



Application for Works Approval

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

Works Approval Number	W6491/2021/1
Applicant	Eagle Bay Brewing Co. Pty Ltd
ACN	124 209 794
File number	DER2020/000672
Premises	Eagle Bay Brewing Co. 236 Eagle Bay Road NATURALISTE WA 6394 Legal description – Lots 150 and 151 on Plan 412213
Date of report	29 July 2021
Proposed Decision	Works approval granted

Decision summary

This decision report documents the assessment of potential risks to the environment and public health from emissions and discharges during the construction and operation of the proposed new brewery wastewater treatment plant (WWTP) at the premises. As a result of this assessment, works approval W6491/2021/1 has been granted.

In completing the assessment documented in this 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>.

Scope of assessment

1.1 Application summary

On 21 December 2021, Eagle Bay Brewery Co Pty Ltd (the applicant) submitted an application under section 54 of the *Environmental Protection Act 1986* (EP Act) to install a WWTP at their existing beer and cider brewery operation, located approximately 4 km northwest of Dunsborough.

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 works approval W6491/2021/1.

Since opening the brewery in 2010, the production capacity has increased; however, the wastewater treatment infrastructure has remained unchanged. The existing wastewater treatment system is basic comprising only of primary level treatment with aeration, manual pH balancing (with sodium hydroxide). Disposal of wastewater is currently to a sub-soil leach drain system, with irrigation, to a 1.3 ha area currently being assessed under an application for a licence.

The proposed WWTP has been designed to treat an average volume of 6.6 kL/day of wastewater, with a maximum peak of 10 kL/day to allow for future expansion. The WWTP will incorporate anaerobic and aerobic treatment, along with flocculation. It will consist of three 50 kL tanks (anaerobic, aeration, and sequential batch reactor (SBR)) each with a submersible vortex pump so that wastewater can be pumped from one tank to the next, and to the irrigation area (see Figure 1). Poly aluminium chloride will be stored in a 200 L tank for flocculant dosing of the wastewater as it enters the anaerobic tank.

Sludge settled at the bottom of the tanks will be sent back to the anaerobic tank as an activated sludge, or removed from the premises to a licensed waste disposal site. Treated wastewater will be irrigated to a 1.3 ha area on the premises (assessed under licence L9275 – see section 1.2).

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 works approval W6491/2021/1.

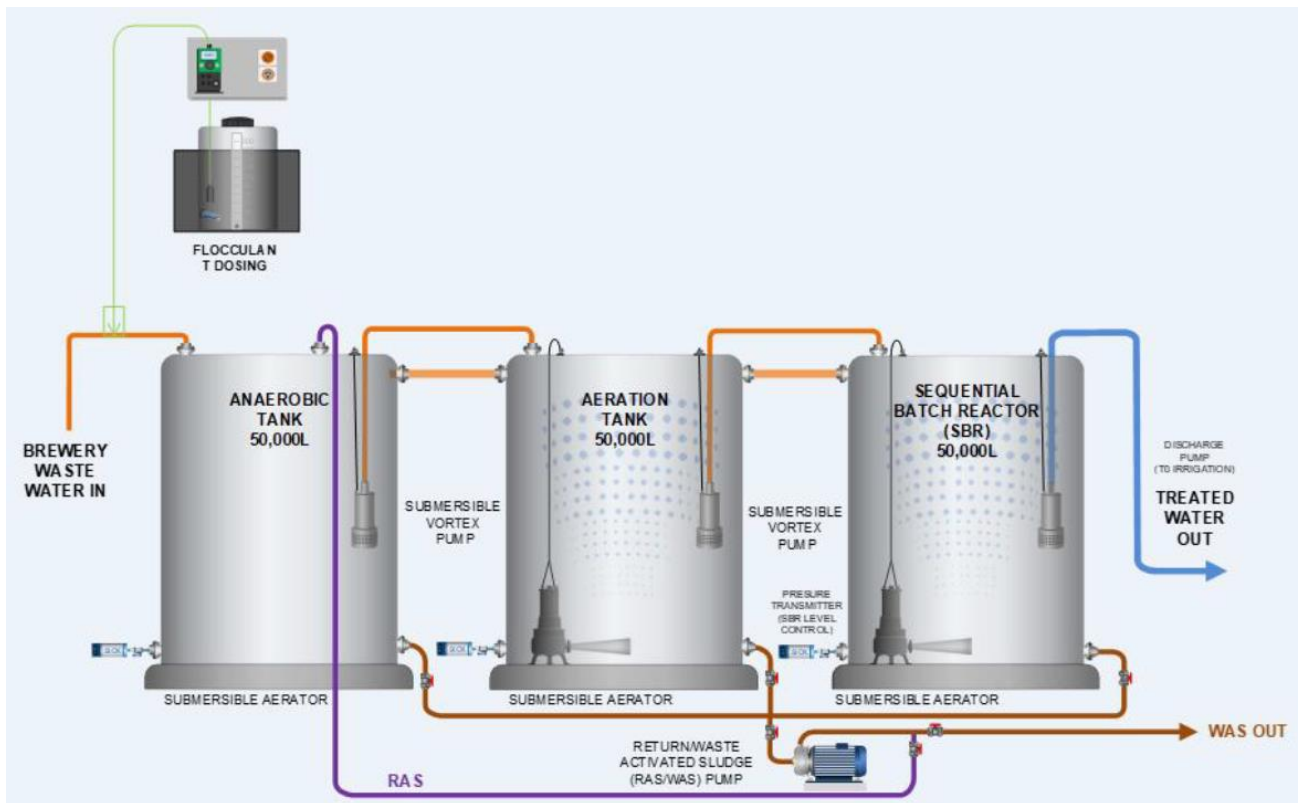


Figure 1: Proposed WWTP process diagram

1.1.1 Expected treated wastewater quality

The applicant has provided the expected treated wastewater quality once the proposed WWTP is operational (Table 1). Total nitrogen (TN) and total phosphorus (TP) are expected to meet the ANZECC 2000 guidelines, with biochemical oxygen demand (BOD) expected to be higher than the guidelines. It is noted that Water Quality Protection Note (WQPN) 22 *Irrigation with nutrient rich wastewater* recommends that for wastewater with BOD concentrations exceeding 150 mg/L, effective chemical or biological stabilization methods should be used prior to irrigation.

Table 1: Expected and existing wastewater quality

Parameter	TN (mg/L)	TP (mg/L)	BOD (mg/L)	TSS (mg/L)	TDS (mg/L)	SAR ⁷
Expected wastewater quality (from application) ¹	25	2.5	50	-	-	-
Existing treated wastewater quality ²	63.9	27.6	2,480	601	1,900	-
	61.4	28.4	2,350	206	1,500	-
	67.1	32.8	956	612	1,590	22.0
	50.3	34.6	2,460	207	1,630	14.5
Typical range of raw brewery wastewater ³	25 – 80	10 – 50	1,200 – 3,600	200 – 1,000	-	-
Typical effluent quality following nutrient removal ⁴	10 – 20	<2	5 – 20	5 – 20	-	-
ANZECC 2000 – Primary Industries ⁵	25 – 125 ⁶	0.8 – 12 ⁶	<15	<40	3,000	<8

¹ Following installation and operation of the proposed WWTP.

² Samples taken from evaporation pond in June and October 2019

³ Kebede, T.B. 2018. *Wastewater treatment in brewery industry, review*. International Journal of Engineering Development and Research. Available at <https://www.ijedr.org/papers/IJEDR1801124.pdf>

- ⁴ Treatment process category D from Appendix 6 of ARMCANZ and ANZECC 1997. *National Water Quality Management Strategy – Australian Guidelines for Sewerage Systems – Effluent Management*. Commonwealth of Australia.
- ⁵ National Water Quality Management Strategy Paper No. 4 – Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Volume 3 Primary Industries, 2000, ANZECC and ARMCANZ (ANZECC 2000).
- ⁶ ANZECC 2000, requires site specific assessment to determine actual value.
- ⁷ SAR means sodium absorption ratio

1.2 Exclusions to the assessment

The irrigation of treated wastewater has been assessed under licence L9275/2020/1 and has not been reassessed under this works approval. Following installation of the proposed WWTP, the disposal of wastewater to land may be reassessed as part of the subsequent licence amendment for the continued operation of the WWTP.

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.

1.3 Source-pathways and receptors

1.3.1 Emissions and controls

The key emissions and associated actual or likely pathway during construction and operation of the proposed WWTP which have been considered in this decision report are detailed in Table 2 below. Table 2 also details the proposed 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 (from application)
Construction			
Dust	Installation of the proposed WWTP, including machinery and vehicle movements	Air / windborne pathway	No applicant controls proposed.
Noise			
Operation			
Odour	High BOD and nutrient wastewater contained within the WWTP	Air / windborne pathway	WWTP tanks are enclosed. Aeration tank has been sized to accommodate the requisite volume required to treat the incoming organic and nutrient load (TN, TP, BOD ₅). Submersible aerators supply high volume of oxygen for the biological process and facilitate recirculation of the wastewater within the aeration tank.
Wastewater with elevated nutrient, salts (TDS) and	Storage and treatment of wastewater from the	Direct discharge to land, infiltration to groundwater, runoff to surface water	Three, 50 kL enclosed fiberglass tanks with high level sensors. Tanks located on a gravel hardstand.

Emission	Sources	Potential pathways	Proposed controls (from application)
BOD concentrations	brewery including spillages, overtopping of tanks management of solids generated during treatment of wastewater.		<p>WWTP designed to treat an average of 6.6 kL/day, with a maximum peak of 10 kL/day.</p> <p>WWTP designed to achieve an expected wastewater quality of: 25 mg/L of TN, 2.5 mg/L of TP and 50 mg/L of BOD.</p> <p>Submersible aerators supply high volume of oxygen for the biological process and facilitate recirculation of the wastewater within the aeration and sequential batch reactor tanks.</p> <p>Alarms to alert applicant if pumps are blocked.</p> <p>Alarms to alert applicant if aeration blocked or electrical issue with the blower.</p> <p>Alarm to activate in the event of a power failure.</p> <p>All alarms in the system are recorded in a PLC system and activate a flashing light on top of the tanks.</p> <p>Sludge to be returned to the top of the anaerobic tank as activated sludge or removed from the process to an approved disposal site.</p> <p>Water sampling every 6 months or as required to determine overall performance of the WWTP.</p>
Flocculant (poly aluminium chloride)	Storage of flocculant including spillages and overtopping of tanks.	Direct discharge to land, infiltration to groundwater, contamination of stormwater and runoff to surface water	<p>Flocculant contained within a 200 L enclosed tank.</p> <p>Alarm to warn of low levels in the tank.</p> <p>Tank located on a gravel hardstand.</p>

1.3.2 Receptors

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

Table 3 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)).

The premises is zoned within agricultural and rural land on the eastern slopes of Cape Naturaliste, with the surrounding area comprising of conservation estate and interspersed rural lifestyle developments.

Table 3: Sensitive human and environmental receptors

Human receptors	Distance from proposed WWTP and irrigation area
Closest residential receptor – single rural residential property	850 m and 1.3 km W of irrigation area and proposed WWTP respectively.
Eagle Bay residential area	1.1 km and 1.2 km NNE of proposed WWTP and irrigation area respectively.
Dunsborough North rural residential area	1.2 km and 1.3 km SSE of proposed WWTP and irrigation area respectively.

Environmental receptors	Distance from proposed WWTP and irrigation area
Surface water	<p>The premises is within the Cape to Cape North Surface Water Area, proclaimed under the <i>Rights in Water and Irrigation Act 1914</i> (RIWI Act).</p> <p>The Jingarmup Brook is one of five waterways that are classified as intervention waterways within the <i>Vasse Wonnerup Wetlands and Geographe Bay – Water Quality Improvement Plan</i> (Geographe WQIP). Intervention waterways are classified as having winter median nutrient (nitrogen) values below the Geographe WQIP trigger values, therefore, the department’s objective for the Jingarmup Brook is to improve the water quality (to reduce nitrogen criteria levels in the documents) within the Jingarmup Brook.</p> <p>Tributaries of Jingarmup Brook (winter only) are 230 m N and 450 m S of the proposed WWTP; and 280 m NE and 300 m NW of the irrigation area.</p> <p>Jingarmup Brook (non-perennial minor river) is 940 m and 1.4 km W of irrigation area and proposed WWTP respectively.</p> <p>Closest licence to take surface water is 500 m S of irrigation area.</p>
Groundwater	<p>The premises is within the Busselton-Capel Groundwater Area proclaimed under the RIWI Act.</p> <p>Aquifer potential of the Leeuwin block is limited to the saprolitic zone (weathered interval between the granite and the overlying clay) and perched water between clay and any overlying sand interval.</p> <p>Maximum depth to groundwater at the WWTP proposed location (based on standing water level measurements at 4 bores located within irrigation area on 22 July 2020 and statewide topographical contours) is estimated to be approximately 3 to 4 mbgl.</p>

1.4 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 1.3. 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 1.3), 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 works approval as regulatory controls.

Additional regulatory controls may be imposed where the applicant's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 4.

Works approval W6491/2021/1 that accompanies this decision report authorises construction and time-limited operations. The conditions in the issued works approval, as outlined in Table 4 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

Table 4: Risk assessment of potential emissions and discharges from the premises during construction and operation

Risk events				Risk rating ¹ C = consequence L = likelihood	Reasoning	Regulatory controls (refer to conditions of instrument)
Sources / activities	Potential emission	Potential receptors, pathway and impact	Applicant controls			
Installation of WWTP						
Installation of proposed WWTP including machinery and vehicle movements.	Fugitive dust	Air / windborne pathway causing impacts to health and amenity. Closest residential receptor located approximately 1.3 km W of proposed WWTP.	Refer to section 1.3.1.	C – Slight : minimal impacts to amenity at a local scale. L – Unlikely : the risk event will probably not occur in most circumstances. Low Risk Acceptable, generally not subject to regulatory controls.	The delegated officer considers that the separation distance from the proposed location of the WWTP to the closest receptor is sufficiently large for there to be no adverse impact from noise or dust emissions from the installation of the WWTP. Additionally, installation is expected to be of short duration. The Environmental Protection (Noise) Regulations 1997 apply to noise emissions.	N/A
	Noise					
Operation of WWTP						
Treatment of brewery wastewater at WWTP	Odour from wastewater high in nutrients and BOD.	Air / windborne pathway causing impacts to health and amenity. Closest residential receptor located approximately 1.3 km W of proposed WWTP.	Refer to section 1.3.1.	C – Minor : low level impact to amenity at a local scale. L – Rare : the risk event may only occur in exceptional circumstances. Low Risk Acceptable, generally not subject to regulatory controls.	Due to the nature of brewery wastewater, there is an inherent risk of odour causing impacts to off-site receptors. Given the applicant controls and the distance to off-site receptors, the delegated officer does not reasonably foresee off-site receptors being impacted by odour from operation of the WWTP.	Applicant controls conditioned. No additional regulatory controls.
	Storage and treatment of wastewater from the brewery in tanks including spillages, overtopping of tanks management of solids generated during treatment of wastewater.	Overland runoff and/or infiltration causing contamination of shallow groundwater or surface water. Surface water (tributaries of Jingarmup Brook) are located 230 m N and 450 m S of proposed WWTP. Depth to groundwater is approximately 3 to 4 m.	Refer to section 1.3.1.	C = Minor : low level onsite impacts. L = Unlikely : the risk event will probably not occur in most circumstances. Medium Risk Acceptable, generally subject to regulatory controls.	The delegated officer determined that the applicant's proposed controls were generally reasonable and appropriate. Applicant controls have been conditioned in the licence. To confirm that the installed WWTP achieves the wastewater quality expected by the applicant (see section 1.1.1), the delegated officer will require wastewater quality monitoring for wastewater entering and exiting the installed WWTP during time limited operations.	Applicant controls conditioned (conditions 1 and 7). Conditions 2 to 4, 12 and 13 – compliance reporting. Conditions 8 to 11 – monitoring during time limited operations.

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

Decision

The delegated officer has determined, subject to regulatory controls outlined in Table 4, that the construction and operation of the new wastewater treatment plant does not present an unacceptable risk of impacts to human health, amenity or the environment.

The applicant's proposed wastewater containment and treatment infrastructure (tanks) design controls will be conditioned in the works approval to manage the risk associated with the release of wastewater with elevated nutrient, salt and BOD content to ground and flocculant storage. These controls include the installation of enclosed tanks on a hardstand area that are fitted with alarms and level sensors. Compliance reporting requirements will be conditioned to ensure all new infrastructure is installed as per the specified design requirements, which includes wastewater treating requirements as per Table 1 and the definition of 'treat' in the works approval. In addition, general reporting, record keeping and administration requirements will be conditioned to ensure compliance with the works approval.

Time limited operations are permitted for a period of 180 days to enable the applicant to bring the new wastewater treatment plant online. During this period, the applicant may submit a licence amendment application for the continued operation of the new wastewater treatment plant under licence L9275/2020/1.

Monitoring of the quality of wastewater entering and exiting the wastewater treatment plant will be required during time limited operations to determine the effectiveness of the installed wastewater treatment plant.

Operational requirements for the irrigation of the treated wastewater are specified in the existing licence L9275/2020/1.

Consultation

Table 5 provides a summary of the consultation undertaken by the department.

Table 5: Consultation

Consultation method	Comments received	Department response
Application advertised on the department's website on 3 March 2021	None received	N/A
Local Government Authority advised of proposal on 15 January 2021	LGA is supportive of installing an appropriate brewery wastewater treatment system.	N/A
Department of Primary Industries and Regional Development advised of proposal on 15 January 2021	No comments were received on the installation of the WWTP.	N/A
Applicant was provided with draft documents on 23 June 2021	Comments were received on 27 July 2021. See Appendix 1 for details.	See Appendix 1.

Conclusion

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

References

1. ARMCANZ and ANZECC 2000 (ANZECC 2000), *National Water Quality Management Strategy Paper No. 4 – Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Volume 3 Primary Industries*.
2. ARMCANZ and ANZECC 1997, *National Water Quality Management Strategy – Australian Guidelines for Sewerage Systems – Effluent Management*, Commonwealth of Australia.
3. Department of Water and Environment Regulation (DWER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
4. DoW 2008, *Water Quality Protection Note 22: Irrigation with nutrient-rich wastewater*, Perth, Western Australia.
5. DoW 2010, *A water quality improvement plan for the Vasse Wonnerup Wetlands and Geographe Bay*, Perth, Western Australia.
6. DWER 2020, *Guideline: Decision making*, Perth, Western Australia.
7. DWER 2020, *Guideline: Environmental siting*, Perth, Western Australia.
8. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.
9. Kebede, T.B. 2018. *Wastewater treatment in brewery industry, review*. International Journal of Engineering Development and Research. Available at <https://www.ijedr.org/papers/IJEDR1801124.pdf>

Appendix 1

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

Summary of applicant's comment	Department's response
<p>Applicant provided/confirmed the following information:</p> <ul style="list-style-type: none"> • type of chemicals used as a flocculant – poly aluminium chloride; • size of the flocculant tank to be 200 L (approximately 930H by 580D); • sludge settled at the bottom of the tanks will be sent back to the anaerobic tank as an activated sludge; • a diagram showing the location of the sampling points: prior to flocculant dosing; and after treatment. 	<p>Relevant sections of the works approval and decision report have been updated.</p>
<p>Applicant has advised that the location of the wastewater treatment plant has moved slightly (approximately 30 m SW) from the original proposal. The applicant provided an updated map showing the new location.</p>	<p>Relevant map in the works approval has been updated. As the location has only moved a small amount (30 m) the distance to sensitive receptors (section 0) has not been updated.</p>
<p>The applicant objects to the works approval condition relating to the frequency of monitoring required during time limited operations. The applicant considers weekly monitoring for a period of up to 180 days to be onerous, a financial burden, and believes it does not contribute significantly to the understanding of the effectiveness of the wastewater treatment plant. The applicant is proposing that the condition be amended to require a minimum of 6 sample events during time limited operations.</p>	<p>The purpose of monitoring the inflow and outflow of the proposed wastewater treatment plant (WWTP) (once installed and operational) during time limited operations, is to determine the effectiveness of the WWTP and whether it is capable of achieving the expected wastewater quality (as per the application) (see section 1.1.1). The delegated officer has considered the applicant's comments and has amended the requirement to monitor inflow and outflow from weekly to monthly during time limited operations. Condition 11 has been updated to reflect a monthly period and the definition for monthly has been added to the works approval definitions.</p>