------------------|--------------------------|---------------|----------------------------|
| Primary Pond 1 | 96 | 42 | 1.31 | 4,047 | 4,584 | 0.40 | 12.19 |
| Primary Pond 2 | 96 | 43 | 1.15 | 4,127 | 4,189 | 0.32 | 12.43 |
| Evaporation Pond 1 | 111 | 59 | 1.2 | 6,556 | 7,137 | 0.60 | 12.10 |
| Evaporation Pond 2 | 111 | 57 | 1.15 | 6,368 | 6,650 | 0.60 | 12.15 |

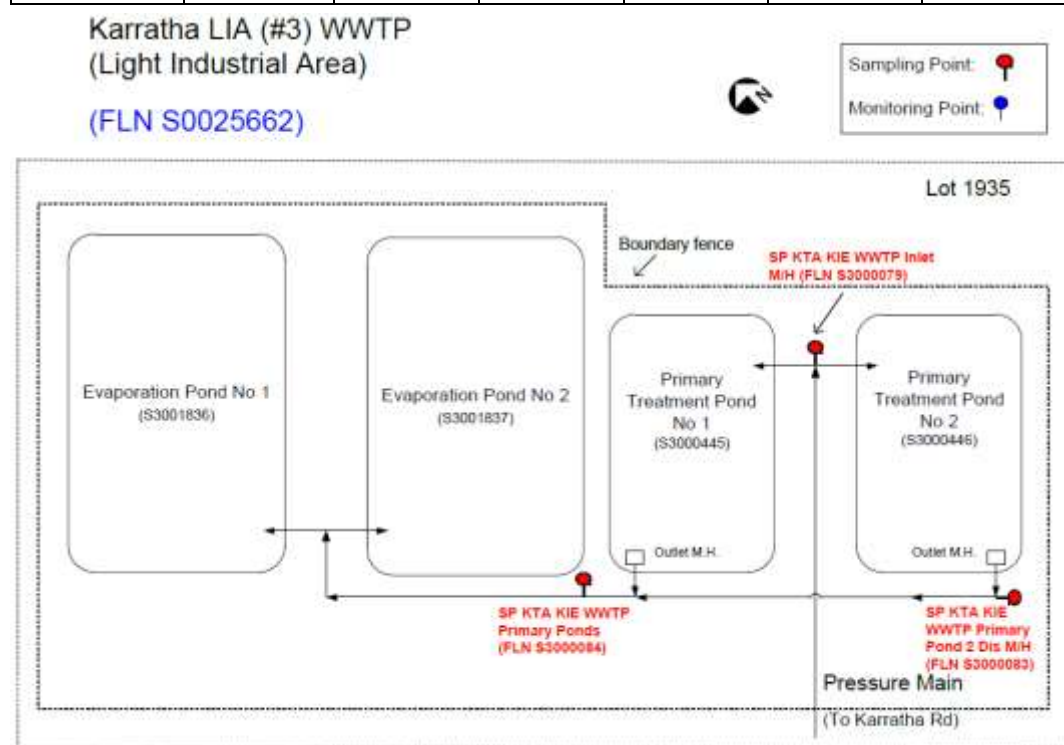


Figure 1: Schematic layout of the Premises

3. Modelling and monitoring data

The Applicant commissioned an Environmental Site Assessment (ESA) (Senversa 2021) to collect information relating to potential receptors and pathways for emissions and discharges at the Premises. The ESA addressed information gaps outlined in a baseline desktop assessment previously conducted by the Applicant in 2020, including installation and sampling of groundwater monitoring bores. Groundwater conditions were also contextualised with information gathered from the Applicant's nearby facility, Karratha No.1 WWTP, located hydraulically upgradient of the Premises.

Two groundwater gauging events were undertaken in October 2020 and May 2021, which corresponds with the post dry season and post wet season respectively. Groundwater sampling was only undertaken during the October event.

3.1 Monitoring of groundwater

The Applicant has installed four groundwater monitoring bores (C/11, D/11, 1D/20 and 2D/20) at locations offsite of the Premises. Bores C/11 and 1D/20 are located hydraulically upgradient to the north of the Premises, with bores D/11 and 2D/20 being located downgradient. The bores were installed with a screen depth suitable for sampling the underlying fractured rock aquifer. Major ion analysis for each of the bores indicated they are likely to be sampling the same aquifer system.

Groundwater was encountered at 5.95 mAHD to 6.15 mAHD (7.15 – 8.99 mbgl) during post dry season monitoring and at 6.09 mAHD to 6.27 mAHD (6.97 – 8.89 mbgl) during post wet season monitoring. Groundwater elevation was observed to increase by approximately 0.15 mAHD between the seasons. The gauging data indicated that a relatively low hydraulic gradient occurs across the Premises, with an east-northeasterly flow direction based on groundwater elevations from the Premises specific bores only. The Applicant's consultant considered the minor elevation differences used for developing the contours were within the margin of error for the bore survey and may not be reliable. Groundwater contours were re-interpolated using gauging data from the Karratha No.1 WWTP (located approximately 580 m north of the Premises), which indicated a south to south-southwesterly flow direction.

3.1.1 Nutrients

Groundwater monitoring conducted during the site investigation (Senversa 2021) found that concentrations of total nitrogen (TN) and total phosphorus (TP) ranged between 3.9 mg/L – 13.6 mg/L and <0.02 – 0.1 mg/L respectively. No obvious trends between upgradient and downgradient concentrations were observed. Nitrogen species in groundwater occurred predominately as nitrate, in comparison to raw sewage and treated wastewater where nitrogen occurs mainly as ammonia. TN, oxidised nitrogen, TP and filterable reactive phosphate were elevated about the default physical and chemical stressor values for tropical Australia (ANZG 2018) in all samples, with the exception of TP in bore D/11. Nitrate and ammonia did not exceed the 95% species protection values for toxicants (ANZG 2018).

3.1.2 Metals

Metals analysis conducted during the site investigation (Senversa 2021) found that concentrations of arsenic, cadmium, iron, lead, manganese, mercury, selenium and zinc were either below method limits of reporting (LOR) or the adopted assessment criteria. 95% species protection values for toxicants in fresh waters (ANZG 2018) and non-potable groundwater use (NPUG) values (DOH 2014) were considered the relevant criteria. No samples were found to exceed the NPUG values and a summary of the remaining findings is as follows:

- Aluminium (Al): Al was detected in bore 02D/20, located downgradient of the Premises, at concentrations slightly above the 95% species protection value.

- Chromium (Cr): Total chromium concentrations were observed at or slightly above the 95% species protection value for CrVI in both upgradient and downgradient bores.
- Cobalt: Concentrations in downgradient bores were elevated above upgradient conditions and exceeding the 95% species protection value.
- Copper: Concentrations were generally comparable between upgradient and downgradient bores, with both exceeding the 95% species protection value.
- Nickel: Concentrations in downgradient bores were elevated above upgradient conditions and exceeding the 95% species protection value.

3.1.3 Pathogens

The site investigation (Senversa 2021) included pathogen monitoring for *Escherichia coli*, with all bores reporting concentrations at or below the method limit of detection of 1 CFU/100mL. *E. coli* was considered the relevant indicator organism for faecal pathogens as groundwater salinity was below 10,000 mg/L.

3.2 Monitoring of surface water

No surface water monitoring was undertaken during the site investigation (Senversa 2021), as the nearest non-perennial watercourses considered as potential receptors were dry during both the post-wet and post-dry season events.

A review of topographical data was undertaken which indicated that the floor of Gwen Creek (400 m south of the Premises) was situated at approximately 12 mAHD. Accounting for the maximum groundwater elevation observed at the Premises of 6.27 mAHD, groundwater levels would need to fluctuate by up to 6 m for discharge to occur. It was considered unlikely that Gwen Creek would be a receptor for groundwater discharge.

The topographical review was further extended to find the lowest point along the groundwater flow path, heading south from the Premises. The lowest point was considered to be an unnamed tributary of Lulu Creek located to the south of Gwen Creek (approximately 1.6 km south of the Premises). The drainage channel had an approximate elevation of 9 mAHD, indicating that groundwater discharge was also unlikely.

3.3 Key findings

The Delegated Officer has reviewed the monitoring data provided by the Applicant and has found:

1. The east-northeasterly groundwater flow observed at the Premises specific bores may be indicative of pond seepage causing groundwater mounding, rather than an effect of the survey margin of error and low hydraulic gradient. The Delegated Officer considers this a potential scenario due to the poor condition and erosion of pond embankments that can be frequently observed in aerials of the Premises. The limited availability of groundwater information is insufficient to support either interpretation.
2. Cobalt and nickel concentrations in groundwater downgradient of the Premises are elevated above upgradient conditions and 95% species protection values for toxicants (ANZG 2018). In the absence of additional temporal monitoring data, this indicates that activities at the Premises may be potentially impacting groundwater.
3. Non-perennial watercourses located hydraulically downgradient from the Premises are unlikely to be receptors for potentially impacted groundwater. The watercourses are situated at a higher elevation than the maximum groundwater level observed at the Premises and groundwater levels would need to rise by approximately 5.5 m for discharge to occur.

4. 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 2020b).

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.

4.1 Source-pathways and receptors

4.1.1 Emissions and controls

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

Table 2: Proposed applicant controls

| Emission | Sources | Potential pathways | Proposed controls |
|--|--|--------------------|--|
| Dust | General operations | Air/windborne | Dust suppression as required. Siting. |
| Noise | | | Compliance with the <i>Environmental Protection (Noise) Regulations 1997</i> . Siting. |
| Contaminated stormwater | | Overland flow | Grading of outer pond embankments to prevent stormwater entry. |
| Disease vectors (e.g mosquitoes) | | Direct exposure | Monthly inspection and removal of vegetation from pond embankments. |
| Odour | Acceptance and treatment of sewage | Air/windborne | Siting. Use of facultative treatment ponds. |
| | Disposal of treated wastewater via evaporation | | |
| | Pond desludging | | |
| Sewage | Acceptance and treatment of sewage | Overland flow | 220 mm thick in-situ clay liner. Monthly inspection of pond embankment integrity. |
| | | Subsurface seepage | |
| Treated wastewater containing contaminants | Disposal of treated wastewater via evaporation | Overland flow | 300 mm thick in-situ clay liner. Quarterly effluent monitoring. Monthly inspection of pond embankment integrity. |

| Emission | Sources | Potential pathways | Proposed controls |
|--|--|--------------------|---|
| (e.g. nutrients, metals, pathogens, persistent organic pollutants) | | Subsurface seepage | |
| Leachate containing contaminants (e.g. nutrients, pathogens, metals, persistent organic pollutants) | Pond desludging Grit and screenings | Overland flow | Sludge will be dewatered and dried on a temporary, bunded hardstand area or in-situ using the 'drain and dry' method. |
| | | Subsurface seepage | Dewatered sludge and grit and screenings to be disposed offsite at an appropriately licensed waste facility. |

4.1.2 Receptors

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

Table 3 and Figure 2 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 Premises (*Guideline: Environmental Siting* (DWER 2020a)).

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

| Receptors | Distance from prescribed activity |
|--|--|
| Human | |
| Nearest sensitive receptor – Temporary accommodation | Approximately 740 m southwest of the Premises boundary |
| Nearest industrial receptors | Approximately 440 m south of the Premises boundary |
| | Approximately 380 m east of the Premises boundary |
| Environmental | |
| Priority 1 Ecological Community – Roebourne Plains gilgai grasslands | Approximately 1.7 km southwest of the Premises boundary. The buffer area of the PEC extends onto the Premises. The PEC has not been considered further as a receptor in the risk assessment due to the distance to the physical location of the PEC. |
| Priority 3 Ecological Community – Horseflat Land System | Approximately 1.7 km southwest of the Premises boundary. The buffer area of the PEC extends onto the Premises. The PEC has not been considered further as a receptor in the risk assessment due to the distance to the physical location of the PEC. |

| Receptors | Distance from prescribed activity |
|---|--|
| Groundwater – Pilbara fractured rock aquifer (unconfined) | <p>Depth to groundwater at the Premises ranges between 6.97 to 8.99 mbgl (5.95 to 6.27 mAHD), based on groundwater sampling conducted by the Applicant. The lowest pond base (Evaporation Pond 1) is situated at 12.10 mAHD, indicating a minimum separation distance between groundwater and pond infrastructure of approximately 6 m at the Premises. Monitoring conducted by the Applicant indicates that the local groundwater flow direction is south towards Gwen Creek, differing from the regional interpretation (Senversa 2021).</p> <p>The water table in the Pilbara fractured rock aquifer is described generally as being within 5 – 10 m of the surface and varying seasonally by 2 – 3 m. Regional groundwater flow is inferred to be north to northeast towards Nickol Bay.</p> <p>There are two licensed groundwater users within 5 km of the Premises, with the nearest being located approximately 2 km south. Both licences are for the non-potable use of groundwater.</p> |
| Minor non-perennial watercourse – Tributaries of Gwen Creek | <p>Approximately 70 m east of the Premises boundary</p> <p>Approximately 105 m southwest of the Premises boundary</p> |
| Non-perennial watercourse – Gwen Creek | <p>Approximately 400 m south of the Premises boundary.</p> <p>The floor of Gwen Creek has an elevation of approximately 12 mAHD and may be unlikely to receive groundwater discharge.</p> |

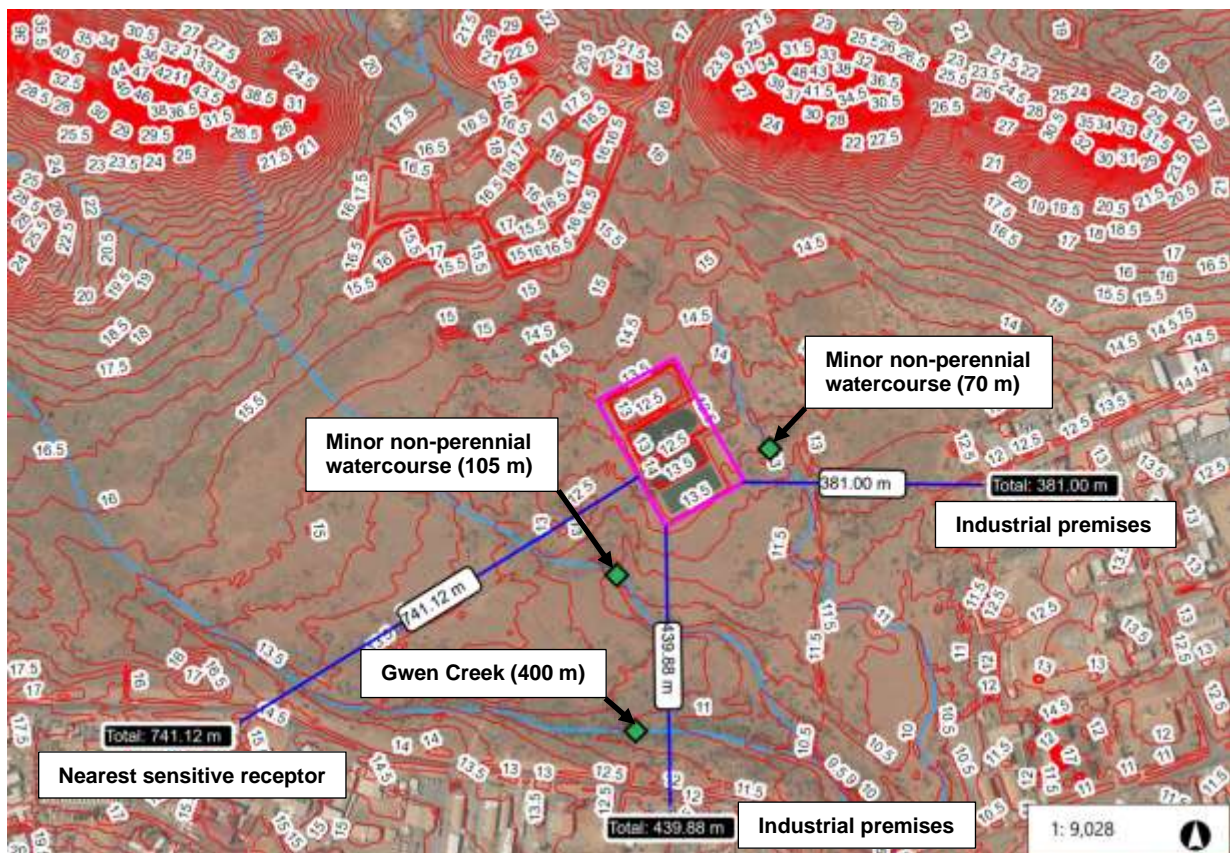



Figure 2: Distance to sensitive receptors. The Premises boundary is shown in pink.

4.1.3 Pathways

Table 4 below provides a summary of the environmental siting and characteristics of potential pathways that are considered relevant to emissions and discharges from the Premises (*Guideline: Risk Assessments* (DWER 2020b)).

Table 4: Pathways and site characteristics at the Premises

| Aspect | Details |
|-------------------|---|
| Geology | <p>The ESA (Senversa 2021) summarised that the Premises was underlain by the following, based on lithological records from groundwater bores B/11, C/11 and D/11:</p> <ul style="list-style-type: none"> 0 - 2 m: Alluvium (brown clay with some quartz). 2 - 16 m: Ultramafic basement: weathered mafic volcanic rocks, with some calcrete cemented weathered horizons. 16 – 30 m: As above, less fractured. <p>This aligns with the regional interpretation that the area comprises silty sand of quaternary age, underlain by mafic and intermediate volcanic and minor metasediments of Archean age (1:50,000 Karratha Geology Sheet (1979)).</p> |
| Surface hydrology | <p>The Premises is situated between two minor non-perennial drainage lines which drain southward towards Gwen Creek. Gwen Creek discharges to Lulu Creek, located east of the Premises, which in-turn discharges to the marine environment.</p> <p>The drainage lines and Gwen Creek are not considered to be in hydraulic connection with groundwater (Senversa 2021).</p> |
| Meteorology | <p>The Pilbara coastal climate is arid-tropical and influenced by both tropical maritime air from the Indian Ocean and continental air from the interior. This results in climate extremes, including severe droughts and major floods at close intervals, with rainfall patterns varying considerably due to the influence of tropical cyclones (Senversa 2021).</p> <p>The nearest Bureau of Meteorology weather station (No. 004083 Karratha Aero) provided the following information:</p> <ul style="list-style-type: none"> The majority of rainfall occurs between January and June with an average annual rainfall of 324.6 mm (1991 to 2020). Prevailing wind directions are predominately east or westerly in the morning and northeasterly or west to north westerly in the afternoon (1993 to 2021). <p>The Queensland SILO climate database provided the following information based on records from 1990 to 2021:</p> <ul style="list-style-type: none"> Annual average pan evaporation is 3220.9 mm with a daily average of 8.61 mm. |
| Topography | <p>Topographic contours indicate that the Premises is relatively flat, with an elevation of approximately 13 mAHD. Regional topography indicates a declining slope from north of the Premises to Gwen Creek in the south (Senversa 2021).</p>  <p>Figure 3: Topographical cross section of the Premises (Senversa 2021)</p> |

4.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020b) for each identified emission source and takes into account potential source-pathway and receptor linkages as identified in Section 4.1. 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 4.1), 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 5.

Licence L9284/2021/1 that accompanies this Decision Report authorises emissions associated with the operation of the Premises i.e. sewage treatment activities.

The conditions in the issued Licence, as outlined in Table 5 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

Table 5: Risk assessment of potential emissions and discharges from the Premises during operation

| Risk Event | | | | | Risk rating ¹ | Applicant controls sufficient? | Conditions ² of licence | Justification for additional regulatory controls |
|--|--|---|--|------------------------|--|--------------------------------|--|--|
| Source/Activities | Potential emission | Potential pathways and impact | Receptors | Applicant controls | C = consequence L = likelihood | | | |
| Operation | | | | | | | | |
| General operations | Noise | Air/windborne pathway causing impact to amenity | Industrial premises (440 m south and 380 m east) | Refer to Section 4.1.1 | C = Slight L = Rare Low Risk | Y | The <i>Environmental Protection (Noise) Regulations 1997</i> apply | N/A |
| | Dust | | Nearest sensitive receptor (740 m southwest) | Refer to Section 4.1.1 | C = Slight L = Rare Low Risk | Y | N/A | N/A |
| | Contaminated stormwater | Overland flow causing impacts to terrestrial and aquatic ecosystems | Tributaries of Gwen Creek (70 m east and 105 m southwest) | Refer to Section 4.1.1 | C = Minor L = Unlikely Medium Risk | Y | 2, 3, 6, 7 | N/A |
| | Disease vectors (e.g mosquitoes) | Direct exposure causing impacts to health and amenity | Industrial premises (440 m south and 380 m east) Nearest sensitive receptor (740 m southwest) | Refer to Section 4.1.1 | C = Major L = Unlikely Medium Risk | Y | 3 – Table 3: Row 1(e) and 2(d) | N/A |
| Acceptance and treatment of sewage | Odour | Air/windborne pathway causing impact to amenity | Industrial premises (440 m south and 380 m east) Nearest sensitive receptor (740 m southwest) | Refer to Section 4.1.1 | C = Minor L = Unlikely Medium Risk | Y | 6, 7 | N/A |
| | Sewage containing contaminants (e.g. nutrients, pathogens, metals, persistent organic pollutants) | Subsurface seepage causing contamination of soil and groundwater | Groundwater (approximately 6 m below pond base) | Refer to Section 4.1.1 | C = Moderate L = Possible Medium Risk | N | 1, 2, 3, 6, 7 10 – Groundwater monitoring | The Delegated Officer notes that the primary ponds were constructed in 1984 and the Applicant was unable to provide direct information pertaining to the current integrity of the in-situ clay liners used in the ponds. The Applicant has provided groundwater monitoring results from four existing groundwater monitoring bores surrounding the Premises. In the absence of additional monitoring data, the results indicate that seepage to groundwater may be occurring at the Premises due to cobalt and nickel concentrations being elevated above upgradient conditions and 95% species protection values for toxicants in groundwater downgradient of the Premises. The Delegated Officer considers that ongoing monitoring of the four existing groundwater bores is required to ensure detection of any sewage seepage to groundwater and potential issues with the integrity of the pond liners. This has been specified within the licence as an additional regulatory control. |
| | | Overland flow causing impacts to terrestrial and aquatic ecosystems | Tributaries of Gwen Creek (70 m east and 105 m southwest) | | C = Moderate L = Unlikely Medium Risk | Y | 1, 2, 3, 6, 7 | N/A |
| Disposal of treated wastewater evaporation | Odour | Air/windborne pathway causing impact to amenity | Industrial premises (440 m south and 380m east) Nearest sensitive receptor (740 m southwest) | Refer to Section 4.1.1 | C = Minor L = Rare Low Risk | Y | 2, 13 | N/A |

| Source/Activities | Risk Event | | | | Risk rating ¹ C = consequence L = likelihood | Applicant controls sufficient? | Conditions ² of licence | Justification for additional regulatory controls |
|--|--|---|--|------------------------|---|--------------------------------|--|--|
| | Potential emission | Potential pathways and impact | Receptors | Applicant controls | | | | |
| Disposal of treated wastewater evaporation (cont.) | Treated wastewater containing contaminants (e.g. nutrients, pathogens, metals, persistent organic pollutants) | Subsurface seepage causing contamination of soil and groundwater | Groundwater (approximately 6 m below pond base) | Refer to Section 4.1.1 | C = Moderate L = Possible Medium Risk | N | 2, 3, 6, 7 <u>4 – Inspection and repair of containment infrastructure</u> <u>10 – Groundwater monitoring</u> <u>15 – Annual summary of inspection and repair to containment infrastructure</u> | <p>The Delegated Officer notes from historical aerals and information provided by the Applicant that due to the climatic conditions of the area and relatively low throughput at the Premises, the evaporation pond liners may be susceptible to erosion and cracking. This is particularly apparent in Evaporation Pond 1 where significant subsidence of the northern pond embankment has occurred at least twice between 2017 and 2020. Erosion and cracking has the potential to reduce the integrity of the containment infrastructure, resulting in seepage of treated wastewater to groundwater.</p> <p>The Applicant has provided groundwater monitoring results from four existing groundwater monitoring bores surrounding the Premises. The results indicate that seepage to groundwater may be occurring at the Premises, due to the elevated presence of metals in downgradient groundwater and the water levels observed in surrounding bores.</p> <p>Seepage of treated wastewater may cause low level off-site impacts at a local scale and could occur at some time, based on the currently available monitoring data and aerial observations.</p> <p>The Delegated Officer considers that ongoing monitoring of the four existing groundwater bores is required, so that trends in nutrient and metal concentrations in groundwater at the Premises can be determined. Additional monitoring events are also required to assist interpretations of the groundwater flow direction at the Premises and whether seepage is occurring. A groundwater monitoring program has been specified within the licence as an additional regulatory control.</p> <p>Due to the substantial erosion observed in aerial imagery of the evaporation ponds, the Delegated Officer considers that additional inspection and reporting requirements are needed. The Applicant will be required to inspect pond embankments for signs of erosion and undertake repairs if necessary. The department will use this information and the results of ongoing groundwater monitoring to determine whether the Applicant will be required to take further action to validate the integrity of the evaporation ponds.</p> |
| | | Overland flow causing impacts to terrestrial and aquatic ecosystems | Tributaries of Gwen Creek (70 m east and 105 m southwest) | | C = Moderate L = Unlikely Medium Risk | Y | 2, 3, 6, 7 | N/A |
| Pond desludging | Odour | Air/windborne pathway causing impact to amenity | Industrial premises (440 m south and 380 m east) Nearest sensitive receptor (740 m southwest) | Refer to Section 4.1.1 | C = Minor L = Unlikely Medium Risk | Y | <u>2 – Table 2: Row 2(c)</u> | Due to the increased potential for odour emissions during desludging works, the Delegated Officer has specified a 14 day CEO notification prior to desludging as an additional regulatory control. The condition aligns with the desludging notification required at the Karratha No.1 WWTP. |
| | Leachate containing contaminants (e.g. nutrients, pathogens, metals) | Subsurface seepage causing contamination of soil and groundwater | Groundwater (approximately 6 m below pond base) | Refer to Section 4.1.1 | C = Moderate L = Unlikely Medium Risk | N | 2, 3, 6, 7 <u>3 – Table 3: Row 3</u> | <p>The Delegated Officer notes that the Applicant's proposed control for leachate emissions during pond desludging includes the use of a temporary bunded hardstand area for sludge dewatering and drying. The permeability of the hardstand was not specified.</p> <p>The Delegated Officer considers that the hardstand and bunding should have a permeability of less than 1×10^{-9} m/s and leachate should be returned to the treatment ponds. This has been specified within the licence as an additional regulatory control.</p> |
| | | Overland flow causing impacts to terrestrial and aquatic ecosystems | Tributaries of Gwen Creek (70 m east and 105 m southwest) | | C = Moderate L = Unlikely Medium Risk | Y | 2, 3, 6, 7 | N/A |

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

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

5. Consultation

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

Table 6: Consultation

| Consultation method | Comments received | Department response |
|---|--|---|
| Application advertised on the department's website (16/04/2021) | None received | N/A |
| Local Government Authority advised of proposal (19/04/2021) | <p>The City of Karratha replied on 24 May 2021 with the below comments.</p> <p>The site is a Local Scheme Reserve - Public Purpose: Waste Disposal and Treatment under the City's Local Planning Scheme No. 8. The Lot is also Reserve 35098 under Management Order to the Minister for Water Resources with the responsible agency being the Water Corporation. The Reserve is for the purpose of 'sewerage treatment works & access thereto'.</p> <p>As a prescribed premises this land use would be defined as 'Industry – Noxious' under the Scheme. The development on the site and this proposal would likely be considered a public work under the Public Works Act and as such, under the <i>Planning and Development Act 2005</i>, this would be exempt from requiring development Approval. The relevant authority for the works/proposal should clarify whether any works or proposals are a Public Work.</p> <p>Further, the Scheme provides an exemption under Schedule A (1) (k) which states:</p> <p>Development approval of the local government is not required for the following works:</p> <p><i>The development of land in a reserve, where such land is held by the local government or a public authority, and where the proposed development is for the purpose for which the land:</i></p> <ul style="list-style-type: none"> (i) is reserved under the Scheme; or (ii) may be lawfully developed by the local government or public authority, unless the land is located in a storm surge risk area identified under clause 6.17. | <p>The Delegated Officer notes that no works are associated with this application, as the Premises is existing and currently operating under a registration.</p> |
| Department of Health (DOH) advised of proposal (19/04/2021) | <p>DOH replied on 17 May 2021 stating that they have no objections to the licensing of the Premises as a category 54 sewage facility, provided that there are no accompanying modifications or upgrades that would require approval by DOH.</p> <p>The subject land is in an area that occasionally experiences problems with nuisance and disease carrying mosquitoes. These mosquitoes can disperse several kilometres from breeding sites under favourable environmental conditions. These mosquitoes are known carriers of Ross River virus, Barmah Forest virus, Kunjin virus and the rare, but potentially fatal Murray Valley Encephalitis. Future workers</p> | <p>The Delegated Officer notes that no works are associated with this application, as the Premises is existing and currently operating under a registration.</p> <p>The Delegated Officer has considered the comments regarding potential mosquito disease vectors when undertaking the Risk Assessment in Section 3.</p> |

| Consultation method | Comments received | Department response |
|--|---|---|
| | <p>and other onsite visitors may be exposed to the virus vector mosquitoes.</p> <p>There is the potential for mosquitoes to breed in on-site infrastructure and constructed water bodies (particularly existing and new sewage ponds), if they are poorly designed or not maintained.</p> <p>It is the recommendation of DOH that:</p> <ul style="list-style-type: none"> • The constructed water bodies (drainage infrastructure, infiltration basins and swales, settling ponds, wetlands, etc.) must be located, designed and maintained (including vegetation management which may require regular monitoring and application of herbicides and/or removal of invasive vegetation) so they do not create or contribute to mosquito breeding; and • Provision of advice and seasonal warnings to protect residents, workers and visitors to the businesses including dissemination of information on: <ul style="list-style-type: none"> ○ Insect screening of accommodation and enclosed workspaces ○ Personal repellents ○ Appropriate clothing to enable people to reduce their exposure to biting insects. | <p>Condition 3: Table 3 - Row 1(e) and 2(d) have been included in the licence which requires the Applicant to reduce potential mosquito breeding habitat by preventing vegetation growing within pond infrastructure.</p> |
| Applicant was provided with draft documents on (8 December 2021) | The Applicant responded on 19 May 2022. Refer to Appendix 1. | Refer to Appendix 1 |

6. Conclusion

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

The Delegated Officer considers that ongoing groundwater monitoring is required at the Premises. The existing information indicates that seepage to groundwater may be potentially occurring, as there were elevated concentrations of cobalt and nickel in groundwater downgradient of the Premises, in comparison to upgradient concentrations during the same monitoring event. Groundwater levels measured in bores considered to be upgradient of the Premises may also be interpreted as occurring due to mounding from pond seepage. As there have only been two gauging events and one sampling event, it is difficult to determine the significance of groundwater results presented in the ESA (Senversa 2021) and ongoing monitoring of groundwater is required to resolve these uncertainties.

Embankment erosion issues, potentially impacting the integrity of the evaporation pond containment infrastructure, have been noted when reviewing historical aerials of the Premises. The Applicant will be required to report on the use and maintenance of the evaporation ponds within each annual period.

The department will use the annual reporting and monitoring information to determine whether further actions are required with regard to the integrity of containment infrastructure at the Premises.

References

1. Australian and New Zealand Governments and Australian state and territory governments (ANZG) 2018, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, Canberra, Australian Capital Territory. Available at www.waterquality.gov.au/anz-guidelines.
2. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
3. Department of Health (DOH) 2014, *Contaminated Sites Ground and Surface Water Chemical Screening Guidelines*, Perth, Western Australia.
4. Department of Water and Environmental Regulation (DWER) 2020a, *Guideline: Environmental Siting*, Perth, Western Australia.
5. DWER 2020b, *Guideline: Risk Assessments*, Perth, Western Australia.
6. Senversa 2021, *Environmental Site Assessment: Karratha 3 Wastewater Treatment Plant, Karratha, WA*, Unpublished report.

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

| Condition | Summary of applicant's comment | Department's response |
|--|--|---|
| 1(a) Waste acceptance | The Applicant stated that acceptance via waste tanker was not required in the acceptance specifications for sewage. | The specification has been removed. |
| 3 – Table 3 Infrastructure requirements | <p>The Applicant requested that the operational freeboard height for all ponds be changed to 300 mm.</p> <p>The Applicant stated that the previous freeboard heights supplied with a request for information were outdated and did not reflect how the ponds were operated following construction.</p> | The minimum freeboard heights for the two primary ponds and two evaporation ponds have been changed to 300 mm. Previously supplied information indicates that no overtopping or overflow events have resulted from the ponds being operated at a 300 mm minimum freeboard level. |
| 4(b) Inspection and repairs to containment infrastructure | <p>The Applicant requested that the condition requiring the repairs of erosion, cracking or subsidence in the containment infrastructure be changed from <i>within one month of identification</i> to <i>as soon as practicable</i>.</p> <p>This is due to there being varying degrees of erosion, cracking or subsidence that is able to occur to the ponds. Some may be minor and not result in potential containment loss while other occurrences may be more severe. Identified deficiencies are logged within a register for action, however the schedule for when repairs will occur is dependent on the severity of the issue and availabilities.</p> | <p>It is recognised that the initial condition wording may be too broad in its potential application. However, the department's position is to avoid the use of terms such as <i>as soon as practicable</i> due to their subjective interpretation and difficulty with enforcement.</p> <p>The intent of the requirement is to ensure that repairs are undertaken in a timely manner that prevents the loss of containment from the relevant infrastructure.</p> <p>The Delegated Officer has resolved to change the wording to:</p> <p><i>where erosion, cracking or subsidence of pond embankments is identified, undertake repairs to the containment infrastructure to prevent containment loss from that infrastructure</i></p> <p>The above wording is considered to be clear and precise on the outcome that must be achieved and worded so that the requirement for compliance is clear, being that repairs must be undertaken before containment loss occurs.</p> <p>On review, it was identified that Condition 5(c) also uses the <i>as soon as practicable</i> term. This has been modified to now read as:</p> <p><i>undertake monthly inspections of all security measures and repair any damage to ensure unauthorised access is prevented</i></p> |

| Condition | Summary of applicant's comment | Department's response |
|--|---|--|
| 9 – Table 5 Effluent monitoring | The Applicant confirmed that copper and aluminium dosing does not occur at the premises. | The requirement to monitor final effluent for total copper and aluminium concentrations has been removed from the list of parameters in Table 5. The requirement to monitor ambient groundwater quality (Condition 10 – Table 6) for dissolved copper and aluminium has been removed from the list of parameters in Table 6. |
| 9 – Table 5 Monitoring of volumes discharged to evaporation ponds | The Applicant commented that the cumulative volumetric flow rate to the evaporation ponds cannot be monitored as there is no flow meter for this discharge point. | The requirement to monitor the cumulative volumetric flow of treated wastewater discharged to the evaporation ponds has been removed. Due to the relatively low capacity of the WWTP, the Delegated Officer considers that the recording of sewage inflows required by Condition 8 – Table 4 is sufficient as an estimate of volumes discharged to the evaporation ponds. It is recognised that the actual discharge volumes will be lower due to evaporation from the primary ponds. |
| 14 Annual Audit Compliance Report | The Applicant requested that the report submission date be changed from <i>1 September</i> to <i>1 October</i> . | The submission date has been changed. |
| 15 Annual Environmental Report (AER) | The Applicant requested that the report submission date be changed from <i>1 September</i> to <i>1 October</i> . | The submission date has been changed. |
| 15 – Table 7 AER requirements | The Applicant requested the removal of requirement (a), relating to the reporting of treated wastewater volumes discharged to the evaporation ponds. This was due to the same reasons listed above for Condition 9. | The requirement has been removed. |
| 17 | The Applicant noted a condition number reference error. | The error has been corrected. The correct condition reference was Condition 16. |

Appendix 2: Application validation summary

| SECTION 1: APPLICATION SUMMARY (as updated from validation checklist) | | | | | |
|---|-------------------------------------|---|--|------|--|
| Application type | | | | | |
| Works approval | <input type="checkbox"/> | | | | |
| Licence | <input checked="" type="checkbox"/> | Relevant works approval number: | | None | <input checked="" type="checkbox"/> Registration to licence |
| | | Has the works approval been complied with? | | | Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" 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 type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" 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 | | 23/12/2020 | | | |
| Applicant and Premises details | | | | | |
| Applicant name/s (full legal name/s) | | Water Corporation | | | |
| Premises name | | Karratha No.3 Wastewater Treatment Plant | | | |
| Premises location | | Lot 1935 on Deposited Plan 214092. Reserve 35098 | | | |
| Local Government Authority | | City of Karratha | | | |
| Application documents | | | | | |
| HPCM file reference number: | | DWERDT396595 | | | |
| Key application documents (additional to application form): | | Supporting Information document 1 st RFI Response (DWERDT429840) 2 nd RFI Response (A2044261) | | | |
| Scope of application/assessment | | | | | |

| | | |
|--|---|---|
| Summary of proposed activities or changes to existing operations. | <p><i>New Licence – Category 54</i></p> <p>Operation of an up to 670 m³/day wastewater treatment plant. The plant uses a pond system comprised of two in-situ clay lined primary ponds and two in-situ clay lined evaporation ponds. The premises does not have a discharge to land or water. The WWTP services the Karratha Industrial Estate.</p> <p>The WWTP is currently registered under instrument R1009/1991/1. Inflow has increased to the plant and a newly installed flow meter has shown that sewage inflows have been above the Category 54 threshold since at least July 2020 (131 kL/day).</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 54: Sewage facility | Max – 670 m ³ /day Actual – 140 m ³ /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"/> | Referral decision No: Managed under Part V <input type="checkbox"/> Assessed under Part IV <input type="checkbox"/> |
| Does the applicant hold any existing Part IV Ministerial Statements relevant to the application? | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | Ministerial statement No: EPA Report No: |
| Has the proposal been referred and/or assessed under the EPBC Act? | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | Reference No: |
| 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"/> General lease <input type="checkbox"/> Expiry: Mining lease / tenement <input 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? Exempt due to public purpose |
| 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 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"/> | Application reference No: N/A Licence/permit No: N/A 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 type="checkbox"/> No <input checked="" type="checkbox"/> | Application reference No: Licence/permit No: Licence / permit not required. |
| Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)? | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | Name: N/A Type: N/A Has Regulatory Services (Water) been consulted? Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Regional office: North West |
| Is the Premises situated in a Public Drinking Water Source Area (PDWSA)? | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | Name: N/A Priority: N/A Are the proposed activities/ landuse compatible with the PDWSA (refer to WQPN 25)? Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/> |
| Is the Premises subject to any other Acts or subsidiary regulations (e.g. <i>Dangerous Goods Safety Act 2004</i> , <i>Environmental Protection (Controlled Waste) Regulations 2004</i> , <i>State Agreement Act xxxx</i>) | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | Application advises that no chemical storage occurs on the premises. |
| Is the Premises within an Environmental Protection Policy (EPP) Area? | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | |
| Is the Premises subject to any EPP requirements? | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | |
| Is the Premises a known or suspected contaminated site under the <i>Contaminated Sites Act 2003</i> ? | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | Classification: N/A Date of classification: N/A |