RECORD OF CERTIFICATE OF TITLE
UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

STWRN AUSTRALIA

RECORO OF CERTIFICATE OF TITLE
UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES

LOT 131 ON DEPOSITED PLAN 32067

LAND DESCRIPTION:

REGISTERED PROPRIETOR:

(FIRST SCHEDULE)

JULIA HELEN ATKINS OF UNIT 1/125 BEATRICE STREET, INNALOO
(TL964995 ) REGISTERED 18 JUNE 2012

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:

(SECOND SCHEDULE)


Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.

* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
Lot as described in the land description may be a lot or location.

END OF CERTIFICATE OF TITLE

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: DP32067 [SHEET 1].
PREVIOUS TITLE: 2223-342, 2223-341.
PROPERTY STREET ADDRESS: 133 GALE RD, METRICUP.
LOCAL GOVERNMENT AREA: CITY OF BUSSELTON.
NOTE I: DUPLICATE CERTIFICATE OF TITLE NOT ISSUED AS REQUESTED BY DEALING L964996

LANDGATE COPY OF ORIGINAL NOT TO SCALE  Wed Jul 11 11:20:22 2012 JOB 39569162
Current Company Extract

Name: THE BEER FARM PTY LTD
ACN: 606 046 306

Date/Time: 21 December 2015 AEST 03:01:05 AM

This extract contains information derived from the Australian Securities and Investments Commission's (ASIC) database under section 1274A of the Corporations Act 2001.

Please advise ASIC of any error or omission which you may identify.
## Organisation Details

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<th>Name:</th>
<th>THE BEER FARM PTY LTD</th>
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<td>606 046 306</td>
</tr>
<tr>
<td>ABN:</td>
<td>25606046306</td>
</tr>
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<tr>
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</tr>
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<td>Subclass:</td>
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</tr>
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## Address Details

| Registered address: | 177 Gale Road, METRICUP WA 6280 |
| Start date: | 26/05/2015 |
| Principal Place Of Business address: | 177 Gale Road, METRICUP WA 6280 |
| Start date: | 26/05/2015 |

## Contact Address

Section 146A of the Corporations Act 2001 states 'A contact address is the address to which communications and notices are sent from ASIC to the company'.

| Address: | Level 2 Piccadilly Court, 222 Pitt Street, SYDNEY NSW 2000 |
| Start date: | 26/05/2015 |

## Officeholders and Other Roles

### Director

<table>
<thead>
<tr>
<th>Name:</th>
<th>IAN PETER ATKINS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address:</td>
<td>133 Gale Road, METRICUP WA 6280</td>
</tr>
<tr>
<td>Born:</td>
<td>09/05/1973, UNITED KINGDOM</td>
</tr>
<tr>
<td>Appointment date:</td>
<td>26/05/2015</td>
</tr>
</tbody>
</table>

### Secretary

<table>
<thead>
<tr>
<th>Name:</th>
<th>IAN PETER ATKINS</th>
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</thead>
<tbody>
<tr>
<td>Address:</td>
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</tr>
<tr>
<td>Born:</td>
<td>09/05/1973, UNITED KINGDOM</td>
</tr>
<tr>
<td>Appointment date:</td>
<td>26/05/2015</td>
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Class | Description | Number issued | Total amount paid | Total amount unpaid | Document number
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"A" | "A" SHARES | 2 | 2.00 | 0.00 | 2E1890539

**Members**

Note: For each class of shares issued by a proprietary company, ASIC records the details of the top twenty members of the class (based on shareholdings). The details of any other members holding the same number of shares as the twentieth ranked member will also be recorded by ASIC on the database. Where available, historical records show that a member has ceased to be ranked amongst the top twenty members. This may, but does not necessarily mean, that they have ceased to be a member of the company.

Name: HNH HOLDINGS PTY LIMITED
ACN: 132 466 641
Address: 133 Gale Road, METRICUP WA 6280

Class | Number held | Beneficially held | Paid | Document number
--- | --- | --- | --- | ---
"A" | 2 | no | FULLY | 7E7048456

**Documents**

Note: Where no Date Processed is shown, the document in question has not been processed. In these instances care should be taken in using information that may be updated by the document when it is processed. Where the Date Processed is shown but there is a zero under No Pages, the document has been processed but a copy is not yet available.

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<td>26/05/2015</td>
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<td>18/06/2015</td>
<td>484E Change To Company Details Appointment Or Cessation Of A Company Officeholder</td>
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Figure 2. Extent of the Subject Site

Figure 3. Schematic of wastewater system
1 INTRODUCTION

1.1 Background

The Beer Farm Pty Ltd, (The Beer Farm) (the proponent), owns and operates a beer processing facility located at Lot 133 (No. 177) Gale Road, Metricup (herein referred to as the subject site). The subject site is situated on 32 hectares (ha) within the municipality of the City of Busselton (refer to Figure 1) and is bordered by rural properties to the north, east and west, and Gale Road to the south (refer to Figure 2).

The facility has a maximum production capacity of 1,040 kL per year, with a current production capacity of 780 kL. Wastewater from the brewery is processed through a standard septic system before being used for irrigation.

In accordance with the Environmental Protection Regulations 1987 (EP Regulations), the projected production throughput exceeds the minimum threshold for Prescribed Premises Category No. 25, as defined within Table 1 below.

Table 1. Prescribed premises summary.

<table>
<thead>
<tr>
<th>Category Number</th>
<th>Category Description</th>
<th>Category Production Capacity</th>
<th>Premises Production Capacity</th>
<th>Premises Fee Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>Alcoholic beverage manufacturing: premises on which an alcoholic beverage is manufactured and from which liquid waste is or is to be discharged onto land or into waters</td>
<td>350 kL/year</td>
<td>1,040 kL/year</td>
<td>50 – Not more than 2,000 tonnes per year</td>
</tr>
</tbody>
</table>

This denotes that pursuant to Section 56 of the Environmental Protection Act 1986 (EP Act), The Beer Farm require a DER licence to operate their wastewater treatment system.

The purpose of a licence is to allow the DER to assess the environmental acceptability of a proposal against standards and policies. Licences also contain conditions to ensure the premises can operate in an environmentally acceptable manner.

1.2 Purpose of this Document

As previously discussed, the operation of the wastewater treatment system is subject to a DER licence. On this basis, the purpose of this licence application is to provide suitable justification that the proposed wastewater treatment system will appropriately treat wastewater which will subsequently be discharged to the environment. Specifically, this document contains:

- A description of the subject site’s environmental characteristics;
- A description of the existing infrastructure and operations;
- The regulatory framework applicable to the subject site; and
- Details regarding the wastewater treatment system, including a water balance and the projected nutrient loading rates.

1.3 Proponent Information

The subject site consists of a beer processing facility, a public sales outlet and associated infrastructure, three dams and approximately 30 ha of paddocks. The beer processing facility has been in operation since 2015.
The Beer Farm’s company and contact details are outlined in Table 2.

**Table 2 Company details for The Beer Farm.**

<table>
<thead>
<tr>
<th>Description</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACN</td>
<td>606 046 306</td>
</tr>
<tr>
<td>Licensee</td>
<td>The Beer Farm Pty Ltd</td>
</tr>
<tr>
<td>Registered Agent Address</td>
<td>Presidio Partners Pty Ltd</td>
</tr>
<tr>
<td></td>
<td>Level 2 Piccadilly court</td>
</tr>
<tr>
<td></td>
<td>222 Pitt Street</td>
</tr>
<tr>
<td></td>
<td>Sydney, NSW, 2000</td>
</tr>
<tr>
<td>Postal Address</td>
<td>177 Gale Road</td>
</tr>
<tr>
<td></td>
<td>Metricup WA 6280</td>
</tr>
<tr>
<td>Site Address</td>
<td>Lot 133 (177) Gale Road, Metricup</td>
</tr>
<tr>
<td>Site Contact</td>
<td>Ian Atkins</td>
</tr>
<tr>
<td></td>
<td>Email: <a href="mailto:ian@beerfarm.com.au">ian@beerfarm.com.au</a></td>
</tr>
</tbody>
</table>
2 REGULATORY CONTEXT

Guidance and regulation regarding wastewater treatment within breweries is provided by a number of government agencies including:

- Department of Environment Regulation (DER); and
- Department of Water (DoW).

Specific policies and legislation relating to the abovementioned government agencies is provided in the following sections.

2.1 Department of Environment Regulation

Breweries with a design capacity of 350kL or more are considered ‘prescribed premises’ pursuant to Category 25 within Schedule 1 of the EP Regulations. Prescribed premises require a licence to operate under the EP Act, which is administered by the DER. The DER is responsible for ensuring that the prescribed premises are constructed and operated in an environmentally acceptable manner. This is achieved by imposing the provisions of the EP Act and issuing licence approvals subject to conditions.

2.2 Department of Water

The DoW provides regulations and guidance for activities that may affect the quality of the State’s water resources. In particular, the DoW has developed a set of Water Quality Protection Notes that are designed to provide guidance on land use activities and water resource protection issues. In relation to the subject site, the following guiding documents are applicable:

- Water Quality Protection Note 22: Irrigation with nutrient-rich wastewater; and
- Water Quality Protection Note 73: Wineries and distilleries.

The DoW also administers the Rights in Water Irrigation Act 1914 (RiWI Act) which manages the utilisation of groundwater and surface water resources. The proponent does not hold a Groundwater Licence pursuant to the RiWI Act as groundwater is not extracted from an aquifer within the subject site.
3 EXISTING ENVIRONMENT

3.1 Topography
The subject site is undulating with the elevation range from 65 m Australian Height Datum (AHD) in the north west to 85 mAHD in the south west of the subject site.

3.2 Landforms and Soils
The subject site is located within the Donnybrook Sunkland Zone which is comprised of moderately dissected lateritic plateau on Perth Basin Sedimentary rocks. Soil are formed in lateritic colluvium, weathered in-situ sedimentary rocks and alluvium (poorly drained sandy alluvial plain in the south). It is part of the Whicher Scarp system which is a low scarp and raised platform situated on the northern edge of the Donnybrook Sunkland Zone consisting of sandy gravel and pale deep sands, loamy gravel and non-saline wet soils (DAFWA).

The Busselton Margaret River Augusta land capability survey described the subject site as being part of the Yelverton Flats phase consisting of raised flats, duplex sandy gravels, semi-wet soils, yellow deep sands and sandy earths and loamy gravels.

3.3 Acid Sulfate Soils
Acid Sulfate Soils (ASS) is the common name given to naturally occurring soil and sediment containing iron sulfides. They have become a potential issue in land development projects on the Swan Coastal Plain. When the naturally anaerobic conditions in which these soils are situated are disturbed, they are exposed to aerobic conditions and subsequently oxidise. When oxidised, ASS can acidify groundwater, which can result in a range of impacts on the surrounding environment.

ASS that have been oxidised and resulted in the creation of acidic conditions are termed “Actual ASS” (AASS) and those that have acid generating potential but remain in their naturally anaerobic conditions are termed “Potential ASS” (PASS).

ASS mapping prepared by the DER (2009) is available on the DER’s Geographic Data Atlas and indicates that the subject site is classified as having a “moderate to low risk of ASS occurring within 3m of the natural soil surface”.

3.4 Hydrology

3.4.1 Surface Water
The subject site contains three dams located in south-west portion of the subject site. An ephemeral creek line running through the centre of the site in a north-west direction. The subject site is not located in a Public Drinking Water Source Area or in proximity to any conservation significant watercourses.

3.4.2 Groundwater
The subject site is located within the proclaimed Busselton – Capel Groundwater Area. Anecdotal information suggests that groundwater is in excess of 4.0m below ground surface in winter.
3.5 Flora and Vegetation

The vegetation of the subject site falls within the Southern Jarrah Forest sub-region of the Jarrah Forest bioregion (McKenzie et al. 2003). The Southern Jarrah Forest sub-region is composed of Jarrah – Marri forest in the west grading to Marri and Wandoo woodlands in the east (McKenzie et al. 2003).

The subject site only contains a small pocket of degraded remnant vegetation of the Yelverton complex as labelled by Beard Association which consists Woodland of *Eucalyptus marginata* subsp. *marginata-Corymbia calophylla-Allocasuarina fraseriana-Agonis flexuosa* and open woodland of *Corymbia calophylla* on low undulating uplands in the humid zone in the centre of the site.

The subject site is not mapped within an Environmentally Sensitive Area.
4 WASTEWATER TREATMENT SYSTEM

4.1 Background

The Beer Farm have developed their wastewater treatment system in order to accommodate a maximum production throughput of 1,040 kL of product per annum. The system has been upgraded to improve the treatment of wastewater onsite by increasing the volume of storage and dispersing the final treated wastewater to an irrigation lot replacing the previous leach drain system. The treatment of the wastewater is intended to produce treated effluent quality that will comply with the Water Quality Protection Note 22: Irrigation with nutrient rich wastewater (DoW 2008).

4.2 Design

The production of beer is not limited by a harvest period therefore production schedules and associated wastewater production is relatively stable throughout the year. Brewery wastewater is high in cellulose, sugars and organic matter, it contains moderate nutrient loadings and depending on the cleaning products used has an overall neutral pH.

The wastewater treatment system has been designed to provide adequate wastewater storage based on predicted monthly effluent production. A schematic of the wastewater treatment system is provided in Figure 3. These figures have subsequently been compared against the average number of days experiencing rainfall to ensure that the proposed wastewater treatment system has adequate capacity to store wastewater. These calculations are provided within Table 3 below.

### Table 3. Modelled wastewater effluent production and storage capacity.

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated Monthly Effluent Production (kL)</td>
<td>347</td>
<td>347</td>
<td>347</td>
<td>347</td>
<td>347</td>
<td>347</td>
<td>347</td>
<td>347</td>
<td>347</td>
<td>347</td>
<td>347</td>
<td>347</td>
</tr>
<tr>
<td>Volume of Storage Required (kL)¹</td>
<td>1.5</td>
<td>1.5</td>
<td>3.5</td>
<td>8.5</td>
<td>25</td>
<td>40</td>
<td>37</td>
<td>25</td>
<td>15.5</td>
<td>9</td>
<td>4.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Excess Storage Available (kL)²</td>
<td>43.5</td>
<td>43.5</td>
<td>41.5</td>
<td>36.5</td>
<td>20</td>
<td>5</td>
<td>8</td>
<td>20</td>
<td>30.5</td>
<td>36</td>
<td>41.5</td>
<td>43.5</td>
</tr>
</tbody>
</table>

¹ Based on the average number of days experiencing rainfall
² Based on the design of the wastewater treatment system

Wastewater Collection

All brewery processing is contained within a roofed, concrete hardstand area. Wastewater produced from washout procedures within the concrete hardstand area and the brewery enter the grated drains at several locations prior to being gravity fed to a 2 kL collection sump. The concrete hardstand area has been designed to divert stormwater that is not contained within this area.

The grated drains contain basket screens that capture course solids and debris up to 2mm in size. The basket screens require periodic monitoring and emptying, which is undertaken as required or at least weekly.

From the 2 kL collection sump, the wastewater overflows to the septic system via gravity. This process enables solids to settle out prior to the wastewater undergoing treatment.
Treatment
Further settling of the effluent is undertaken within the septic system, followed by bacterial conversion of the waste into treated effluent and a solid sludge. Settling plays an important role prior to biological treatment processes to remove heavier sludge solids by means of settling and separation from the liquid phase. When it is used ahead of biological treatment, the key advantage is that it will assist in significantly reducing BOD levels and thus, reducing the load feed into the system. The solids accumulate at the base of the septic system are removed as required by a licensed liquid waste contractor.

Storage
Treated effluent will be transferred initially to a 7 kL storage tank, then via overflow to a 45 kL storage tank. It is from this tank that the effluent will be pumped to the irrigation area.

Irrigation
Treated wastewater is irrigated to a 6.44 ha irrigation area comprised of paddock grasses (refer to Figure 2). Irrigation will occur via an automated travelling cannon spray system positioned within the irrigation area.

The irrigation area can be described as follows:

- Sufficiently vegetated with paddock grass species;
- Located on ground with a slope of less than one in twenty and categorised as duplex sandy soil;
- Not subject to seasonal flooding; and
- Approximately 30m from the nearest watercourse.

4.3 Water Balance
For an effective wastewater irrigation system, wastewater application needs to correlate with the requirements of the vegetation, while ensuring that increases in runoff and percolation are minimised.

Approximately 99 percent of the water absorbed by plants is lost by transpiration and evaporation from the plant surface. On this basis, the water requirement of crops is equal to the evapotranspiration requirement (DPI NSW 2008). Crop evapotranspiration can be determined by using the ‘Irrigation Calculator’ (Department of Agriculture and Food 2014), which indicates that approximately 6 ha of pasture in the Busselton region can absorb up to 23,740 kL of water annually. Based on the estimated effluent production, the maximum volume of treated wastewater irrigated will be approximately 4,164 kL, denoting that the pasture water requirements within the irrigation area will not be exceeded. Based on an assessment on the average number of days that receive rainfall (in excess of 10mm) in the locality, the estimated storage requirements have been calculated to ensure that irrigation does not occur on days experiencing in excess of 10mm of rainfall (refer to Table 4).
Table 4. Water balance for the irrigated wastewater.

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irrigation Calculator (kL)</td>
<td>7,060</td>
<td>6,100</td>
<td>5,100</td>
<td>2,600</td>
<td>540</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>210</td>
<td>2,120</td>
<td>3,040</td>
<td>4,160</td>
</tr>
<tr>
<td>Estimated Maximum Irrigation (kL)</td>
<td>347</td>
<td>347</td>
<td>347</td>
<td>347</td>
<td>347</td>
<td>347</td>
<td>347</td>
<td>347</td>
<td>347</td>
<td>347</td>
<td>347</td>
<td>347</td>
</tr>
<tr>
<td>Volume of Wastewater During Rain Days (kL)</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>9</td>
<td>25</td>
<td>40</td>
<td>37</td>
<td>25</td>
<td>16</td>
<td>9</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Storage Remaining (kL)</td>
<td>43.5</td>
<td>43.5</td>
<td>41.5</td>
<td>36.5</td>
<td>20</td>
<td>5</td>
<td>8</td>
<td>20</td>
<td>30.5</td>
<td>36</td>
<td>41.5</td>
<td>43.5</td>
</tr>
</tbody>
</table>

The wastewater treatment system has been designed to provide in excess of the winter storage requirements. This approach has been utilised as a contingency measure should a temporary system failure occur.

Application problems can occur with soils that are seasonally wet due to a regular period of excessive rainfall, where a perched water table exists, or when there is a seasonal rise in the water table within permeable soils. Seasonal wetness limitations will be avoided by deferring irrigation and retaining effluent within the tanks.

### 4.4 Nutrient Loading

#### 4.4.1 Soils

The properties and type of soils can determine the suitability of a site for irrigation of treated wastewater. In accordance with the requirements of the *Water Quality Protection Note 22: Irrigation with nutrient rich wastewater* (DoW 2008), the subject site is physically suitable for irrigation of treated effluent due to the following:

- Suitably zoned;
- Located in a rural farming / agricultural context;
- Comprised of arable land which is vegetated; and
- Capable of providing appropriate 30m buffer to the nearest sensitive water resource.

Based on regional soil mapping for the subject site, soils within the irrigation area are described as sands and gravels. As a result, in accordance with the *Water Quality Protection Note 22: Irrigation with nutrient rich wastewater* (DoW 2008), the eutrophication risk based on the soil characteristics within the subject site can be described as ‘Low’ (Category B pursuant to Table 5).
Table 5. Eutrophication risk based on soil type and location.

<table>
<thead>
<tr>
<th>Characteristics of the irrigated soils</th>
<th>Eutrophication risk of surface water within 500m of irrigation site</th>
<th>Risk category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course grained soils (e.g. sands and gravels)</td>
<td>Significant</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>B</td>
</tr>
<tr>
<td>Fine grained soils, PBI &gt;100 (e.g. loam, clays or peat)</td>
<td>Significant</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>D</td>
</tr>
</tbody>
</table>

Appropriate management measures will be implemented which will assist in reducing the risk associated with eutrophication and nutrient leaching. This will include the following:

- Rotation of irrigation areas;
- Even application or irrigated wastewater; and
- Ensuring that irrigated areas are dry for 24 hours between applications.

### 4.4.2 Nutrient Loading Rates

Brewery wastewater is not typically associated with high nutrient loading rates however it can have a high degree of organic matter due to the composition of the inputs.

The success of wastewater irrigation systems is dependent on the appropriate application of effluent to ensure that both nutrient and hydraulic loading rates are not excessive. This will require the following:

- Sufficient area to manage the nutrient and hydraulic loading;
- Equipment that will apply effluent at low application rates;
- Provision of rest periods between applications so that bacteria in the soil can breakdown effluent organic matter to prevent a decline in the soil infiltration; and
- Adequate provision of irrigation area which:
  - reduces nitrate leaching;
  - prevents ponding and surface runoff of effluent;
  - avoids physical deterioration of soil; and
  - allows efficient use of the nutrients for pasture growth.

The nutrient application criteria associated with Risk Category B are provided below within Table 6. DoW guidelines (2008) also specify a BOD loading rate of 30 kg/ha/day.

Table 6. Nutrient application criteria to control eutrophication risk.

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>Maximum Reactive Nitrogen Addition Loading Rate</th>
<th>Maximum Reactive Phosphorus Addition Loading Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>180 kg/ha/year</td>
<td>20 kg/ha/year</td>
</tr>
</tbody>
</table>

Based on recent wastewater quality results obtained post treatment, the predicted nutrient and BOD loading rates are provided within Table 7.

Table 7. Projected nutrient loading rates based on wastewater quality monitoring results.

<table>
<thead>
<tr>
<th>Nitrogen Loading Rate</th>
<th>Phosphorus Loading Rate</th>
<th>BOD Loading Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>27 kg/ha/yr</td>
<td>18 kg/ha/yr</td>
<td>0.007 kg/ha/day</td>
</tr>
</tbody>
</table>
4.5 Irrigation Management

4.5.1 Scheduling
Irrigation will occur within the nominated irrigation area, as provided within Figure 2. Irrigation scheduling will be closely supervised by the project manager. Effluent will be irrigated primarily during summer, with irrigation in winter being dependent on rainfall and regular observation of the irrigation area. Irrigation within the 6.44 ha irrigation area will occur on a rotational basis, ensuring that irrigated areas are dry for 24 hours between applications to prevent soil water-logging. Irrigation will occur with the use of a cannon spray system.

4.5.2 Irrigation Areas
The following measures will be implemented to manage the irrigation area:

- Irrigated wastewater will be confined to the irrigation area and will not escape to any watercourse;
- Treated wastewater will not be applied to land if soil moisture conditions are such that surface run-off or ponding is likely to occur;
- Wastewater will be evenly distributed over the irrigation area;
- The irrigation of treated wastewater to the land will not be performed within 30m of any defined watercourse;
- Treated wastewater will not be discharged to the irrigation area during rainfall or onto flooded areas; and
- The irrigation area will be maintained in a proper and efficient condition (i.e. maintain healthy vegetation cover) so as to provide adequate assimilation, percolation, evaporation and transpiration of the irrigated wastewater.
5 ENVIRONMENTAL IMPACTS AND MANAGEMENT

This section provides information that primarily relates to the potential environmental impacts from the operation of the wastewater treatment system. For those environmental issues that have the potential to have significant impacts, management measures and strategies are provided to ensure that potential impacts are minimised as far as practicable.

5.1 Discharges to Land

Treated wastewater will be irrigated to a 6.44 ha paddock area. Irrigation will occur as per Section 4.6 with specific details documented within a Nutrient Irrigation Management Plan (NIMP) (refer to Appendix A). The projected nutrient loading rates and water balance calculations indicate that irrigation of the treated wastewater can be sustained without any environmental impacts.

Management Measures
Irrigate treated wastewater in accordance with the NIMP.

5.2 Discharges to Water

There are no planned discharges to surface or groundwater during the operation of the facility. Nutrient leaching into the groundwater or runoff from the irrigation areas into surface waters is considered very unlikely based on the following:

- There are no groundwater receptors within the vicinity of the irrigation area;
- There are no watercourses that will be directly affected by the operation. The closest watercourse is 30m east of the irrigation area;
- Irrigation will not occur during periods of rainfall or onto flooded areas; and
- Irrigation rates have been developed to ensure runoff from the irrigation areas does not occur.

Management Measures
The risk associated with seepage into groundwater and runoff into surface waters is considered very low and therefore management measures associated with discharges to water are not required.

5.3 Solid and Liquid Waste

Wastewater generated from the brewery operations will be treated through a conventional septic wastewater treatment system, as defined within this document. Solid waste generated as a result of the treatment process will include thickened sludge. Sludge will be periodically extracted from the system and removed by a licensed contractor.

Management Measures
Management of liquid and solid waste will be undertaken in accordance with the conditions of the EP Act Licence and the requirements of applicable regulations. The risk associated with solid and liquid waste is considered very low.

5.4 Noise Emissions

The use of a pump to transfer the treated wastewater to the irrigation area is the only source of potential noise emissions during the operation of the wastewater treatment system. All noise generating activities (i.e. irrigation of wastewater, trucks etc.) will occur during the day and will be indistinguishable from noise generated from typical rural activities.
Management Strategy

Noise represents a low risk for this proposal due to the distance from the nearest sensitive receptor and the minimal level of noise expected to be generated during the construction and operation of the upgraded wastewater treatment system.

In addition, The Beer Farm has not received any noise complaints during the operation of the facility. As a result, no additional noise management strategies have been developed for the subject site.

5.5 Odour Emissions

During operation of the wastewater treatment system, potential sources of odour are as follows:

- Wastewater treatment system (high organic loads and BOD levels can result in odour emissions); and
- Irrigation of wastewater.

Odour emissions are expected to be insignificant given that the nearest sensitive receptors, private residences, are 200m and 350m to the north and west respectively. The nearest township, Cowaramup township, is approximately 10 km south west of the wastewater treatment system. Furthermore, a site inspection undertaken by Accendo Australia on the 3rd March 2017 confirmed that odour emissions are currently negligible.

Management Measures

Odour emissions present a low risk for the premises due to the distance from the nearest sensitive receptor, the minimal odour emissions expected to be generated and the fact that no complaints have been received. Furthermore, The Beer Farm will ensure compliance with the general provisions of the EP Act and the licence conditions. Given the minimal risk that odour emissions present, no additional odour management measures have been developed for this submission.

5.6 Dust Emissions

No dust emissions will be generated during the operation of the wastewater treatment system.

5.7 Light Emissions

No light emissions will be generated during the operation of the wastewater treatment system.

5.8 Reporting Requirements

In order to determine the nutrient loading rates within the irrigation areas monitoring of the treated wastewater will be required. Monitoring will be undertaken in accordance with a schedule provided within the EP Act licence. As a conditional requirement, annual reporting of the monitoring results to the DER will also be required.
6 CONCLUSION

The Beer Farm owns and operates a beer processing facility located within the municipality of the City of Busselton. The subject site is situated on 32 ha and is bordered by rural properties to the north, east, and west, and Gale Road to the south.

The Beer Farm has a maximum capacity of 1,040 kL of product per annum. In accordance with the EP Regulations, the projected production throughput exceeds the minimum threshold for Prescribed Premises Category No. 25. This denotes that pursuant to Section 56 of the EP Act, the Beer Farm require a DER licence to operate the wastewater treatment system.

This licence application provides suitable justification that the developed wastewater treatment system will appropriately treat wastewater that will subsequently be discharged to the environment. Specifically, this document contains:

- A description of the subject site’s environmental characteristics;
- A description of the existing infrastructure and operations;
- The regulatory framework applicable to the subject site; and
- Details regarding the wastewater treatment system, including a water balance and the projected nutrient loading rates.

The potential environmental impacts from the operation of the wastewater treatment system are limited to discharges to land. However, appropriate management measures have been developed to ensure the environmental risk is minimised as far as practicable.
REFERENCES


Department of Agriculture and Food. (2014). Irrigation Calculator, Available at: http://www.irrigationcalculator.com/


Tille, P.J. and Lantzke, N.C. (1990), Busselton, Margaret River, Augusta: land capability study. Department of Agriculture and Food, Western Australia.

Lot 131 Gale Road, Metricup (The Beer Farm)

FIGURE 1 - Location of the Subject Site

The Beer Farm

Diagramatic

Local Authority: City of Busselton

Sheet 1 of 1

Lot 131 Gale Road, Metricup (The Beer Farm)

FIGURE 1 - Location of the Subject Site

The Beer Farm

Diagramatic

Local Authority: City of Busselton

Sheet 1 of 1
FIGURE 2 - Extent of the Subject Site

Lot 131 Gale Road, Metricup (The Beer Farm)

Legend
- Site boundary
- Irrigation area

Lot 131
Landuse:
Dairy
Intensive animal production
Intensive uses

Existing Residence
To Interest Residence

Gale Road

The Beer Farm

Scale 1:3000

Local Authority: City of Busselton
PO Box 5178
West Busselton
Western Australia 6280
Telephone (08) 9755 7217
Mobile 0418 950 852

Designed: KMT
Drawn: DTF
Checked: Approved

Date 22-03-17
Sheet 1 of 1
FIGURE 3:
THE BEER FARM
SEWER AND EFFLUENT
(SCHEMATIC)

45kL STORAGE
7kL STORAGE
TO LEACH DRAINS

IRRIGATION

LEGEND
- STORM WATER WASTE
- DOWNPIPES
- 100 HDPE EFFLUENT
- 100 DMV SEWER

PROJECT No. 1709
NUTRIENT AND IRRIGATION MANAGEMENT PLAN

The Beer Farm Pty Ltd
INTRODUCTION

Purpose

The Beer Farm Pty Ltd (The Beer Farm) (the proponent), owns and operates a beer processing facility located at Lot 133 (177) Gale Road, Metricup (herein referred to as the subject site). The subject site is situated on 32 hectares (ha) within the municipality of the City of Busselton and is bordered by rural properties to the north, east and west, and Gale Road to the south.

With a maximum production capacity of 1,040 kL per year, the brewery is a prescribed premises pursuant to the Environmental Protection Regulations 1987. Accordingly, this Nutrient and Irrigation Management Plan (NIMP) has been developed to ensure that disposal of treated wastewater from the operation of the brewery is undertaken and managed in a manner that reduces the environmental impacts to as low as reasonably practicable. Specifically, the purpose of this NIMP is to ensure that the irrigation of nutrient-rich wastewater does not result in contaminant leaching into the surrounding environment.

This NIMP has been prepared with reference to the following documentation:

- *Water Quality Protection Note – Nutrient Irrigation Management Plans* (DoW 2010);
- *Water Quality Protection Note – Irrigation with Nutrient Rich Wastewater* (DoW 2008);
- *Water Quality Information Sheet – Nutrient and Irrigation Management Plan Checklist* (DoW 2010);
- *Water Quality Protection Note - Wineries and Distilleries* (DoW 2006); and

Scope

The scope of the NIMP includes treatment and disposal of water from the following sources:

- Wash down water within the process areas; and
- Water collected from process equipment.

The NIMP does not include the management of uncontaminated stormwater or water (from any source) that is free of contamination and does not pose a risk to the environment.
NUTRIENT AND IRRIGATION MANAGEMENT

For an effluent irrigation system to be ecologically sustainable a number of factors must be considered to ensure that the surrounding environment is not impacted by the wastewater or by the organic, nutrient or chemical loadings applied. Factors relevant to the subject site are discussed below.

Soils

The properties and type of soils can determine the suitability of a site for irrigation of treated wastewater. In accordance with the requirements of the Water Quality Protection Note 22: Irrigation with nutrient rich wastewater (DoW 2008), the subject site is physically suitable for irrigation of treated effluent due to the following:

- Suitably zoned;
- Located in a rural farming / agricultural context;
- Comprised of arable land which is vegetated; and
- Capable of providing appropriate 30m buffer to the nearest sensitive water resource.

Based on regional soil mapping for the subject site, soils within the irrigation area are described as sands and gravels. As a result, in accordance with the Water Quality Protection Note 22: Irrigation with nutrient rich wastewater (DoW 2008), the eutrophication risk based on the soil characteristics within the subject site can be described as ‘Low’ (Category B pursuant to Table 1).

Table 1. Eutrophication risk based on soil type and location.

<table>
<thead>
<tr>
<th>Characteristics of the irrigated soils</th>
<th>Eutrophication risk of surface water within 500m of irrigation site</th>
<th>Risk category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course grained soils (e.g. sands and gravels)</td>
<td>Significant</td>
<td>A</td>
</tr>
<tr>
<td>Fine grained soils, PBI &gt;100 (e.g. loam, clays or peat)</td>
<td>Significant</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>D</td>
</tr>
</tbody>
</table>

Appropriate management measures will be implemented which will assist in reducing the risk associated with eutrophication and nutrient leaching. This will include the following:

- Rotation of irrigation areas;
- Even application or irrigated wastewater; and
- Ensuring that irrigated areas are dry for 24 hours between applications.

Water Balance

For an effective wastewater irrigation system, wastewater application needs to correlate with the requirements of the vegetation, while ensuring that increases in runoff and percolation are minimised.

Approximately 99 percent of the water absorbed by plants is lost by transpiration and evaporation from the plant surface. On this basis, the water requirement of crops is equal to the evapotranspiration requirement (DPI NSW 2008). Crop evapotranspiration can be determined by using the ‘Irrigation Calculator’ (Department of Agriculture and Food 2014), which indicates that approximately 6 ha of pasture in the Busselton region can absorb up to 23,740 kL of water annually. Based on the estimated effluent production, the maximum volume of treated wastewater irrigated will be approximately 4,164kL, denoting that the pasture water requirements within the irrigation area will not be exceeded.
Based on an assessment on the average number of days that receive rainfall (in excess of 10mm) in the locality, the estimated storage requirements have been calculated to ensure that irrigation does not occur on days experiencing in excess of 10mm of rainfall (refer to Table 2).

**Table 2. Water balance for the irrigated wastewater.**

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irrigation Calculator (kL)</td>
<td>29,000</td>
<td>26,000</td>
<td>21,000</td>
<td>10,000</td>
<td>1,140</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>12,000</td>
<td>18,000</td>
<td>25,000</td>
<td></td>
</tr>
<tr>
<td>Estimated Maximum Irrigation (kL)</td>
<td>248</td>
<td>280</td>
<td>341</td>
<td>300</td>
<td>248</td>
<td>210</td>
<td>186</td>
<td>186</td>
<td>150</td>
<td>155</td>
<td>180</td>
<td>248</td>
</tr>
<tr>
<td>Volume of Wastewater During Rain Days (kL)</td>
<td>6</td>
<td>37</td>
<td>60</td>
<td>104</td>
<td>141</td>
<td>149</td>
<td>140</td>
<td>130</td>
<td>90</td>
<td>67</td>
<td>51</td>
<td>42</td>
</tr>
<tr>
<td>Storage Remaining (kL)</td>
<td>158</td>
<td>127</td>
<td>103</td>
<td>60</td>
<td>23</td>
<td>15</td>
<td>24</td>
<td>34</td>
<td>74</td>
<td>96</td>
<td>113</td>
<td>122</td>
</tr>
</tbody>
</table>

The wastewater treatment system has been designed to provide in excess of the winter storage requirements. This approach has been utilised as a contingency measure should a temporary system failure occur.

Application problems can occur with soils that are seasonally wet due to a regular period of excessive rainfall, where a perched water table exists, or when there is a seasonal rise in the water table within permeable soils. Seasonal wetness limitations will be avoided by deferring irrigation and retaining effluent within the tanks.

**Nutrient Loading Rates**

Brewery wastewater is typically not associated with high nutrient loading rates however it can have a high degree of organic matter due to the composition of the inputs.

The success of wastewater irrigation systems is dependent on the appropriate application of effluent to ensure that both nutrient and hydraulic loading rates are not excessive. This will require the following:

- Sufficient area to manage the nutrient and hydraulic loading;
- Equipment that will apply effluent at low application rates;
- Provision of rest periods between applications so that bacteria in the soil can breakdown effluent organic matter to prevent a decline in the soil infiltration; and
- Adequate provision of irrigation area which:
  - reduces nitrate leaching;
  - prevents ponding and surface runoff of effluent;
  - avoids physical deterioration of soil; and
  - allows efficient use of the nutrients for pasture growth.

Nutrient inputs should be compared with nutrient losses in order to establish an appropriate nutrient loading rate. A simple approach to the nitrogen balance is to compare the total nitrogen and phosphorus
usage of each irrigation area with the amount of total nitrogen and phosphorus available. In accordance with the Productive Pastures Guidelines (Incitec Pivot 2005), typically pasture crops will require up to 250 kg/ha/year of nitrogen and 25 kg/ha/year of phosphorus.

The nutrient application criteria associated with Risk Category B are provided below within Table 3. DoW guidelines (2008) also specify a BOD loading rate of 30 kg/ha/day.

Table 3. Nutrient application criteria to control eutrophication risk.

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>Maximum Reactive Nitrogen Addition Loading Rate</th>
<th>Maximum Reactive Phosphorus Addition Loading Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>180 kg/ha/year</td>
<td>20 kg/ha/year</td>
</tr>
</tbody>
</table>

Based on recent wastewater quality results obtained post treatment, the predicted nutrient and BOD concentrations and associated loading rates are provided within Table 4.

Table 4. Projected nutrient loading rates based on wastewater quality monitoring results.

<table>
<thead>
<tr>
<th>Nitrogen Loading Rate</th>
<th>Phosphorus Loading Rate</th>
<th>BOD Loading Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>27 kg/ha/yr</td>
<td>18 kg/ha/yr</td>
<td>0.4 kg/ha/day</td>
</tr>
</tbody>
</table>

Irrigation Management

Scheduling

Irrigation will occur within the nominated irrigation areas, as provided within Figure 1. Irrigation scheduling will be closely supervised by the irrigation manager. Effluent will be irrigated primarily during the hotter months, with irrigation in the winter months being dependent on rainfall and regular observation of the irrigation area. Irrigation within the 6.44 ha irrigation area will occur on a rotational basis, ensuring that irrigated areas are dry for 24 hours between applications to prevent soil water-logging.

During winter, this will require ongoing inspections of the irrigation area to determine the soil moisture status. Visual inspections will be required prior to every irrigation event following rainfall.

Irrigation Areas

The following measures will be implemented to manage the irrigation areas:

- Irrigated wastewater will be confined to the irrigation area and will not escape to any watercourse;
- Treated wastewater will not be applied to land if soil moisture conditions are such that surface run-off or ponding is likely to occur;
- Wastewater will be evenly distributed over the irrigation area;
- The irrigation of treated wastewater to the land will not be performed within 30m of any defined watercourse;
- Wastewater will not be discharged to the irrigation area during rainfall or onto flooded areas; and
- The irrigation area will be maintained in a proper and efficient condition (i.e. maintain healthy vegetation cover) so as to provide adequate assimilation, percolation, evaporation and transpiration of the irrigated wastewater.
Monitoring

The results of monitoring will assist in demonstrating due diligence in the protection of public health and agricultural resources, while reducing environmental risks. Monitoring will be undertaken in accordance with the requirements outlined in DER’s licence.

Where it is identified that an incident has occurred that has caused or is likely to cause a discharge of wastewater not authorized by the licence, the following will be undertaken:

• Advise the DER in writing within forty-eight (48) hours of becoming aware of the incident; and
• Submit to the DER in writing within fifteen (15) days of becoming aware of the incident a report specifying the details of the incident.

Reporting

In accordance with the requirements of the DER licence, an Annual Environmental Report will be required each year. The report will contain the following details:

• Monitoring data collected as a requirement of the licence conditions;
• An assessment of the data collected in comparison with past monitoring data collected from the previous years;
• Any issues raised from inspections or incident responses during the reporting period; and
• Any changes to site boundaries, surface drainage channels and onsite or offsite impact or pollution.

In addition to the above, completion of an Annual Audit Compliance Report will be required for each year.
REFERENCES


Department of Agriculture and Food. (2014). Irrigation Calculator, Available at: http://www.irrigationcalculator.com/


Department of Water (DoW), (2010). Water Quality Information Sheet 04: Nutrient and irrigation management plan checklist. Department of Water, Western Australia


Department of Water (DoW), (2010), Water Quality Protection Note 33: Nutrient and irrigation management plans. Department of Water, Western Australia.


Tille, P.J. and Lantzke, N.C. (1990), Busselton, Margaret River, Augusta: land capability study. Department of Agriculture and Food, Western Australia.
FIGURES
Lot 131 Gale Road, Metricup (The Beer Farm)

Legend

Site boundary
Irrigation area

FIGURE 2 - Extent of the Subject Site

Lot 131
Landuse: Dairy
Intensive animal production
Intensive uses

To Proposed Residence

Existing Residence

Gale Road

Scale 1:3000

The Beer Farm

The Beer Farm
Lot 131 Gale Road, Metricup (The Beer Farm)

FIGURE 2 - Extent of the Subject Site

Legend

Site boundary
Irrigation area

Lot 131

Landuse:
Dairy
Intensive animal production
Intensive uses

Existing Residence

The Beer Farm

Gale Road
FIGURE 3:
THE BEER FARM
SEWER AND EFFLUENT
(SCHEMATIC)