



# Amendment Report

## Application for Licence Amendment

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

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<b>Licence Number</b>	L6395/1993/16
<b>Licence Holder</b>	Harvey Industries Group Pty Ltd
<b>ACN</b>	117 597 985
<b>DWER file number</b>	DER2015/000553-1
<b>Premises</b>	Harvey Beef Abattoir Seventh Street HARVEY WA 6220  Legal description – Lot 3 on Diagram 70328, Lots 105, 106, 107 and 113 on Plan 202106, Lots 114, 115, 116, 117, 118, 119, 139, 140, 141, 142, 143, 145, 147, 149, 168, 170, 171, 172, 173, 174, 175, 177, 200, 201, 202, 203, 204, 205, 228, 229, 230, 231 and 232 on Plan 2492, Lot 18 on Plan 883, Lot 239 on Plan 206741, Lots 235 and 236 on Plan 29898, and Lots 400 and 401 on Plan 302521 as defined by the premises map attached to the revised licence
<b>Date of Report</b>	17/04/2024
<b>Decision</b>	Revised licence granted

## 1. Decision summary

Licence L6395/1993/16 is held by Harvey Industries Group Pty Ltd (licence holder) for the Harvey Beef Abattoir (the premises), located at Seventh Street, Harvey.

This amendment report documents the assessment of potential risks to the environment and public health from proposed changes to the emissions and discharges from the increase the number of cattle slaughtered at the premises, increase in the amount of animal material accepted for rendering, construction and operation of a number of new facilities, increase in the wastewater disposal (irrigation) area and proposed salting of hides. As a result of this assessment, revised licence L6395/1993/16 has been granted.

The revised licence issued because of this amendment supersedes the licence previously granted in relation to the premises.

## 2. Scope of assessment

### 2.1 Regulatory framework

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

### 2.2 Application summary

On 31 October 2023, the licence holder submitted an application to the department to amend licence L6395/1993/16 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The following amendments are being sought:

- Increase the number of cattle held pending slaughter at the premises from approximately 250,000 to 300,000 head per annual period.
- Increase the amount of animal material to be accepted (from offsite) for rendering from 10,000 to 50,000 tonnes per annual period.
- Construction of a new rendering / by-products facility.
- Construction of new biofilters.
- Construction of new gas power plant (<10 MW).
- Construction and installation of a new concrete pad and new biosolids dewatering (Geotubes).
- Increase in the wastewater disposal (irrigation) area to 200 ha (which includes expanding the existing premises boundary), to accommodate the proposed increase in the amount of wastewater irrigated.
- Salting of up to 300,000 cattle hides per annual period.

#### 2.2.1 Exclusions to this assessment

The licence holder is intending to refurbish and convert the existing decommissioned anaerobic pond to a RENOIR (removal of nitrogen for irrigation) pond and convert the existing RENOIR pond to an auxiliary pond. The department understands that these activities are proposed to occur in 2024/2025 and 2025/2026 respectively and that the licence holder will apply for an additional licence amendment once details have been finalised. The removal and disposal of sludge from the existing anaerobic pond can be managed under existing conditions of the licence. Therefore, this amendment report does not include an assessment of these changes to the ponds.

Other changes that the licence holder has determined do not comprise a change under

Section 53 of the EP Act, and therefore do not require assessment include:

- Upgrades to existing amenities.
- Automated storage and retrieval systems (ASRS) (automated warehouse).
- Laydown areas.
- Shade sails over existing concrete lairage yards.
- Development of solar farm to supplement the existing energy for the premises with renewable resources.
- Existing sand based lairage yards will be progressively decommissioned as the new rendering facility and ASRS are constructed. *The delegated office notes that the sand lairage yards are not currently specified within conditions of the licence.* The licence holder has advised that purpose made rubber matting will be fitted to the existing concrete yards, enabling soft feet cattle to be held in these pens, rather than on sand.
- Relocate and upgrade the existing refrigeration plant room. Ammonia will be used as the refrigerant liquid. The new plant will be a self-contained room with no direct emissions or prescribed discharge points/stacks.

This amendment report does not include an assessment of the above changes that the licence holder has determined do not require assessment.

### 2.3 Background – existing operational aspects

The licence holder currently operates an abattoir and rendering facility located approximately 2 km west of Harvey on the swan coastal plain, approximately 120 km south of Perth.

Beef cattle are transported by truck to the property via an entrance on Eighth Street, Harvey, and unloaded in the stockyards and held in lairage pens or holding paddocks before slaughter.

Animals are slaughtered and processed in the abattoir building. The slaughter and boning floors operate 5 days a week all year round; however, this can reduce or increase depending on seasonal variation. The slaughter floor runs one shift per day and the boning room runs two shifts per day. Each shift can operate 8.5 to 12 hours.

Blood is collected in a dedicated sump prior to transfer to the rendering area. Paunch (undigested stomach contents) and hides are taken off site for disposal or further processing.

Mortality is either processed within the rendering plant or denatured prior to transport to a licenced landfill facility. Faecal material recovered from the lairage yards is taken offsite.

All renderable materials including offal and blood from the abattoir, and renderable material sourced from offsite, are processed in the rendering plant at the premises. The processing rate of renderable material is highly dependent on the drying rate of the products introduced to the cooker with dry products being processed faster than wetter products. The combined (wet and dry) rendering operations can process up to approximately 18 tonnes per hour (15 t/hr of dry products and 3 t/hr of wet (blood) products). Process water is sourced from the Harvey Pipeline Scheme. Rendering plant operations include the drying of blood; cooking, screening, pressing and milling raw material to produce meat bone meal; screening, polishing and settling material to produce tallow and cooking and decanting material from the kill floor to produce other products.

Extracted air (odour) emissions from the rendering facility is directed at low flows into the base of one of two biofilters where the air is diffused through wood chip filter media. Moisture content within the biofilters is maintained using scheme water to sustain microbial activity. Treated air is released over the surface of the biofilters.

Currently, approximately, 50,000 tonnes (hot standard carcass weight) of cattle are slaughtered and 22,000 tonnes of animal material is rendered per annual period (based on 2018 to 2022

annual environmental reports submitted by the licence holder).

Wastewater generated from the slaughter floor, boning room and rendering plant, along with some contribution from cleaning of chilling and freezing areas within the abattoir, is directed through primary (solids removal) and secondary (covered anaerobic lagoon (CAL) and RENOIR) wastewater treatment systems. The primary treatment consists of a contrashear rotary screen and a saveall (which includes a dissolved air floatation (DAF) system) to remove at least 90% fat and 70% solids. Wastewater is directed to the CAL from the saveall and yard pond (that receives stormwater and washdown water from the lairage yards) and then to the RENOIR pond. Treated wastewater is then stored in evaporation ponds (ponds 5, 4, 3 and 6) until it is used for irrigation (from pond 3 or 6) on approximately 140 ha of pastures and crops as part of the licence holder's cropping program. At 2.4 kL/head, a maximum of 600,000 kL of wastewater is estimated to be irrigated with the current throughput of 250,000 head of cattle. Based on licence holder submitted data (2018-2022), approximately 435,000 kL is currently irrigated per annual period as actual cattle numbers are usually below 200,000.

Sludge wastes (from ponds onsite) are stored on a banded drying bed or geobag, with leachate being directed back into the wastewater ponds. Dried sludge is then removed off site.

## 2.4 Proposed amendment for expansion (from application)

### **Increase number of cattle for slaughter**

The licence holder is requesting to increase the number of cattle for slaughter, and therefore increase the current production limit at the abattoir, to support growing market demand. The increase will occur progressively and is likely to be fully realized by late 2026. The increase in production will be achieved through extended kill shifts and operation over a 6-day week. See Table 4 and section 5 for further information.

### **Increase amount of animal material accepted for rendering**

Infrastructure upgrades will enable the acceptance of rendering material sourced offsite to increase from 10,000 to 50,000 tonnes per year. This will allow the licence holder to accept other abattoir's raw material on a short term or permanent basis. This increase will also allow the licence holder to accept raw material from the next largest beef processing facility in Western Australia and smaller quantities currently collected from smaller abattoirs. See Table 4 and section 5 for further information.

### **Proposed rendering / by-products facility**

A new rendering facility will be constructed approximately 100 m from the existing, approximately 25-year-old, rendering facility. The facility will include a purpose-built raw material receival area, fully enclosed stainless-steel bin with extraction to proposed biofilters to maintain negative pressure. The bin will have a lid that opens only while the delivery is taking place (where rendering material is tipped from a covered tip truck into the bin). Raw material from the onsite abattoir will be transferred via an enclosed pipeline using "Lamella" pump technology. Further information is provided in Table 4.

### **Proposed biofilters**

The licence holder is proposing to install new biofilters that will accept exhaust emissions and odours, via an enclosed air distribution system, from the proposed rendering facility. The design of the proposed biofilters will be similar to the existing biofilters, with improvements based on best available technology where feasible. Further information is provided in Table 4.

The licence holder has also requested to maintain the option to retain the ongoing use of the existing and functional biofilters.

### **Proposed gas power plant**

A new natural gas generator, with up to 8 MWh capacity including redundancy generating up to 31,131 MWh/annum is proposed to be installed. This is required to reduce the operational risks associated with capacity shortfalls of the current electricity grid supply, and reduce ongoing

operational impacts associated with power quality issue with low voltage on the lines. Further information is provided in Table 4.

**Proposed sludge drying area**

The licence holder currently utilises geobags to capture and store waste sludge generated in the RENOIR pond. Due to the increased throughput an additional geobag area is required.

The concrete pad for the new geotubes will be approximately 100 m x 30 m and located on the south side of existing pond 5. Leachate from the area will be directed to the evaporation ponds. Further information is provided in Table 4.

**Increase in volume of irrigation and irrigation area**

The licence holder has estimated that a maximum of 720,000 kL/year will be irrigated following the expansion. This is based on an average of 2.4 kL of wastewater irrigated per head of livestock slaughtered, for the proposed 300,000 head per year.

To accommodate the increase in wastewater irrigated, the licence holder is proposing to increase the irrigation area from 140 to 200 ha. This is through the addition of 10 paddocks across all three irrigation areas. Wastewater will continue to be flood irrigated as per existing irrigation practices.

Table 1 below show the range and average wastewater quality from January 2020 to December 2022 (2023 data is not yet available) of submitted monitoring results for irrigation ponds 3 and 6.

**Table 1: Quality of treated wastewater discharged to irrigation areas (from licence holder)**

Parameter	Units	Pond 3 treated wastewater quality (2020-2022) <sup>1</sup>		Pond 6 treated wastewater quality (2020-2022) <sup>1</sup>		Average wastewater quality of Pond 3 and Pond 6 combined (2020-2022) <sup>1</sup>	Common levels of concern
		Range	Average	Range	Average		
TN	mg/L	16 – 110	58	11 – 96	51	54	25 – 125 <sup>2,3</sup>
TP	mg/L	<b>15 – 65</b>	<b>29</b>	<b>15 – 42</b>	<b>27</b>	<b>28</b>	0.8 – 12 <sup>2,3</sup>
pH	pH units	6.4 – 8.7	7.4	6.6 – <b>9.5</b>	7.5	7.5	6 – 9 <sup>2</sup>
BOD	mg/L	2 – 20	7	2 – 15	6	6	<30 <sup>4</sup>
TDS	mg/L	350 – 1,200	785	430 – 1,100	753	769	1,500 <sup>5</sup>
TSS	mg/L	5 – 85	31	1 – 6,000	178	104	-
oil and grease	mg/L	5 – 110	11	5 – 260	20	15	-

Note 1: Data taken from annual reports submitted by the licence holder.

Note 2: National Water Quality Management Strategy (NWQMS) Paper No. 4 – Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Volume 3 *Primary Industries*, 2000, ANZECC and ARMCANZ (ANZECC 2000).

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

Note 4: Typical effluent quality following secondary treatment, *Australian Guidelines for Sewerage Systems – Effluent Management*, 1997, ANZECC and ARMCANZ.

Note 5: Critical limit above which operational corrective actions are recommended, NWQMS *Australian guidelines for water recycling and managing health and environmental risk*, 2006, Natural Resource Management Ministerial Council, Environment Protection and Heritage Council, Australian Health Ministers’ Conference.

The licence holder has provided a hydraulic loading investigation which shows that under current cropping practices the soil profile can support up to 141 cm/yr (which equates to 2,820 ML/year over the proposed 200 ha) of water inputs (rainfall and irrigation) without excessive seepage to groundwater. The licence holder estimates that, assuming 720,000 kL of wastewater is irrigated, if annual rainfall remains below 105 cm/yr (1,050 mm/yr) then no

excessive seepage to groundwater will occur. The licence holder has stated that if annual rainfall exceeds 105 cm/yr, the volume of irrigation may need to be regulated such that total inputs on the land (rainfall and irrigation) do not exceed 2,820 ML/yr.

The licence holder has provided updated nutrient and irrigation management information that considers the expected treated wastewater quality (based on existing data), increased volume of wastewater irrigated and cropping within the irrigation areas.

The licence holder continues to utilise five cropping systems over designated irrigation areas which consists of a combination of crop and pasture species. Dry matter yields and leaf tissue analysis data have been collected since 2017 and have been used to estimate the projected nutrient uptake capabilities of crop systems following the expansion to 200 ha. Table 2 has been provided by the applicant to show expected net application of nutrients to soil.

**Table 2: Estimated net application of nutrients to soil (kg/ha/yr) (from application)**

Irrigation area	A	B	C	A	B	C
Hectares	71.2	78.7	50.1	71.2	78.7	50.1
Parameter	Total nitrogen			Total phosphorus		
Summer nutrient uptake (kg)	15,508	12,047	9,492	2,991	2,864	1,947
Winter nutrient uptake (kg)	4,475	5,119	3,259	791	904	576
Combined nutrient uptake (kg)	19,983	17,166	12,751	3,782	3,768	2,523
Estimated nutrient application (kg/ha)	271	271	271	101	101	101
Estimated nutrient application (kg)	19,269	21,299	13,559	7,204	7,963	5,069
Net application to soil (kg/yr)	-714	4,132	808	3,422	4,195	2,546
Net application to soil (kg/ha/yr)	-10	53	16	48	53	51
Current licence limit (kg/ha/yr)	400			120		

### Salting of cattle hides

The licence holder is proposing to salt up to 300,000 hides per year which is estimated to produce approximately 10 L of brine per hide (i.e. 3 ML per year). The salting of hides will be undertaken within existing infrastructure, with salting drums to be installed within the existing shed. Further information is provided in Table 4.

## 3. Consultation

Table 3 provides a summary of the consultation undertaken by the department.

**Table 3: Consultation**

Consultation method	Comments received	Department response
Local government authority advised of proposal (5 December 2023)	No comments received.	N/A
Licence holder was provided with draft documents on 20 March 2024	Comments were received on 3, 9 and 10 April 2024. A summary of the comments are in Appendix 1.	See Appendix 1.
Licence holder was provided with revised draft documents on 16 April 2024	The licence holder provided no further comments and waived the consultation period on 16 April 2024.	N/A

## 4. Risk assessment

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the *Guideline: Risk assessments* (DWER 2020). To establish a risk event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission.

Table 4 describes the risk events associated with the proposed changes to the premises, consistent with the *Guideline: Risk Assessments*. In accordance with this guideline, the delegated officer has excluded the employees, visitors, and contractors of the licence holder's from its assessment of the proposed changes. Protection of these parties often involves different exposure risks and prevention strategies and is provided for under other state legislation.

Where the licence holder has proposed mitigation measures/controls, these have been considered when determining the final risk rating. Where the delegated officer considers the licence holder's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the licence as regulatory controls.

Additional regulatory controls may be imposed where the licence holder's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in the below table.

Revised licence L6395/1993/16 that accompanies this amendment report authorises emissions associated with the proposed changes to the premises. The conditions in the revised licence have been determined in accordance with *Guidance Statement: Setting Conditions* (DWER 2015).



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

Risk Event				Risk rating	Reasoning	Regulatory controls
Source /Activities	Potential emissions	Potential pathways, receptors and impact	Licence holder controls	C = consequence L = likelihood		
<b>Construction</b>						
Machinery and vehicle movements for the construction of proposed rendering / by-products facility, proposed gas power plant, proposed concrete pad for biosolids dewatering (including installation of geotubes), and proposed biofilters	Fugitive dust Noise	Air / windborne pathway causing impacts to health and amenity. The closest six residential premises (zoned intensive farming) are located within 430 m to 600 m of the proposed construction.	No specific licence holder controls proposed for the construction of infrastructure.	C = <b>Slight</b> : minimal impacts to amenity at local scale L = <b>Possible</b> : could occur at some time <b>Low Risk</b>	The delegated officer considers that the separation distance from the location of the proposed infrastructure to the closest rural dwellings is sufficiently large and therefore, does not reasonably foresee offsite impacts from dust or noise above the existing activities on the premises and has assessed the risk as low. The Environmental Protection (Noise) Regulations 1997 (EP Noise Regulations) apply to noise emissions.	Standard works construction, compliance and reporting conditions apply.
<b>Operation</b>						
Operation of new rendering / products facility, including increased throughput for acceptance and rendering of external material from 10,000 tpa to 50,000 tpa.	Odour	Air / windborne pathway causing impacts to health and amenity. Approximately 7 residential premises (zoned intensive farming) located within 560 m to 660 m, SE to NE of the proposed rendering facility.	<ul style="list-style-type: none"> <li>Rendering material will be contained in covered receptacles / tanks / vessels and unloaded into the new by-products building within 15 hours of receipt.</li> <li>Fully enclosed stainless-steel bin with extraction to the new biofilters to maintain negative pressure.</li> </ul>	C = <b>Moderate</b> : low level offsite impacts at a local scale L = <b>Unlikely</b> : probably not occur in most circumstances <b>Medium Risk</b>	<p>There has been one complaint received by the department in the last 5 years, which was related to odour. The complainant advised that they contacted the licence holder, who confirmed it was from broken machinery (existing rendering plant), and that the odour had resolved once the machinery was fixed. The licence holder anticipates that the new rendering facility will be more reliable and therefore reduce the frequency of breakdowns and associated odour impact.</p> <p>Considering the above, the licence holder's controls and the separation distance from the location of the proposed infrastructure to the closest rural dwellings, the delegated officer has determined that the operation of the proposed rendering facility, including the increase to the acceptance of up to 50,000 tonnes of material from offsite, will result in a medium risk of odour and noise impacting sensitive receptors. Similarly, the delegated officer has determined that the operation of the proposed rendering facility will result in a low risk of solid wastes impacting on surface water or groundwater.</p> <p>As licence holder controls have been considered in the risk assessment, they will be included on the licence as operational controls.</p> <p>Additionally, as the licence holder has advised they are constructing the new facility as a replacement for the existing facility, the delegated officer has included a decommissioning condition for the existing facility.</p>	<p>Licence holder controls will be conditioned.</p> <p>Increase the allowed acceptance of renderable material from 10,000 to 50,000 tonnes per annual period.</p> <p>Decommissioning of the existing facility once the new facility is constructed.</p>
	Noise	Wind at 9am at the site is E or SE for the majority of the year, which would direct odours way from the closest residential premises. There are 12 residential premises (zoned intensive farming) located within 850 m to 1.5 km, NW of the proposed rendering facility. Wind at 9am at the site may direct odours towards these premises for the majority of the year.	<ul style="list-style-type: none"> <li>The bin will have a lid that opens only while delivery is taking place, where rendering material is tipped from a covered tip truck into the bin.</li> <li>Transport for raw material will continue to be delivered by covered tip trucks with sealed tailgates.</li> <li>Raw material from slaughtering onsite will be transferred via an enclosed pipeline using "Lamella" pump technology.</li> </ul>	C = <b>Minor</b> : minimal offsite impacts at a local scale L = <b>Unlikely</b> : probably not occur in most circumstances <b>Medium Risk</b>		
	Solid wastes	Spillages causing contamination of soil, surface water or infiltration to groundwater. Existing agricultural drainage network through and adjacent to premises. Depth to maximum groundwater can be as shallow as 1 – 2 mbgl.	<ul style="list-style-type: none"> <li>Sealed building shell with negative pressure conditions directing exhaust airs and odours to two new dedicated biofilters.</li> <li>Machinery / equipment with potential to generate noise will be contained within buildings and/or include shrouding or noise cladding to minimise noise emissions.</li> <li>Suitable noise attenuation measures will be employed where practicable.</li> <li>Facility will be located over a concrete hardstand with clean stormwater segregated from potentially contaminated runoff, the latter which will enter the WWTS prior to irrigation.</li> <li>Solid waste not able to be rendered (i.e. paunch and bone material) will be disposed of at an appropriately licenced landfill, as per current practices.</li> </ul>	C = <b>Minor</b> : low level onsite impacts L = <b>Rare</b> : may only occur in exceptional circumstances <b>Low Risk</b>		



Risk Event				Risk rating	Reasoning	Regulatory controls
Source /Activities	Potential emissions	Potential pathways, receptors and impact	Licence holder controls	C = consequence L = likelihood		
Proposed biofilters – for the treatment of air emissions from the new rendering facility	Odour	Air / windborne pathway causing impacts to health and amenity. Closest three residential premises (zoned intensive farming) are located approximately 550 m and 630 m NE of the proposed biofilters. Wind at 9am at the site is E or SE for the majority of the year, which would direct odours way from the closest residential premises.	<ul style="list-style-type: none"> <li>Dedicated enclosed air distribution system from the by-products building to the above ground biofilter facility.</li> <li>Biofilters will comprise soil or compost in combination with bark, woodchips, crushed pine bark or other coarse material to provide an open structure.</li> <li>Moisture levels within the biofilter medium will be maintained through water sprinklers/sprays to support a population of microorganisms that have the ability to break down odorous compounds.</li> <li>A network of perforated pipes will distribute the air evenly or comprise a plenum chamber below the biomass.</li> <li>A leachate collection system will be installed to collect and direct liquids from the filter medium to the existing WWTS.</li> </ul>	<p><b>C = Slight:</b> minimal impacts to amenity at a local scale.</p> <p><b>L = Unlikely:</b> probably not occur in most circumstances</p> <p><b>Low Risk</b></p>	<p>The delegated officer considers that the separation distance between the source and potential receptors is sufficient. The delegated officer notes that the design of the proposed biofilters is similar to that of the existing biofilters, with improvements based on upgraded technology/design.</p> <p>The licence holder has requested to retain the use of the existing operational biofilters, which the delegated officer considers acceptable.</p>	<p>No additional regulatory controls.</p> <p>Licence holder controls will be conditioned.</p>
Increase in number of beef cattle held in lairage yards pending their slaughter at the onsite abattoir	Increase in fugitive dust from cattle movement	<p>The increase in the number of beef cattle held at the lairage yards has the potential to cause an increase in fugitive dust, odour and noise which may adversely impact upon nearby sensitive premises. The amount of solid waste (manure) will also increase.</p> <p>The closest residential premises (rural) are located approximately 470 to 700 m NE, E and SE of the existing lairage yards. Wind at 9am at the site is E or SE for the majority of the year, which would direct odours way from the closest residential premises.</p>	<ul style="list-style-type: none"> <li>Compacted gravel unloading and truck turn-around area.</li> <li>Majority of livestock holding yards are concrete based.</li> <li>Lairage yards are watered under dry, windy conditions.</li> <li>Regular housekeeping of lairage yards and holding pens to minimise fugitive dust.</li> <li>Internal unsealed roads and other trafficked areas are watered as required.</li> <li>Potentially contaminated stormwater (and any hosing down water) from holding yards is directed to yard pond via concrete box drains and PVC pipe.</li> <li>Lairage areas include bunding and/or sloped hardstand to direct uncontaminated stormwater away from these areas.</li> <li>Manure that accumulates in the lairage yards will be dry scraped at least weekly and stored in bins prior to removal offsite.</li> </ul>	<p><b>C = Slight:</b> minimal impacts to amenity at a local scale</p> <p><b>L = Unlikely:</b> probably not occur in most circumstances</p> <p><b>Low Risk</b></p>	<p>The delegated officer considers that the separation distance between the source and potential receptors is sufficient noting that fugitive odour from the increase in the number of beef cattle held is expected to be insignificant compared to abattoir and rendering operations onsite and the treatment of wastewater in the onsite wastewater treatment pond system.</p>	<p>No additional regulatory controls.</p> <p>Approved production capacity for category 55 will be amended to 300,000 animals (cattle) per annual period.</p>
	Increase in odour from manure					
	Increase in noise from bellowing cattle and vehicle movements/unloading					
	Solid waste (manure)					
Operation of proposed gas power plant	Stack emissions	<p>Air / windborne pathway causing impacts to health and amenity. Four residential premises (zoned intensive farming) located approximately 440 m to 590 m SE to ESE from the proposed gas power plant location.</p>	<ul style="list-style-type: none"> <li>Power plant will meet OHS noise specifications and comply with EP Noise Regs.</li> <li>Power plant will be located on concrete hardstand with drainage segregating clean stormwater from contaminated runoff.</li> <li>No hydrocarbon storage is envisaged.</li> <li>Power plant procurement specifications dictate requirement for emissions and sound power levels to be as low as reasonably possible.</li> <li>Greenhouse gas emissions are expected to be approximately: <ul style="list-style-type: none"> <li>CO<sub>2</sub> – 41,693 tpa</li> <li>CH<sub>4</sub> – 2.90 tpa</li> <li>N<sub>2</sub>O – 0.091 tpa</li> <li>Total CO<sub>2</sub>-e – 41,800 tCO<sub>2</sub>-e p.a.</li> </ul> </li> <li>Commissioning phase stack testing proposed to characterize stack emissions for NO<sub>x</sub>, CO and particulates.</li> </ul>	<p><b>C = Slight:</b> minimal onsite impact</p> <p><b>L = Unlikely:</b> probably not occur in most circumstances</p> <p><b>Low Risk</b></p>	<p>The delegated officer considers that the separation distance from the location of the proposed gas power plant to the closest rural dwellings, and taking into account wind direction, is sufficiently large and therefore, does not reasonably foresee offsite impacts from stack emissions or noise above the existing activities on the premises and has assessed the risk as low.</p> <p>The applicant has committed to stack testing for NO<sub>x</sub>, CO and particulates once constructed.</p> <p>The EP Noise Regulations apply to noise emissions.</p>	<p>Licence holder control for stack testing of NO<sub>x</sub>, CO and particulates as a once off to characterize stack emissions will be conditioned.</p>
	Noise	<p>Wind at 9am at the site is E or SE for most of the year, which would direct air emissions away from the closest residential premises'.</p>		<p><b>C = Slight:</b> minimal onsite impact</p> <p><b>L = Rare:</b> may only occur in exceptional circumstances</p> <p><b>Low Risk</b></p>		

Risk Event				Risk rating	Reasoning	Regulatory controls
Source /Activities	Potential emissions	Potential pathways, receptors and impact	Licence holder controls	C = consequence L = likelihood		
Operation of biosolids dewatering area (geotubes) (concrete pad approximately 100 m x 30 m)	Odour	Air / windborne pathway causing impacts to health and amenity. Closest residential premises (zoned intensive farming) is located approximately 550 m SE of the proposed dewatering area.	<ul style="list-style-type: none"> <li>Concrete pad will have a permeability of at least <math>1 \times 10^{-9}</math> m/s.</li> <li>Concrete pad will be graded and bunded.</li> <li>Concrete pad placed on top of limestone pad.</li> <li>Geotube will be placed within the concrete pad.</li> <li>Leachate will be directed to a sump to capture any leachate from the geotube. Leachate will then be directed to ponds 3, 4, 5 or 6.</li> <li>Biosolids from the geotubes will be removed offsite.</li> </ul>	<p><b>C = Slight:</b> minimal onsite impact</p> <p><b>L = Unlikely:</b> probably not occur in most circumstances</p> <p><b>Low Risk</b></p>	<p>The delegated officer considers that the separation distance from the location of the proposed geobags to the closest rural dwelling is sufficiently large and therefore, does not reasonably foresee offsite impacts from odour above the existing activities on the premises and has assessed the risk as low.</p> <p>There have been no complaints regarding the existing geotubes on the premises.</p> <p>Existing licence conditions require the licence holder to store all removed sludge on drying beds or in a geobag which is adequately bunded and drained to direct leachate from the drying bed or geobag back into the wastewater ponds; or dispose of all removed sludge off the premises to a licensed landfill.</p>	Licence holder controls conditioned.
	Leachate containment	Surface water or groundwater contamination. Surface drains 40 m S of proposed area.		<p><b>C = Minor:</b> low level onsite impacts</p> <p><b>L = Rare:</b> may only occur in exceptional circumstances</p> <p><b>Low Risk</b></p>		
Onsite disposal of an increased volume of treated wastewater (increasing from 600,000 kL to 720,000 kL) via irrigation to cropping areas (increasing from 140 to 200 ha)	Wastewater to land with excessive contaminants	Potential to contaminate surrounding land and adversely impact upon surface water, soil and groundwater. Existing agricultural drainage network through and adjacent to premises. Premises approximately 1.5 km N of Harvey Diversion Drain. Premises approximately 550 m S of an area protected under Environmental Protection (Peel Inlet – Harvey Estuary) Policy 1992. A minor river is located 50 m NW of premises boundary and current irrigation area. Depth to maximum groundwater can be as shallow as 1 – 2 mbgl. Groundwater salinity for the majority of the existing and proposed irrigation area is 1,500 – 3,000 mg/L (Perth Groundwater Map), which is considered brackish to saline. Soil types within irrigation areas have been tested and consist of heavy loam and clay soils with phosphorus buffering capacity generally >100.	<ul style="list-style-type: none"> <li>Wastewater will be treated and wastewater quality monitored. Treatment includes screening (rotating contrashear) to remove manure, fats and other solid waste. Contrashear is cleaned regularly. Adequate retention time of effluent within CAL (covered anaerobic lagoon) to ensure adequate anaerobic treatment of wastewater.</li> <li>Implementation of NIMP which will be updated for expanded production and irrigation area.</li> <li>Clean stormwater is diverted around the abattoir, yards, ponds, lairage areas and irrigation area to prevent it from entering and overloading the wastewater treatment system.</li> <li>Minimum freeboard of 300 mm will be maintained in ponds to ensure containment in the event of a 72 hour, 1 in 10 year storm event, when ponds are operating at maximum level at the end of the wet season.</li> <li>Extension of soil and groundwater monitoring network and continued analysis of key parameters at prescribed location in accordance with licence.</li> <li>Visual inspections of irrigation area to ensure land area is suitable for irrigation especially following rainfall events.</li> <li>Maximise holding capacity in ponds to accommodate periods of extended rainfall where irrigation is not possible.</li> <li>Continuation of monitoring of groundwater water quality within MW01, MW02 and MW03.</li> </ul>	<p><b>C = Moderate:</b> mid-level onsite and low level offsite impacts at a local scale</p> <p><b>L = Possible:</b> could occur at some time</p> <p><b>Medium Risk</b></p>	<p>The licence holder has provided a hydraulic loading investigation which shows that under current cropping practices, which the licence holder has committed to expanding to the proposed irrigation areas, the soil profile can support up to 2,820,000 kL/year (rainfall and irrigation) over the proposed 200 ha without excessive seepage to groundwater. Assuming the maximum 720,000 kL of wastewater is irrigated, the licence holder estimates that annual rainfall would need to remain below 1,050 mm/year to ensure no excessive seepage to groundwater occurs. The average annual rainfall at Wokalup (approximately 6 km SE) is 958.5 mm (for 1951 and 2022, Bureau of Meteorology); which is less than the maximum annual rainfall allowed within the licence holder's calculations.</p> <p>While the licence holder hasn't provided an updated NIMP that includes the increase to irrigation of 720,000 kL, the licence holder has provided nutrient and irrigation management information within their application. They have provided a nutrient balance that takes into account cropping within the irrigation areas, with crop uptake estimates are based on dry matter yields and leaf tissue analysis data collected onsite since 2017. The estimated gross nutrient application rates to soil from wastewater are 271 kg/ha/yr for TN and 101 kg/ha/yr for TP, which is below the existing licence nutrient loading limits of 400 kg/ha/yr for TN and 120 kg/ha/yr for TP. The licence holder has then estimated that the highest net nutrient application to soil is 53 kg/ha/yr for both TN and TP (see Table 2).</p> <p>It is noted that the existing TP licence loading limit was exceeded by 3.29 kg/ha during the 2022 reporting period within irrigation area A. The licence holder attributes this exceedance to increased loading from irrigated wastewater. The licence holder has since committed to ensuring wastewater is more evenly spread across irrigation areas and submitted this licence amendment application to increase the irrigation area.</p> <p>The delegated officer has considered the above, including licence holder controls, distance to environmental receptors and existing regulatory controls and has assessed the risk of impacts from wastewater disposal practices to the increased irrigation area to be medium. As the risk rating is dependent on licence holder controls, these will be added to the licence.</p> <p>It is noted that the nutrient and BOD loading limits for the application of wastewater to land are existing in the licence and have not been reassessed at this time and may no longer be appropriate for the premises. Therefore, the licence holder control to submit a NIMP will include the requirement to investigate appropriate nutrient loading rates based on the vegetation requirements within the irrigation areas.</p> <p>Administrative amendments will be made to the licence that include:</p> <ul style="list-style-type: none"> <li>requiring the licence holder to submit an annual photograph of flow meter(s) (clearly showing the meter reading) used for measuring the volume of wastewater irrigated. This is to ensure accurate wastewater volumes are being submitted.</li> <li>requirement to provide loading rate calculations in the form provided in Appendix 2 of this amendment report. This is to ensure nutrient and BOD loading limits are calculated correctly.</li> </ul>	<p>Licence holder commitments conditioned. This includes, but is not limited to:</p> <ul style="list-style-type: none"> <li>Inclusion of new lots within the premises description for the extension of the irrigation area.</li> <li>Submission of revised NIMP (that includes expanded irrigation area).</li> <li>Additional soil sampling areas 6S5:2, 7S5:1, 7S6:1, 8S8:2, 8S9:1, Phoenix 6, GR1:3, GR1:6 and GR1:7.</li> <li>Additional groundwater monitoring bores MW04 and MW05.</li> </ul> <p>Licence holder to provide annual photograph(s) (including date taken) of flow meter(s) used for measuring cumulative volume of wastewater irrigated.</p> <p>Licence holder will be required to submit nutrient and BOD loadings using the department provided spreadsheet.</p>
	Wastewater to land with excessive hydraulic loading			<p><b>C = Moderate:</b> mid-level onsite and low level offsite impacts at a local scale</p> <p><b>L = Possible:</b> could occur at some time</p> <p><b>Medium Risk</b></p>		

Risk Event				Risk rating C = consequence L = likelihood	Reasoning	Regulatory controls
Source /Activities	Potential emissions	Potential pathways, receptors and impact	Licence holder controls			
Salting of up to 300,000 hides on the premises	Solid waste (salt)	Containment of solid waste – potential for spillages onto soil contaminating stormwater, which may impact on soil, surface waters and groundwater. Depth to maximum groundwater can be as shallow as 1 – 2 mbgl. Agricultural drains approximately 300m from hide salting shed.	<ul style="list-style-type: none"> <li>Salting of hides undertaken within existing infrastructure – fully contained shed with concrete hardstand.</li> <li>Bunded concrete run-off collection sump.</li> <li>New salting drums to be installed within existing shed.</li> <li>Spent brine will be stored in tanks prior to being transferred offsite by a licensed liquid waste contractor.</li> </ul>	<b>C = Slight:</b> minimal onsite impact <b>L = Rare:</b> may only occur in exceptional circumstances <b>Low Risk</b>	The delegated officer considers that the distance between the source and potential receptors, taking into account licence holder controls, is sufficient and does not reasonably foresee offsite impacts from the salting of hides at the premises.  Category 83 (fellmongering) will be added to the prescribed premises category table on page 1 of the licence.	Licence holder controls will be conditioned. Category 83 added as a prescribed premises category. Spent brine has also been added as a waste where the amount leaving the premises must be recorded. Additionally, reporting of these amounts has been added to the annual reporting condition.
	Liquid waste (brine)	Spillages, overtopping and leaks from tanks containing brine. Potential for overland runoff of salt rich wastewater contaminating soil, surface water and groundwater. Depth to maximum groundwater can be as shallow as 1 – 2 mbgl. Agricultural drains approximately 300m from hide salting shed.	<ul style="list-style-type: none"> <li>Estimated to produce 10 L of brine per hide (i.e. 3 ML per year).</li> </ul>	<b>C = Minor:</b> low level onsite impacts <b>L = Rare:</b> may only occur in exceptional circumstances <b>Low Risk</b>		

## 5. Decision

Based on the assessment in this amendment report, the delegated officer has determined that a revised licence will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements. The delegated officer's reasoning and regulatory controls can be found in Table 4, with additional comments below.

### Approved production capacity of proposed rendering facility (category 16)

The delegated officer understands that the licence holder is seeking to increase the amount of external rendering material accepted onsite from 10,000 tonnes per annum to 50,000 tonnes per annum. However, the licence holder is not seeking an increase in the existing assessed production capacity that is on the licence (120,000 tonnes per annual period) as they have advised it is sufficient for the new facility. The delegated officer notes that the amount of material rendered at the premises from 2018 to 2022 ranged from 17,715 to 27,000 tonnes.

The licence holder, in their comments on the draft licence and draft amendment report, have requested to increase the assessed production capacity for category 16 to 140,000 tonnes per annual period. The delegated officer has considered the licence holder's comments (see Appendix 1) and has determined that the assessed production capacity for category 16 will remain at 120,000 tonnes per annual period until the proposed facility is constructed and an acceptable compliance certificate has been received.

### Approved production capacity for abattoir (category 15)

The delegated officer notes the licence holder is not requesting an increase to the existing approved production capacity, for category 15, of 220,000 tonnes (hot standard carcass weight) of cattle slaughtered per annual period. This amount was historically on the licence as a live weight and, through an administrative error, was renamed to hot standard carcass weight during a previous licence amendment. No calculations to convert the live weight to hot standard carcass were done at the time.

The delegated officer understands that the licence holder will be increasing production at the abattoir, which will be achieved through extended kill shifts and operation over a 6-day week as part of this amendment.

The delegated officer has sought clarification from the licence holder, who has advised that approximately 192,000 tonnes of hot standard carcass weight of cattle slaughtered per annual period is equivalent to the proposed 300,000 cattle held pending slaughter. The approved production capacity for category 15 will therefore be amended to 192,000 tonnes of hot standard carcass weight to reflect this.

## 5.1 Summary of amendments

Table 5 provides a summary of the proposed amendments and will act as record of implemented changes. All proposed changes have been incorporated into the revised licence as part of the amendment process. The numbering of other conditions (not amended) may have changed but are not detailed below.

**Table 5: Summary of licence amendments**

Condition no.	Proposed amendments
Front page	Amended to update file number, include original date of issue of licence, include additional lots within premises legal description, update assessed production capacity for categories 15, 16 and 55, and added category 83.
Licence history	Added details of this licence amendment
1	Works – Construction – for the construction of proposed rendering facility and proposed biofilters.



2 to 4	Reporting on compliance of construction of proposed infrastructure.
5 and 6	Operation of proposed infrastructure once constructed.
7 to 9	Installation and reporting of compliance of the construction of two groundwater monitoring wells
10	Decommissioning of existing rendering facility following construction of proposed facility.
11, Table 4, row 2	Added 'CAL Pond' label under infrastructure location
11, Table 4, rows 11 to 14	Added gas power plant, biosolids dewatering areas (geobags) and salting of hides
12 and 13	Requirement to submit a revised Nutrient and Irrigation Management Plan
14, Table 5, rows 3 and 4	Clarified that existing rendering facility exhaust gases must be directed through existing biofilters. Proposed rendering facility exhaust gases must be directed through either the existing or proposed biofilters.
16, Table 7	Clarified that no more than 10,000 tonnes per annual period of renderable animal material may be currently accepted. Following construction of the proposed rendering facility, no more than 50,000 tonnes per annual period of renderable animal material may be accepted for rendering at the premises.
18, Table 9, row 9 and 19, Table 10	Added requirements for storage and disposal of brine from the salting of hides and reporting on amount of brine removed from premises
21, Table 12	Added additional soil sampling locations
22, Table 13	Added additional groundwater bore sampling locations and clarified names of existing bores
30, Table 14	Added that the amount of each waste and by-product removed from the premises during the annual period must be reported. Added that an annual photograph of flow meter(s) (clearly showing meter readings) used for measuring cumulative volume of wastewater irrigated must be submitted. Added that monthly and annual nutrient and BOD loading calculations must be provided in the form of the <i>Licence holder loading rates calculator</i> spreadsheet as provided by the department.
Definitions, Table 15	Updated reference to NUDLC to refer to most recent edition
Premises map	Updated to include expanded boundary
Irrigation Areas map	Updated to include additional irrigation areas
Soil sampling locations map	Updated to include additional soil sampling locations
Groundwater monitoring well locations map	Updated to include additional groundwater monitoring bore locations
Proposed infrastructure map	Added to include location of proposed infrastructure

## Appendix 1: Summary of licence holder’s comments on risk assessment and draft conditions

Summary of licence holder’s comments	Department’s response																		
<p>Clarified the assessed production capacity for category 15 - abattoir</p>	<p>The department has updated the assessed production capacity for category 15.</p>																		
<p>Assessed production capacity for category 16 – rendering operations By-products from 300,000 head plus 50,000 tonnes of offsite renderable material equates to approximately 140,000 tonnes. The 140,000 tonnes/year comprises 50,000 tonnes/year of external product plus 90,000 tonnes/year of Harvey Beef generated by-products. Currently Harvey Beef process on average 140-150 tonnes/day of raw material from 715-730 head of cattle processed in a day. This equates to approximately 200 kg of by-products material generated per head slaughtered. At the expanded production capacity of 300,000 head:</p> <ul style="list-style-type: none"> <li>• This requires a by-products throughput of approximately 60,000 tonnes/year.</li> <li>• However, to accommodate the price fluctuation in the offal price, Harvey Beef is seeking the flexibility to render more offal products when this commercial opportunity arises in the market. This may contribute approximately 60 kg per cattle.</li> <li>• In addition, notwithstanding the hide salting process covered in the application, Harvey Beef is seeking the ability to also potentially process cattle hides (which weigh approximately 30-40 kg per cattle) in the new rendering plant.</li> </ul> <p>The latter two activities have been estimated to account for the additional quantity Harvey Beef generated by-products being sought.</p> <p>The table below summarises the basis for the calculation and request for 140,000 tonnes/year for Category 16. Other than the 140,000 tpa total capacity, and 50,000 tpa limit on external rendering, Harvey Beef requests that the other data provided below is for approximate information only, rather than for setting prescribed limits on those components.</p> <table border="1" data-bbox="210 1145 1137 1380"> <thead> <tr> <th>Component</th> <th>Rate</th> <th>By-products</th> </tr> </thead> <tbody> <tr> <td>External product</td> <td>1</td> <td>50,000</td> </tr> <tr> <td>300,000 head processing</td> <td>Approx 200 kg/head</td> <td>60,000</td> </tr> <tr> <td>Additional capacity subject to market</td> <td>Approx 60 kg/head</td> <td>18,000</td> </tr> <tr> <td>Hide rendering</td> <td>Approx 30-40 kg/head</td> <td>12,000</td> </tr> <tr> <td colspan="2"><b>Total Category 16 throughput:</b></td> <td><b>140,000</b></td> </tr> </tbody> </table>	Component	Rate	By-products	External product	1	50,000	300,000 head processing	Approx 200 kg/head	60,000	Additional capacity subject to market	Approx 60 kg/head	18,000	Hide rendering	Approx 30-40 kg/head	12,000	<b>Total Category 16 throughput:</b>		<b>140,000</b>	<p>The department notes that this is an increase from the existing 120,000 tonnes of animal material rendered per annual period, that the licence holder indicated was adequate for the increase from 10,000 to 50,000 tonnes of renderable material accepted from offsite, and the increase to 300,000 head of cattle for the operation of the proposed rendering facility.</p> <p>The delegated officer understands that the proposed facility is capable of rendering 140,000 tonnes of animal material per annum; however, this amount will not be reflected on the licence at this time as the facility is not yet constructed.</p> <p>Once the proposed rendering facility has been constructed and an acceptable compliance certificate has been provided, the licence holder is able to apply for an amendment to the licence to increase the assessed production capacity for category 16 to reflect the new facility.</p> <p>The assessed production capacity of 140,000 tonnes per annual period for the proposed facility has been added as part of the description of the proposed infrastructure within the works – construction condition of the licence.</p>
Component	Rate	By-products																	
External product	1	50,000																	
300,000 head processing	Approx 200 kg/head	60,000																	
Additional capacity subject to market	Approx 60 kg/head	18,000																	
Hide rendering	Approx 30-40 kg/head	12,000																	
<b>Total Category 16 throughput:</b>		<b>140,000</b>																	



Summary of licence holder's comments	Department's response
<p>Condition 1, Table 1, Item 1 (d)            Requesting to change "directing exhaust airs and odours to a biofilter" to "directing <i>process</i> exhaust airs and odours to a biofilter".            The proposed odour extraction system will capture all significant odour sources within the rendering facility (90% of all odours) and direct these to the biofilters; a residual unintensive airflow may be vented through vertical fans thereby maintaining operator comfort within the negative pressure building.</p>	<p>This condition was based on a licence holder control, and while the original wording was taken from the licence holder's application, the condition has been updated to include the word "process" as the delegated officer considers that this is an administrative amendment to clarify the intention of the control.</p>
<p>Clarified the location of the proposed biofilters</p>	<p>The location has been updated in the relevant conditions and the proposed infrastructure map in Schedule 1 has been updated.</p>
<p>Condition 10 – decommissioning of existing abattoir facility            Requesting to change <i>constructed</i> to <i>operational</i>.</p>	<p>No explanation has been given on the reason for this change; however, it is the intention of the condition that the existing abattoir facility is to be decommissioned following the new facility being constructed and able to be operated. Therefore, the delegated officer has made the amendment and included a note to state that operational means once the facility is constructed and the construction compliance report has been submitted.</p>
<p>Condition 11, Table 4, Item 11(a) – Gas Power Plant - clarification on how contaminated runoff will be managed.            Contaminated stormwater will be contained within the concrete banded hardstand area.            Liquid chemical spills will be contained and cleaned up using spill kids located at this facility in accordance with Harvey Beef's Spill Response Procedures prior to removal of contaminated materials from the premises.</p>	<p>Added the word <i>banded</i> to the description of the concrete hardstand area.</p>
<p>Condition 11, Table 4 – Biosolids dewatering            Please note that the existing biosolids dewatering areas with Geobags will be immediately decommissioned and no longer utilised for this purpose once the new Geobag area described in Item 13 of the draft licence is operational.            For the proposed geobag area, requesting to change section (b) from "leachate in the <i>sump</i> to be directed to wastewater treatment ponds 3, 4, 5 or 6" to "leachate from <i>geobags</i> to be drained to wastewater treatment ponds 3, 4 or 5".</p>	<p>Based on information provided by the licence holder, the delegated officer will not include the existing biosolids dewatering areas with geobags within the infrastructure table on the licence.            The proposed areas have been included and the delegated officer understands that once this area is constructed, will be the only geobag area utilised.            The delegated officer has removed the words "in the sump" from section (b) such that leachate within biosolids dewatering area, which will include the geobags, must be directed to the wastewater treatment ponds.            Wastewater pond 6 has been removed as per licence holder comments.</p>

## Appendix 2: Licence holder loading rates calculator

Irrigation areas <sup>1</sup> : size, volume irrigated, irrigation days				Annual period (as defined by your licence) <sup>2</sup>												Volume irrigated during annual period (kL) <sup>3</sup>	
	Size (ha)			January	February	March	April	May	June	July	August	September	October	November	December		
EXAMPLE irrigation area:	25	volume irrigated	kL	20,000	20,000	18,000	15,000	0	0	0	0	15,000	18,000	20,000	25,000	151,000	
		days of irrigation	days/month	29	28	30	25	0	0	0	0	20	25	30	27		
Irrigation Area 1:		volume irrigated	kL														
		days of irrigation	days/month														
Irrigation Area 2:		volume irrigated	kL														
		days of irrigation	days/month														
Irrigation Area 3:		volume irrigated	kL														
		days of irrigation	days/month														
Wastewater quality <sup>4</sup>	EXAMPLE sampling date:			20/01/2022	15/02/2022	17/03/2022	19/04/2022	12/05/2022	12/06/2022	9/07/2022	15/08/2022	12/09/2022	15/10/2022	13/11/2022	7/12/2022		
	EXAMPLE total nitrogen			mg/L	13.2	21.3	17.6	19.2	42.4	25.1	30.4	40.3	34.8	38.7	44.6	47.3	
	EXAMPLE BOD			mg/L	4.8	12.1	6.1	4.9	4.8	4.1	3.3	5.2	4.4	5.2	5.1	7.5	
	Sampling date:																
	For wineries to indicate sampling period: <sup>5</sup>																
	Total nitrogen			mg/L													
	Total phosphorus			mg/L													
Biochemical oxygen demand			mg/L														
Nutrient and BOD loadings <sup>6</sup>				January	February	March	April	May	June	July	August	September	October	November	December	kg/ha/annual period <sup>7</sup>	
EXAMPLE total nitrogen loadings				10.6	17.0	12.7	11.5					20.9	27.9	35.7	47.3	183.5	
EXAMPLE BOD loadings				kg/ha/month	3.8	9.7	4.4	2.9				2.6	3.7	4.1	7.5	38.8	
				kg/ha/day	0.13	0.35	0.15	0.12				0.13	0.15	0.14	0.28		
Irrigation Area 1	Total nitrogen			kg/ha/month													
	Total phosphorus			kg/ha/month													
	Biochemical oxygen demand			kg/ha/month													
				kg/ha/day													
Irrigation Area 2	Total nitrogen			kg/ha/month													
	Total phosphorus			kg/ha/month													
	Biochemical oxygen demand			kg/ha/month													
				kg/ha/day													
Irrigation Area 3	Total nitrogen			kg/ha/month													
	Total phosphorus			kg/ha/month													
	Biochemical oxygen demand			kg/ha/month													
				kg/ha/day													
<b>Explanatory notes and calculations:</b>																	
White cells should be filled in where applicable.																	
NOTE 1 - Where there is irrigation to more than 3 areas, additional copies of this sheet should be completed.																	
NOTE 2 - This sheet should be completed for your annual period as defined by your licence. E.g. If your annual period is from 1 October to the 30 September in the following year, for the 2022-2023 annual period, you should include data from January - September 2023, and October - December 2022.																	
NOTE 3 - Volume irrigated during the annual period (kL), for each irrigation area is the sum of the monthly volumes irrigated to that area. E.g. For the example shown: Volume irrigated during annual period = 20,000 (Jan) + 20,000 (Feb) + 18,000 (Mar) + 15,000 (Apr) + 15,000 (Sep) + 18,000 (Oct) + 20,000 (Nov) + 25,000 (Dec) = 151,000 kL. Noting that for the example there was no irrigation during the months of May, June, July or August.																	
NOTE 4 - The sampling and analysis of your wastewater quality should be undertaken in accordance with your licence conditions. For sampling less often than monthly, i.e. quarterly, 6-monthly, or annually: for months where no sampling is required, wastewater quality should be taken to be equivalent to the most recent sample taken. E.g. Quarterly sampling during Feb, May, Aug and Nov - total nitrogen concentrations were analysed to be 7, 11, 8 and 13 mg/L respectively in the wastewater. For March and April, as February was the most recent sample taken, total nitrogen concentration is estimated to be 7 mg/L. Similarly, for June and July, as May was the most recent sample, total nitrogen concentration is estimated to be 11 mg/L. There will be no sampling date associated with non-sampling months. If your licence requires you to monitor loading rates for additional parameters (e.g. inorganic nitrogen, reactive phosphorus etc.) additional copies of this sheet should be completed for the additional parameters.																	
NOTE 5 - For wineries to indicate sampling period - this row is only required to be completed if your licence condition specifies a sampling period e.g. pre-vintage, peak vintage, late vintage, post vintage, non-vintage. Indicate which sampling date corresponds with which period.																	
NOTE 6 - Parameter loading (TN, TP or BOD) each month per hectare for each irrigation area (kg/ha/month): $\frac{\text{monthly concentration of parameter (TN, TP or BOD) in mg/L} \times \text{monthly volume of wastewater irrigated to irrigation area (kL)}}{\text{size of irrigation area}}$ E.g. Using the example shown, for total nitrogen for January: $13.2 \text{ mg/L} \times 20,000 \text{ kL} / 1,000 = 264 \text{ kg/month}$ . $264 / 25 \text{ ha} = 10.6 \text{ kg/ha/month}$ (for January). Loading of parameter (BOD) each day per hectare for each irrigation area (kg/ha/day): $\text{BOD loading (kg/ha/month)} \div \text{number of days of irrigation during that month}$ . E.g. Using the example shown, for BOD for October: $3.7 \text{ kg/ha/month} / 25 \text{ days of irrigation during October} = 0.15 \text{ kg/ha/day}$ (for October)																	
NOTE 7 - To calculate annual loading of parameter (TN, TP or BOD) per hectare (kg/ha/annual period): sum of monthly loadings (kg/ha/month). You should calculate an annual loading (kg/ha/annual period) for each parameter for each irrigation area.																	

\* To request an electronic copy of this spreadsheet please contact info@dwer.wa.gov.au