



## Application for a Licence Amendment

### Division 3, Part V *Environmental Protection Act 1986*

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<b>Licence number</b>	L7643/1999/8
<b>Licence holder</b>	Flying Fish Cove Pty Ltd
<b>ACN</b>	59 009 163 544
<b>DWER file number</b>	DER2015/002878-1~5
<b>Premises</b>	3763 Caves Road, Wilyabrup WA 6280 Lot 125 on Plan 21450
<b>Date of report</b>	22/08/2024
<b>Status of report</b>	Final report

## Amendment description

This amendment is made pursuant to section 59 of the *Environmental Protection Act 1986* (EP Act) to amend the existing licence issued under the EP Act for a prescribed premises as set out below. This notice of amendment is hereby given under section 59B(9) of the EP Act.

This amendment is limited to a proposal to upgrade the winery wastewater treatment system, including the construction of an aeration pond and two new lined reed beds to support a proposal to install a brewery (beer) and distillation unit to manufacture spirits.

As part of this assessment CEO initiated amendments have been made to update the licence in accordance with the current licence format.

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>.

## Purpose and scope of assessment

Flying Fish Cove Pty Ltd (applicant) has submitted an application to amend licence L7643/1999/8 to construct and operate a distillery and a brewery in addition to the current wine making operations. The proposed changes in beverage production will change the nature and volumes of wastewater produced and will require an upgrade to the wastewater treatment system, storage pond and two reed beds.

## Background

Flying Fish Cove (premises) is in Wilyabrup within the City of Busselton, with the nearest town of Cowaramup 8.5 km south southeast of the premises. The winery was first licenced in 1998 with the licence being reissued in July of 2014 and set to expire in July 2029.

Currently, the premises produces wine and are seeking to diversify their operations by distilling wine into spirits and brewing beer by establishing brewing facilities which will require the installation and operation of associated beverage manufacturing infrastructure. The premises is currently licenced for a maximum premises production capacity of not more than 1,400 kL of wine per annual period. It is noted that the licence holder has exceeded this production capacity for the 2021/2022, and 2022/2023) reporting periods.

### **Wastewater treatment and disposal system**

The premises has an on-site winery wastewater treatment system (WWTS) consisting of collection sumps, screening and post screen sumps, a settling tank, and an aeration pond. The applicant states that the WWTS has been optimised for the treatment of winery wastewater and expects the proposed alterations to the WWTS will be sufficient in the treatment of the additional distillery and brewery wastewater.

The WWTS has had issues with reducing concentrations of salts, biological oxygen demand (BOD) and phosphorous in the treated wastewater that is discharged to land via irrigation. In the past three reporting periods between 2020 and 2023, either BOD or phosphorous has exceeded the licence emission limits to land.

Previous annual environmental reports (AER and AACR) have seen nutrient values for phosphorous and BOD exceed the licence emission limits to land. The applicant has proposed to make alterations to the current aeration pond and to construct and operate two new reed beds to assist in wastewater treatment which includes:

- Expansion of the existing aeration pond from ~1,500 m<sup>3</sup> (40m x 15m x 3m) to ~1,800 m<sup>3</sup> (5m x 20m x 3m).
- Additional aeration device (of 5.5 kW) for the aeration pond.
- Construction of two new reed beds each 220 m<sup>3</sup> (40m x 8m x 1.5m) in size with a

combined capacity of approximately 0.44 ML. These beds will be lined with clay found on site ( $10^9$  m/s or greater) and are linked to the aeration pond. Where wastewater flows from the aeration pond to the first reed bed, then to the second reed bed, and then to the 14.4 m<sup>3</sup> collection sump (4m x 4m x 0.9m). Their purpose is to treat the aerated wastewater via biological treatment.

- Addition of a holding tank for treated wastewater to be irrigated to land with a 25 kL capacity.

This has prompted the applicant to propose upgrades to the WWTS to prevent future noncompliance and support an application to manufacture beer and spirits. The applicant has proposed to expand the size of the current aeration pond and the construction of two new reed beds. Most of the treated wastewater is currently stored in the aeration pond prior to disposal via irrigation to L1 is planted to olive trees and L2, L3 and L4 consisting of 'native trees' (undisclosed species) with understorey grasses.

The application states that the increased aeration should improve the quality of wastewater in the aeration pond by decreasing BOD by up to 99%. These calculations were based on 2kg of oxygen removing 1kg of BOD, no reference was provided for these reductions, so they have been disregarded, but the delegated officer agrees that increased aeration will cause a reduction of BOD concentration in the wastewater, but not to the 99% as claimed.

In the response to the department's request for further information (RFI) (ELM 2024a; ELM 2024b), references were provided as evidence for the reduction of phosphorous and nitrogen via aeration. Although the references did point to a reduction in phosphorous and nitrogen via aeration, the delegate officer notes inconsistencies in the validity of these references as evidence. Papers were disregarded because of the following: the testing of stormwater which has different properties to winery wastewater, tests under greenhouse conditions rather than real world conditions, and tests on different methodologies of aeration.

In the licence the irrigation areas are described as being 2.1 ha in size. Recent review by the department of the annual environmental reports (AER) for reporting periods 2021-2023 it was noted that the irrigation area in the licence does not match the area in which the applicant has reported irrigating wastewater (DWER 2023). Using Google Earth (2023) the extent of the proposed irrigation area was determined to be approximately 1.75 ha in size.

### **Proposed new brewery and distillation unit**

The applicant states the operation of the distillery and brewery will only take place outside of the wineries peak vintage period which, the applicant states, should not have a significant impact on the daily maximum daily volumes of wastewater generated.

The infrastructure associated with the brewery includes:

- A still with a capacity of 400 litres capable of producing 2.5 L of 90% ABV per hour.
- Brewing kit consisting of a 200 L hot liquor tank pot, 200 L mash tank and 200 L boil tank, 225 L fermenter and additional equipment of a hand-operated mill.

The new brewery and still will be located within the same warehouse where the current winery equipment and oak barrel storage are located. The premises will purchase grain offsite, milled onsite using a hand mill for the brewing process. The brewery will be capable of producing up to 11,700 L a year with the applicant expecting to produce 150 L of beer a fortnight with the beer produced to be stored in kegs (3,900 L of beer a year). All other water associated with brewery and still production is sent to the WWTS.

Based on producing an average amount of 5.4 L of wastewater per 1 L of beer produced, there will be approximately 21,060 L of wastewater generated because of beer production (Breweries Association 2017). The spent grain from the brewing process will be stored in 100 L plastic bins to be transported to the marc storage area for disposal.

The applicant plans to use the distillery to process wine produced at the premises into spirits

(vodka and gin). Annually, it's expected to distil wine to produce a maximum 25,000 L of spirits. The spirits will be bottled off site with the applicant proposing the possibility of bottling on site with a hire unit. Wastewater from the distillery is directed to the WWTS with the applicant expecting 8,500 L of wastewater produced per 1,000L of spirits produced. The remaining solids are transported to the marc storage area for disposal.

Based on estimates of predicted ratios of wastewater produced by the brewery and distillery, it's expected to produce up to an additional 134.36 kL of wastewater per month on top of current wastewater production from the winery (Appendix 3).

For heads and tails management the licence holder plans to reuse some of the tails for blending purposes and the heads to be used as solvents for "day to day" operations such as cleaning due to their high alcoholic content. There was no mention of where the heads and tails not being reused will go. **For this reason, the delegate officer has placed the condition for the licence holder to store and remove offsite any non-repurposed heads and tails.**

#### **Description of the capacity of proposed new aeration pond and reed beds (two)**

The new aeration pond will be located at the same location as the current aeration pond with it being expanded from 15 m x 40 m x 3 m (~1.5ML) to 20m x 35m x 3m (~1.8ML), these dimensions and storage excludes freeboard and sloping sides. The reed beds will be constructed adjacent to the east of the aeration pond.

The applicant states that aeration pond carrying capacity is 1.8ML which is more than half the annual production volume of wastewater. This will allow most of the wastewater irrigation to occur during the warmer summer months when rainfall is at its lowest reducing the risk of soil and groundwater contamination.

The two reed beds will each be 10 m x 40 m x 1.5 m (~0.22ML) in size. The wastewater water will flow from the first reed bed to the second then to the collection pond 4 m x 4 m x 0.9 m (14.4 m<sup>3</sup>). The collection pond will be installed with a high-level alarm to alert the licence holder on the risk of overtopping.

#### **Decommissioning of the existing aeration pond**

Before commencing construction of the new aeration pond, the applicant proposes to empty the aeration pond by irrigating the wastewater currently in the pond and removing bottom sludge to the marc pad for drying and off-site disposal. The proposal is not supported by a coherent pond decommissioning plan, with no detail as to how wastewater during the decommissioning and construction phase will be managed, no information of the irrigation rate and timing of irrigation or how sludge will be removed and transferred to the marc pad or the anticipated volumes of sludge and whether the marc pad is adequate in size to manage the volumes of removed sludge.

The licence holder states that the decommissioning works will be carried out after the Marc has been removed from the marc drying pad but if decommissioning is to occur before the marc drying pad has been emptied then the works will occur during the dry months of September to November. They noted that if leachate is to be stored in the pad, then it can hold up to 400 kL of wastewater due to the size of the pad being a surface area of 40 m<sup>2</sup> and 500 mm bund walls.

**For this reason the licence holder will need to submit a detailed pond decommissioning plan to the CEO of DWER for approval prior to decommissioning and construction of the aeration pond commences.**

#### **Proposed treatment by the new aeration pond and reed beds.**

The amendments to the WWTS will provide additional aeration through the installation of a new aeration device (5.5 kW) which will increase the current aeration of the aeration pond from 5 kW to 10.5 kW.

Once the wastewater stream has undergone aeration and biological treatment, in the aeration pond, wastewater will flow into the reed beds via overflow or pump for further biological 'treatment' in the reed beds before it flows to a collection sump to be pumped to a holding tank (25 kL) before being irrigated to land.

Information provided by the applicant (ELM 2023), claimed that the reed beds will reduce phosphorous by a range of 40 – 60%. No figure for the range of nitrogen reduction was presented, but the supplied information indicated that some nitrogen reduction is likely.

The application stated that the reed beds will be planted with native species such as *Juncus kraussii*, *Schoenoplectus validus*, and *Baumea articulata* and that biomass removal from the reedbeds will occur every 3-5 years to allow for the removal of nutrients from the reed bed. The supporting information failed to provide calculations on the amount of nutrient uptake of biomass or any methods as to how the biomass will be removed and weighed.

### **Wastewater treatment and quality**

Under the current licence the applicant must monitor their wastewater quality when irrigating to land. Monitoring requirements are for volumetric flow rate, and the level of nutrients in treated wastewater including pH, electrical conductivity (EC), total nitrogen (TN), total phosphorous (TP), total dissolved solids (TDS), total suspended solids (TSS), biological dissolved oxygen (BOD). The licence has emission limits imposed on the spot samples of pH and the total emissions loads to land of nitrogen and phosphorous being average annually and load of BOD being averaged daily. Treated wastewater data for the two most recent reporting periods between 2021 – 2023 are submitted as a requirement in their AER. This data is summarised against relevant guidelines and licence limits in Table 1.

Table 1 notes the high levels of nutrients in the treated wastewater particularly phosphorous, BOD, and salts (as TDS, TSS and EC). Phosphorous samples exceed the upper limit of the ANZECC guidelines for five of the samples taken, with no samples being under the lower limit. Salts as TSS exceeded ANZECC guidelines in all samples and TDS as described by DPIRD (2019) guidelines, one sample as moderately salty (456 – 1425 mg/L), three samples being very salty (>2850 mg/L), and the remaining samples as salty (1425 – 2850 mg/L).

Sodium absorption ratio (SAR) indicates the amount of sodium relative to calcium and magnesium in a sample. When SAR levels are high it can degrade soil structure resulting in dispersive soils, reducing infiltration, and drainage. There was no testing to demonstrate SAR levels in the treated wastewater, but the applicant submitted soil SAR data which demonstrated a low level of SAR in the soil pit testing. As per ANZECC guidelines there's a relationship between EC and SAR in which a low SAR and EC (dS/m) value can indicate possible soil structural problems. Additionally, the soil testing methodology was specified as being a random point in the middle to lower part of the soil profile with no samples being taken from the topsoil.

**The delegate officer has determined due to high levels of salts in the treated wastewater limits will be applied to prevent degradation of the soil in the irrigation lot. A requirement for emission loading limits for EC and SAR is to be set as per ANZECC long term irrigation guidelines and, they are:**

- **2.9 dS/m (or 290 mS/m) represented by the threshold for olive trees in loam soils.**
- **Relationship between SAR and EC (dS/m) in the stable soil structure range (figure in the amended licence).**

In the application and historically there has been no groundwater monitoring for nutrients and distance from ground level.

**Table 1: Irrigated wastewater quality data (applicant supplied).**

Vintage / Year		Month	pH	EC (mS/m)	BOD (mg/L)	TDS (mg/L)	TSS (mg/L)	TN (mg/L)	TP (mg/L)	Flow (kL)
Licence limits			5.5-8.5		30kg/ha /daily			180 kg/ha/ annual	20 kg/ha/ annual	
<sup>2</sup> ANZECC 2000-Primary Industries <sup>1</sup>			5.5-9.0	<sup>4</sup> 130-290 Moderate salt crops			<40	25-125 <sup>3</sup>	0.8-12 <sup>3</sup>	
Non-vintage	2021	September	5.62	172	1999	2085	65	16.4	8	931
Non-vintage	2021	November	7.42	223	1498	1820	270	39.9	10.88	1229
Pre-vintage	2022	January	7.67	293	748	2130	110	39.3	14.2	1211
Vintage	2022	February	6.68	259	1896	2730	420	30	8.6	240
Vintage	2022	March	5.56	282	2595	3910	300	27.3	10.9	117
Post-vintage	2022	June	7.21	287	2197	3360	170	64.7	13.6	48
Vintage	2022	August	7.00	140	654	1300	140	33	5.1	1361
Pre-vintage	2022	September	7.00	116	1048	1500	430	36	8	800
Vintage	2022	October	6.90	138	1056	1500	560	47	12	630
Pre-vintage	2022	November	7.50	153	826	1900	920	61	12	709
Vintage	2023	January	8.30	249	634	2000	870	58	16	569
Vintage	2023	June	5.60	288	3560	3700	240	22	10	144
<b>Average</b>			<b>6.87</b>	<b>217</b>	<b>1559</b>	<b>2328</b>	<b>375</b>	<b>40</b>	<b>11</b>	<b>666</b>

Note 1: National Water Quality Management Strategy Paper No. 4 – Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Volume 3 Primary Industries long term irrigation (over 20 years), 2000, ARMC and ANZECC (ANZECC 2000).

Note 2: pH has been adjusted to suit southwest swan coastal plain lower pH values within ground water. pH has been adjusted from 6 – 9 to 5.5 -9.

Note 3: ANZECC 2000, requires site specific assessment to determine actual value.

Note 4: Salinity levels have been set based on effects to crop yields for rye grass and general pasture.

Note: Red indicates existing BOD licence limit exceedances.

Note: Blue indicates very salty levels of salinity (DPIRD 2019).

### **Water balance and nutrient loading**

To determine if the proposed irrigation plan and water storage plan is sufficient calculations were undertaken on the water balance of the proposed new aeration pond and reed beds. In the supporting document the applicant has stated that wastewater will flow from the aeration pond as overflow once the pond fills.

Calculations on the water balance was undertaken under the following conditions proposed by the applicant's initial supporting information (Appendix 2):

- An approximate pond storage of 1.86 ML was used, this accounted for a freeboard of 300mm, and sloping edges.
- Proposed irrigation rate for a maximum of 30 kL per day.
- No irrigation occurring in winter.
- Only movement of wastewater from the aeration pond to the reed beds via gravity could occur until capacity was reached.
- Most of the wastewater generation occurring at the start of the year during vintage period.
- Environmental inputs (rainfall) and outputs (evaporation) are based off nearest weather station data (Jarrahwood 009842) (BOM 2024).

The applicant's calculations found that under the above conditions it would be insufficient in preventing excess flow of wastewater through the pond and beds. These calculations showed the potential for up to 542 kL of overflow may occur if pumping of wastewater from the aeration pond to the reed beds is not factored into the water balance scenario. The delegate officer notes that for any overflow events to occur, the applicant must have an operational pump to maintain wastewater level below freeboard.

In response to the RFI sent by the department the applicant stated that there's the possibility of pumping the water from the aeration pond to the reed beds once it has been tested at an NATA accredited laboratory and is at a sufficient nutrient level. These proposed target values are summarised in Table 3 were determined from *Winery Wastewater Management & Recycling Operational Guidelines (2011)*.

Included in the applicant's response to the department's RFI, the applicant submitted nutrient offtake data. It was stated that the information submitted supported the use of pasture grasses and coppicing of trees. The applicant did not provide any references or data regarding pasture grasses in the amendment application or in the request for further information. Additionally, it's noted that in the references provided by the applicant no mention of coppicing was provided, or the applicants proposed management strategies for biomass removal. The delegate officer notes that these yearly uptake rates are only acceptable if yearly coppicing occurs and do not reflect current nutrient uptake.

Calculations were undertaken to determine the level of nutrient offtake; these calculations were based on information sent in the applicants supporting information and RFI (Table 2). The results show under current proposed nutrient management that unless there's a significant decrease in nutrient loading of the irrigation area that excess nutrients will accumulate in soil and leach to groundwater.

**The department has determined that for contamination to be prevented, a condition has been added requiring the licence holder to submit a nutrient irrigation management plan. This will enable site specific loading rates to be determined and used as revised loading rates in the future.**

**Table 2: Nutrient loading and offtake analysis**

	TN	TP
<b>Annual volume wastewater</b>	4328.9 kL	4328.9 kL
<sup>1</sup> <b>Annual nutrient load / ha</b>	81.65 kg/ha/yr	21.20 kg/ha/yr
<sup>2</sup> <b>Eucalypt tree uptake on irrigation L2, L3 and L4 (information provided by applicant and verified)</b>	25.82 kg/ha/yr	0.65 kg/ha/yr
<sup>3</sup> <b>Olive tree plantation uptake of irrigation L1</b>	6.96 kg/ha.yr	0.78 kg/ha/yr

<sup>1</sup>Annual nutrient loads are based off the average nutrient load in the past two reporting periods.

<sup>2</sup>Data provided by the applicant, with references verified.

<sup>3</sup>Results calculated nitrogen and phosphorous values described in Zipori et al. (2019) at 50% yield efficiency due to small and sparse trees identified in spatial imagery.

The proposed controls specified by the applicant for the relevant emissions are summarised in the Table 3 below.

**Table 3: Proposed applicant controls (from application)**

Emission	Sources	Potential	Applicant proposed controls
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		pathways	
Spills, leaks, overtopping of containment of nutrient rich wastewater.	Movement of wastewater through the aeration ponds, reed beds, collection sump and storage tank.	Infiltration to soil and groundwater.	<ul style="list-style-type: none"> <li>• Aeration pond and reed beds will use clay soil found on site which will ensure a liner permeability of <math>10^{-9}</math> m/s or greater.</li> <li>• The reed beds will be designed with a 500mm freeboard and the aeration pond with a 300mm freeboard.</li> <li>• Removing sludge from the aeration pond every 3-5 years.</li> <li>• Mobile pump available to move wastewater from aeration pond to reed beds as required.</li> <li>• The collection pond will be equipped with a high level alarm.</li> </ul>
	<p>Operation of brewery and distillery.</p> <p>Operation of the WWTS</p>		<ul style="list-style-type: none"> <li>• All beverage production will take place inside of the existing warehouse where wine production occurs over concrete/ bitumen hardstand.</li> <li>• Production of beer from the brewery and spirits from the distillery only occurs outside of peak vintage with the months of April to January are considered outside of peak vintage.</li> </ul>
Odour	<p>Operation of brewery and distillery.</p> <p>Operation of the WWTS</p>	Air/ windborne pathways	<ul style="list-style-type: none"> <li>• No controls proposed.</li> </ul>
	Wastewater in the aeration pond and reed beds.		<ul style="list-style-type: none"> <li>• Increased aeration of the pond</li> <li>• Application of slaked lime or magnesium-based caustic solution to the aeration pond for pH reduction.</li> </ul>
Noise from the operation of the brewery	<p>Operation of brewery and distillery.</p> <p>Operation of the WWTS</p>	Air/ windborne pathways	<ul style="list-style-type: none"> <li>• Production to occur in the enclosed warehouse also containing winery production infrastructure.</li> </ul>
Irrigation of nutrient and salt rich wastewater to land.	Wastewater treated by reed beds stored in holding tank to be irrigated to land.	<p>Infiltration to soil and groundwater.</p> <p>Overland surface water runoff.</p>	<ul style="list-style-type: none"> <li>• Maximum daily flow of irrigating treated wastewater of 30 kL per day.</li> <li>• Installed a total of two piezometers on land application areas L3 and L4 which prevent irrigation occurring once groundwater is detected within 1 m of the surface. A third piezometer location has been proposed below the irrigation lots illustrated in the licence.</li> <li>• Treatment by reeds beds to reduce phosphorous and nitrogen.</li> <li>• Only treated wastewater is irrigated using a sprinkler and drip irrigation system.</li> <li>• Wastewater from the ponds will only be</li> </ul>



			<p>pumped between ponds and beds once it is at a sufficient nutrient level. The proposed nutrient level is BOD 200 – 500 mg/L, pH 6-8, phosphorous 5-10, nitrogen 10 – 30 mg/L.</p> <ul style="list-style-type: none"> <li>• Reed beds will be planted with native species such as <i>Juncus kraussii</i>, <i>Schoenoplectus validus</i>, <i>Baumea articulata</i>. With biomass to be cut and removed every 3 – 5 years to export biomass (and nutrient).</li> </ul>
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## Other approvals

### Planning approval

The applicant has applied for planning approval to the City of Busselton concurrently to this application (DA24/0012). The planning approval was granted on 09 April 2024 with the following condition relevant to this application:

*An annual production limit for all alcoholic beverages of 1400 kL, with a maximum of 25 kL of spirits and 3.9 kL of beer.*

### Water licensing

The premises currently has a surface water licence (SWL166191) under the RIWI Act set to expire on 18 December 2024 with the licensee being Earthbay Nominees Pty Ltd. The annual 100 000 kL of water allocated, has a third-party agreement with Flying Fish Cove Pty Ltd to take the water from a dam located on site for agricultural purposes and storage of surface water on lot 125 on Deposited Plan 21450. The surface water licence also has a third-party approval of agreement to Flying Fish Cove Pty Ltd to take annually 10 000 kL of water for commercial purposes.

## Consultation

The applicant was provided a draft amended licence and amendment report on 10 July 2024 for comment, the response was summarised in Appendix 1.

## Risk assessment

The table below describes the risk events associated with the amendments consistent with the *Guidance Statement: Risk Assessments* (DER 2017). The table identifies whether the risk events are acceptable and tolerated, or unacceptable and not tolerated, and the appropriate treatment and degree of regulatory control, where required.

Risk Event			Consequence rating <sup>1</sup>	Likelihood rating and risk <sup>1</sup>	Reasoning	Regulatory controls
Source/ Activities	Potential emissions	Potential receptors, pathway and impact				
<b>PROPOSED AMENDMENT</b>						
<b>Construction</b>						
Installation of distillery and brewery, wastewater holding tank construction of aeration pond and reed beds, including vehicle noises.	Noise		<i>Low level on and off site impacts</i> <b>Minor</b>	<b>C = Minor</b> <b>L = Rare</b> <b>Low risk</b>	Due to the distance from nearby receptors the delegate officer considers the risk to be <b>low</b> .	N/A
Emptying of existing treated wastewater and sludge from the aeration pond	Treated wastewater discharge to ground from spills or leaks.	<ul style="list-style-type: none"> <li>Rural residences, 400 m north, 650 m north, 900 m southeast, 1 km south, 1.2 km west, 1.2 km southeast of the winery / WWTS / irrigation areas</li> <li>Air/windborne pathway causing impacts amenity</li> </ul>	<i>Low level on and off site impacts</i> <b>Minor</b>	<b>C = Minor</b> <b>L = Unlikely</b> <b>Medium risk</b>	<p>As the applicant has proposed no additional storage of wastewater and no clear irrigation plan for the emptying of the aeration pond there may be a risk of exceeding the hydraulic loading of soils. The delegate officer considers the risk as <b>medium</b>.</p> <p>The delegate officer determines:</p> <ul style="list-style-type: none"> <li>That the aeration pond must be emptied before construction of the new aeration pond can commence.</li> <li>The licence holder must submit to the departments CEO an infrastructure report ensuring compliance of construction requirements has been reached.</li> </ul>	<p>Condition 11: decommissioning plan</p> <p>Condition 12: construction and operation requirements.</p> <p>Condition 13 and 14: submit an infrastructure report.</p> <p>the contents of the infrastructure report.</p>
<b>Operation</b>						
	Odour from wastewater high in BOD		<i>Low level on and off site impacts</i> <b>Minor</b>	<b>C = Minor</b> <b>L = Rare</b> <b>Low risk</b>	Due to the added controls of increased aeration of the treated wastewater, and the application of lime to the aeration pond and the lack of any complaints of odour the delegate officer considers the risk of odour as <b>low</b> .	Condition 2: infrastructure and equipment.
Discharge of treated wastewater from WWTS (aeration pond and reed beds).	Wastewater with elevated nutrient, salts (TDS) and BOD concentrations discharged to soil and groundwater.	<ul style="list-style-type: none"> <li>Rural residences, 400 m north, 650 m north, 900 m southeast, 1 km south, 1.2 km west, 1.2 km southeast of the winery / WWTS / irrigation areas</li> <li>Palusvale wetland on the premises adjacent to winery and irrigation areas, Wilyabrup Brook 800 m east and south, 23 licenced surface and groundwater licences within 2 km radius in all directions, groundwater high.</li> <li>Overland runoff contaminating soils, groundwater, and surface water.</li> </ul>	<i>Mid-level on site impacts</i> <i>Low-level off-site impacts</i> <b>Moderate</b>	<b>C = Moderate</b> <b>L = Likely</b> <b>High risk</b>	<p>Historically the WWTS has produced treated wastewater which has had high concentrations of dissolved salts, BOD and phosphorous, with BOD and phosphorous exceeding licence emission limits to land. The proposal to increase the size of the aeration pond and reed beds is expected to improve water quality. The applicant expects the treatment of wastewater by the improved system will reduce phosphorous, BOD and nitrogen loading.</p> <p>The delegate officer determines:</p> <ul style="list-style-type: none"> <li>To assist in managing high nutrient loading levels additional WWTS operational requirements for desludging and management of solids.</li> </ul> <p>The applicant will continue to irrigate treated wastewater to existing lots 1 – 4. Currently, Lot 1 is planted with mature olive trees are Lots 2 – 4 are planted with mature native trees and grasses. The applicant plans to coppice the trees and has also suggested planting pasture crops at the irrigation lot but has not included a suitable nutrient irrigation management plan for how the uptake of nutrients by vegetation will be managed on all irrigation lots. From the delegate officer's calculations, the nutrient uptake is significantly less than the current nutrient loading limits. These factors and a high groundwater level indicate that contamination of soil and groundwater may be occurring.</p> <p>The delegate officer determines:</p> <ul style="list-style-type: none"> <li>That the licence holder must submit a nutrient irrigation management plan to the CEO by 31 March 2025.</li> </ul> <p>The current winter irrigation plan accounts for only the storage in the aeration pond and reed beds, with the applicant expecting irrigation to only occur over the drier months. The applicant also mentioned the use of piezometers to detect groundwater levels within 1m of the surface. A future licence amendment would consider this once detailed information on groundwater levels are obtained.</p> <p>The delegate officer determines:</p>	<p>Condition 2: infrastructure and equipment.</p> <p>Condition 3: Emission limit values</p> <p>Condition 5: Emissions and discharges monitoring.</p> <p>Condition 10: Nutrient irrigation management plan.</p>

					<ul style="list-style-type: none"> <li>Operational requirements to restrict winter irrigation of treated wastewater.</li> </ul> <p>EC and SAR/EC relationship has been added as emission limit loading to land requirements.</p> <p>For reasons mentioned above the delegate officer considers the risk of treated wastewater discharge as <b>high</b>. The delegate officer considers the applicant's controls to be acceptable with additional regulatory controls.</p>	
Containment of wastewater in aeration pond and reed beds	From leaks and overtopping events causing contamination of soil and groundwater.		<p><i>Mid-level on site impacts</i> <i>Low-level off-site impacts</i> <b>Moderate</b></p>	<p><b>C = Moderate</b> <b>L = Likely</b> <b>High Risk</b></p>	<p>Wastewater is treated, diluted with rainfall, and stored within the aeration pond until it overflows into the reed beds. To ensure seepage out of the ponds is prevented the ponds are lined with clay found on site that has a permeability of 10<sup>-9</sup> m/s or less. The applicant plans to irrigate a maximum of 30 kL per day.</p> <p>Water balance calculations has demonstrated that the proposed storage amount and current irrigation plan proposed by the applicant may not be sufficient in preventing overtopping during the winter periods (Appendix 2). For this reason the delegate officer considers the risk of containment as <b>high</b> acceptable under additional regulatory controls.</p> <p>The delegate officer determines:</p> <ul style="list-style-type: none"> <li>The applicant must install and operate a wastewater pump from the aeration pond to reed bed.</li> <li>The reed beds must not be operated until a follow up licence amendment has been granted.</li> </ul>	Condition 12: construction and operation requirements.
Operation of brewery and still equipment	Nutrient rich production or wastewater generated from processing and cleaning of brewery and still equipment.		<p><i>Low level on and off site impacts</i> <b>Minor</b></p>	<p><b>C = Minor</b> <b>L = Rare</b> <b>Low risk</b></p>	<p>Due to the infrastructure being in the same warehouse as the current wine production infrastructure and there being no increase in approved premises production capacity per annual period the delegate officer considers the risk as <b>low</b>.</p> <p>The delegate officer determines:</p> <ul style="list-style-type: none"> <li>That to ensure the annual premises production capacity is not exceeded an annual maximum production of each beverage type is set at wine is 1371.1 kL, for beer 3.9, and spirits 25 kL.</li> </ul>	<p>Condition 1: Beverage production limits</p> <p>Condition 2: infrastructure and equipment.</p>

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the Guidance Statement: Risk Assessments (DER 2017).

## Decision

Based on the assessment in this decision report, the delegate officer has determined under additional regulatory controls to grant the licence amendments. The controls are related to the installation and operation of brewery and distillery, the construction and operation of a new aeration pond, two reed beds, collection sump, and holding tank. This determination to grant is based off the following:

- Operation of the brewery and distillery is to occur in the same enclosed warehouse as the wine production.
- The assessment of water balance showed that without any pumping of wastewater from the aeration pond to the reed beds, that overtopping will likely occur. The licence holder will be required to manage water levels using a pump.
- The assessment into wastewater quality and nutrient uptake has required the licence holder to submit a nutrient irrigation management plan. Additional loading limits for EC and SAR/EC relationship have been added as emission monitoring requirements due to high salts in the treated wastewater.
- Upon completion of the construction works of the pond and reed beds and prior to wastewater being placed into the infrastructure, the licence holder must submit a licence amendment application to obtain approval to operate the newly constructed wastewater containment infrastructure.
- The Proposed works must be completed by 30 August 2026 (condition 12). If an extension of time is required, the licence holder will need to apply for a licence amendment.
- Decommissioning plan prior to pond decommissioning/construction
- Limits to volumes and types of beverages produced as a surrogate to limiting the volumes and quality of wastewater discharged to land to what has been assessed under this application. The limit has also been imposed as the facility has the design capacity to produce more than the assessed production throughput..

## Conclusion

Based on this assessment, it has been determined to amend the existing licence, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

### Summary of amendments

The below table provides a summary of the proposed amendments and will act as a record of implemented changes. All proposed changes have been incorporated into the revised works approval as part of the amendment process.

Old condition	New condition	Proposed amendments
-	Cover page	Restructured to new licence template.
-	Condition 1	Assessed production limit now reflects the maximum allowed production of beer and spirits.
Contents and Introduction	-	Deleted, consistent with current DWER licence template.
Condition 1.2	-	Deleted, consistent with current DWER licence template.
Condition 1.3	Condition 2	Containment infrastructure and operational requirements in old condition “condition 1.3” condensed to new “condition 1” with columns containing the site infrastructure and

		equipment, operational requirements and the infrastructure location shown in Schedule 1.
Conditions 2.5	Condition 3	BOD loading limits were changed from a daily loading of 30kg/ha to monthly loading of <1500kg/ha/month. Added additional parameter for EC <2.9 dS/m, and SAR and EC relationship with a limit of within the “stable soil range”.
Condition 3.1 and 3.5	Conditions 5, 6, 7	Conditions reworded to reflect current DWER licence template. Volumetric flow rate unit changed from m <sup>3</sup> /day to L/day. Added SAR as a parameter.
Condition 3.2-3.4	-	Deleted, consistent with current DWER licence template.
-	Condition 10	Requirement to submit a wastewater irrigation management plan
	Condition 11	Requirement for the licence holder to submit a decommissioning plan for the aeration pond.
-	Condition 12, 13, 14 and 15	Condition added for the design and construction / installation requirements for the proposed infrastructure as part of the licence amendment. Requirement for the licence holder to audit and report on the newly constructed infrastructure. The conditions contain the requirements required by the report. Additional requirement for a follow up licence amendment to be submitted for items to be operational.
Condition 5.2	Condition 21	Removed the format requirement column and added additional reporting requirements.
Condition 1.1.2	Definitions	Relocated definitions and added new definitions mentioned in new conditions of the licence.
-	Schedule 1:	Amended and added a new premises map to include the new infrastructure, pond construction plans, and SAR and EC relationship figure.
Schedule 2: Reporting & notification forms	Schedule 2: Clay Liner requirements	Removed reporting and notification forms from the licence and replaced with clay liner requirements for material construction.
-	Schedule 3: Nutrient loading calculator	Added the template for the nutrient loading calculator as required to be submitted by the licence holder by condition 15.

## References

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14. Queensland Government 2020, *Farming Carbon*. Available from: <https://www.qld.gov.au/environment/plants-animals/habitats/regrowth/regrowth-guides/euc-open/euc-open-carbon>
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## Appendix 1: Summary of licence holder's comments on risk assessment and draft conditions

Document	Reference	Licence holder comment	DWER response
Licence	Condition 3, Table 3: Discharge limits	<p>i. The emission limits for the relationship of Sodium Adsorption Ratio (SAR) and Electrical Conductivity (EC) would be better represented as separate measurements with SAR with a limit of &lt; 3 and a limit for Exchangeable Sodium Percentage (ESP) between 6 and 15% both would only need to be measured on an annual basis. This is because it focuses on the impact of sodium to soil.</p> <p>ii. The EC limit was proposed to be changed from &lt; 2.9 dS/m to &lt; 4 dS/m as EC includes some ions that are helpful for soil structure.</p>	<p>i. No changes. The licence holder did not provide adequate justification for the replacement of SAR and EC relationship to accept the requested change.</p> <p>ii. No changes. The department believes the licence holder was not able to provide sufficient justification to change the EC limit based on ANZECC (2000) guidelines.</p>
	Condition 5, Table 4: Monitoring of emissions to land	<p>i. Under the "Frequency" column text on the original licence "monthly while irrigating" was changed to "monthly" but wasn't included in red as a change.</p> <p>ii. That sodium, magnesium, and calcium are measured quarterly and SAR annually.</p>	<p>i. Agreed. The error was noted and amended to the original text.</p> <p>ii. Agrees in part. Sodium, magnesium and calcium can be measured quarterly to reflect their relationship to the measurement of SAR. SAR will be kept as quarterly due to the importance of understanding differences in the SAR wastewater application throughout the annual period. A single annual measurement would not provide an adequate representation of SAR</p>

## Appendix 2: Water balance calculations.

Month	Inflow (m <sup>3</sup> )	Rainfall (m <sup>3</sup> )	Evaporation (m <sup>3</sup> )	Outflow (m <sup>3</sup> )	Storage change (m <sup>3</sup> )	Storage required (m <sup>3</sup> )	Additional storage required
January	893.40	40.59	177.87	690.00	66.12	756.12	N/A
February	893.40	27.62	150.12	600.00	170.90	1527.02	N/A
March	893.40	50.40	128.30	690.00	125.50	2342.52	542.52
April	893.40	90.00	76.19	660.00	247.21	1969.73	169.73
May	111.68	195.94	49.57	690.00	-431.95	917.78	N/A
June	111.68	235.55	39.51	0.00	307.72	1225.49	N/A
July	111.68	282.87	46.65	0.00	347.89	1573.39	N/A
August	111.68	198.12	52.49	0.00	257.31	1830.70	30.70
September	111.68	167.92	67.72	660.00	-448.13	762.57	N/A
October	111.68	85.35	96.23	690.00	-589.20	863.37	N/A
November	111.68	72.97	124.16	660.00	-599.52	923.85	N/A
December	111.68	42.87	154.54	690.00	-690.00	923.86	N/A

Inflow: based on peak wastewater generation occurring during the vintage months of the year, with small amounts of wastewater being produced from brewery and still operation and other associated cleaning.

Rainfall: taken from the closest weather station (Jarrahwood 009842) from BOM.

Evaporation: taken from the closest weather station (Jarrahwood 009842) from BOM.

Outflow: Based on a maximum rate of 30 kL of treated wastewater irrigated to land per day, every day for the month.

Storage change: the total change in pond volume of inputs - outputs.



### Appendix 3: Expected wastewater generation from operation of brewery and distillery.

	Beer	Spirits	Wine	All
Maximum beverage produced	3.9	25	1371.1	
Ratio Beverage to wastewater	1:5.4 <sup>1</sup>	1:8 <sup>2</sup>	1:3 <sup>3</sup>	
Wastewater total	21.06	200	4113.3	4334.36

Note 1: Ratio taken from Brewers Association (2017) “Wastewater Management Guidance Manual”

Note 2: Ratio was supplied by the applicant.

Note 3: Ratio was based off previous reporting periods in the applicant.s AERs.