Decision Report

Application for a replacement licence

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

Licence Number	L8015/2003/4
Applicant	Mundella Foods Pty Ltd
ACN	055 862 774
File Number	2010/002296-1~2
Premises	Mundella Foods Lot 2 on Plan 51860 (Randell Road), Lot 51 on Plan 226010, Lot 52 on Plan 226115, Lot 123 on Diagram 5045 and Lot 522 on Plan 249485 MARDELLA WA 6125 As defined by the premises maps attached to the issued licence
Date of Report	6 July 2021
Proposed Decision	Licence granted

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1. Decision summary

The delegated officer has determined to replace licence L8015/2003/3, which includes an update to the format and amalgamation of previous amendment notices. The licence is issued for a period of 3 years.

2. Scope of assessment

2.1 Regulatory framework

In replacing the licence, the department has considered and given due regard to its Regulatory Framework and relevant policy documents which are available at https://dwer.wa.gov.au/regulatory-documents.

2.2 Application summary and overview of premises

Licence L8015/2003/4 is held by Mundella Foods Pty Ltd (Mundella) (licence holder) for the Mundella Foods milk processing premises, located at Lot 2 Randell Road, Mundijong, about 12 km west of Jarrahdale. The premises relates to category 17: Milk processing, with an assessed production capacity of 5,000 tonnes per year of milk processed under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations). Mundella has been in operation for approximately 30 years and occupies 200 hectares of land which includes wastewater irrigation paddocks (Lots 51, 52, 115, 123, and 511) and a factory with cooler room, milk storage, and wastewater management infrastructure (sump tank, irrigation tank, grease traps) (Lot 2) (Figure 1).

Licence L8015/2003/3 expires on 14 July 2021. Therefore, on 14 October 2020, the licence holder submitted an application to replace the licence to the department under section 57 of the *Environmental Protection Act 1986* (EP Act).

2.2.1 Solid waste and wastewater management (from application)

Mundella produces yoghurts, cream and a selection of cheese. In the process, the following wastes are produced at the premises: dairy solid waste; dairy liquid waste; whey and washdown water. Following daily production, scheme water is used to wash down the factory which is directed through drains in the factory floor (Figure 2). All solids are collected in sieves located in the floor of the factory and placed in a skip bin which gets emptied by a contractor and removed off site twice a week. The remaining wastewater is then channeled through three grease traps and pumped to a 22,000 L wastewater holding tank. A contractor empties the grease traps every three months. The wastewater holding tank is located on Lot 123 and stores the wastewater prior to irrigation on Lots 52 (54.3 ha), 115 (14.9 ha) and 123 (10.2 ha) (total of 79.4 ha) using a water tanker (Figure 3)

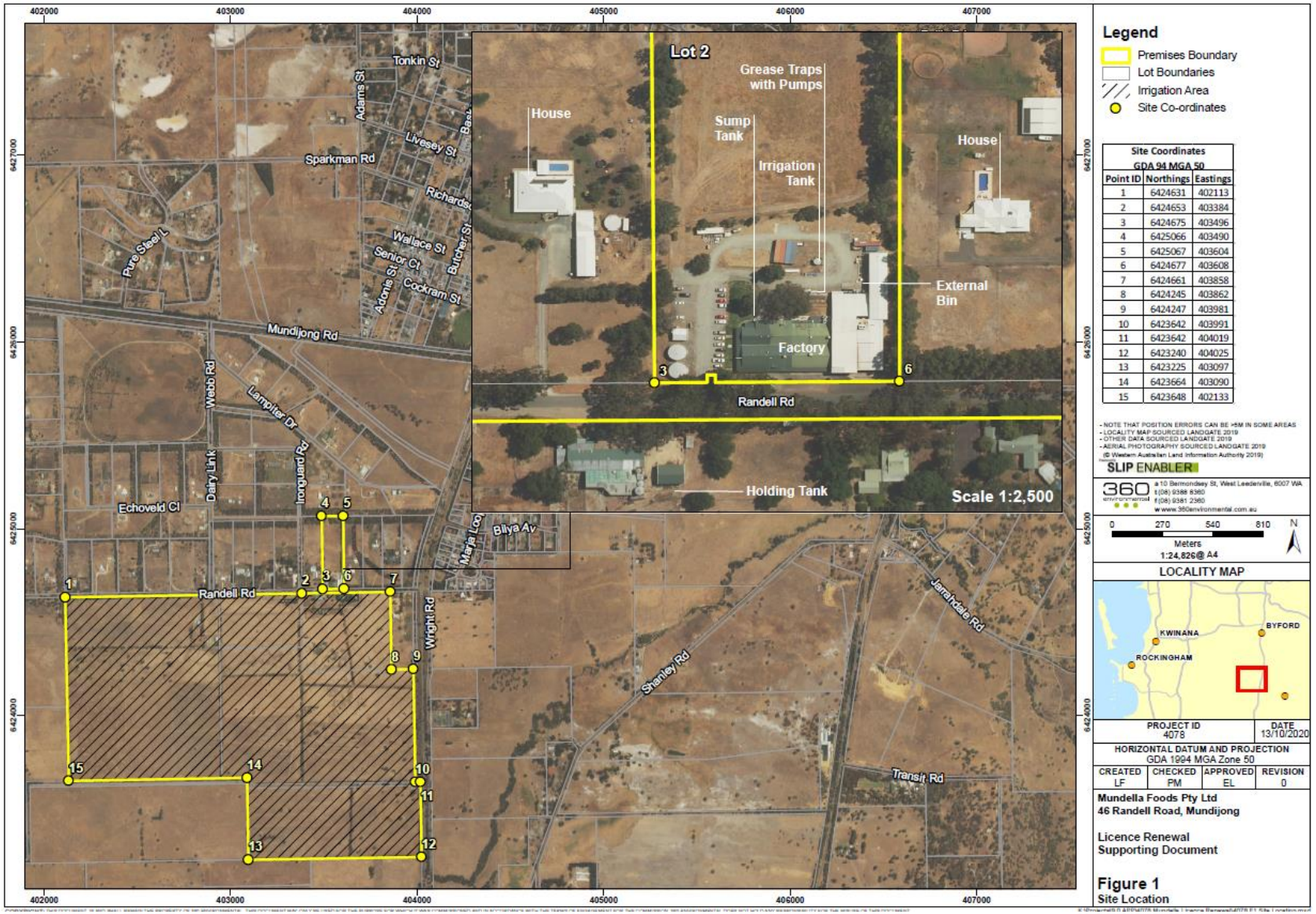


Figure 1: Premises infrastructure map

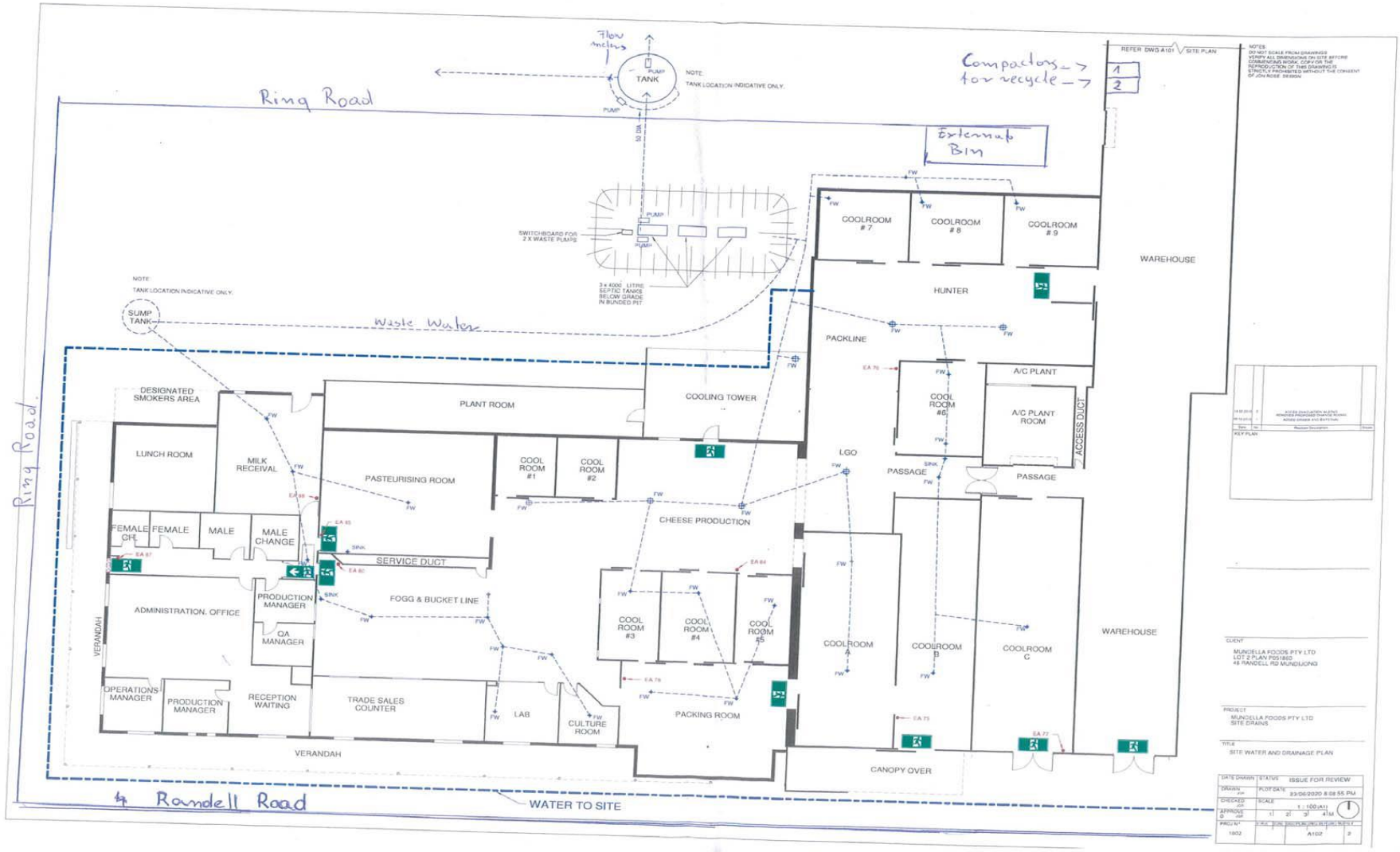


Figure 2: Factory layout plan

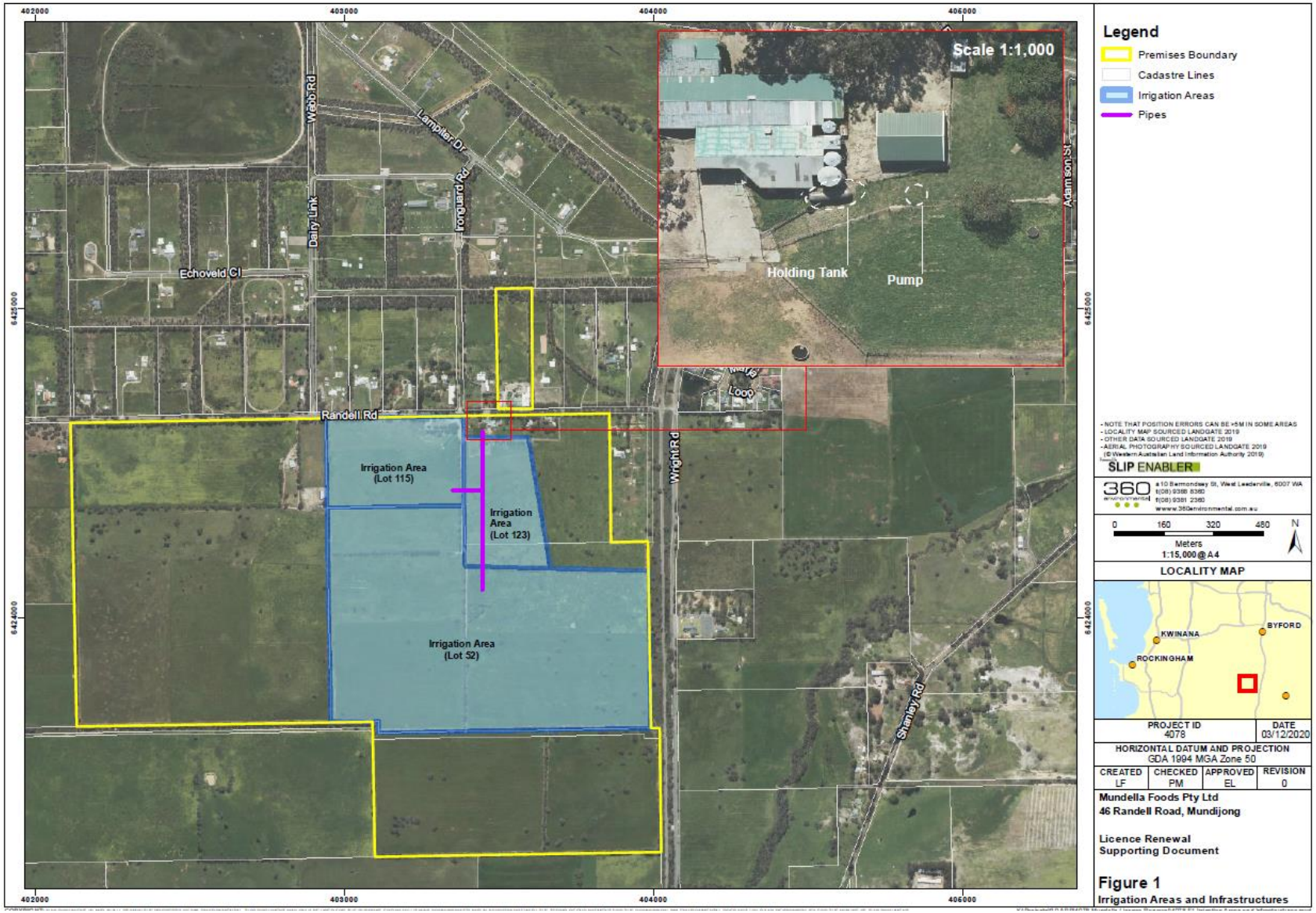


Figure 3: Wastewater irrigation paddocks and piplines

2.3 Wastewater monitoring data

2.3.1 Annual Environmental Reports

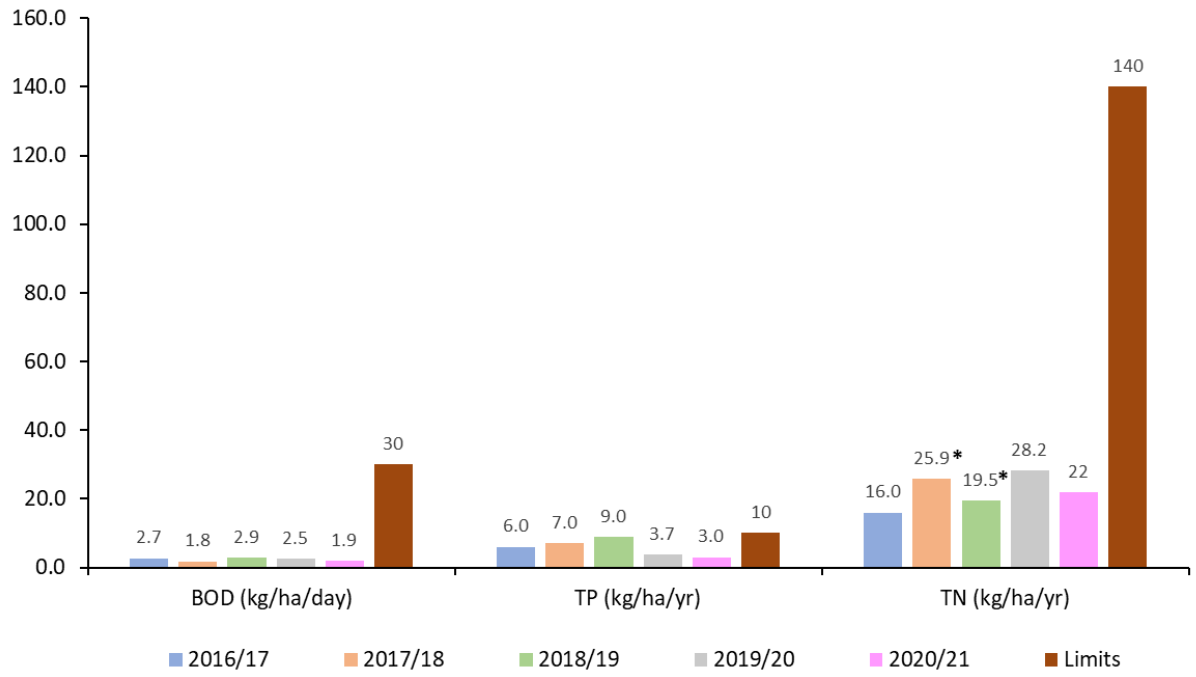
As per the current licence conditions, wastewater is to be monitored at the wastewater holding tank (monitoring point M1) prior to irrigation for volumetric flow rate (monthly), pH, total nitrogen (TN), total phosphorous (TP), biological oxygen demand (BOD) and total suspended solids (TSS) and total dissolved solids (TDS) (six monthly; April and October). The licence holder must also submit an Annual Environmental Report (AER) at the end of each annual period reporting on these parameters (Table 1).

Table 1: Wastewater contaminant concentrations

Reporting period	Amount irrigated (kL)	Area irrigated (ha)	pH average	TDS (mg/L)	TSS (mg/L)	BOD (mg/L)	TN (mg/L)	TP (mg/L)
2016/17	10,800	146.5	8.5	7080	1383	7645	178	87.1
2017/18	12,600	146.5	8.9	8390	990	8925	219[1]	82.8
2018/19	20,599	146.5	10.4	8935	1000	4900	184[1]	76.5
2019/20[2]	20,749	79.4	10.2	9210	1100	4900	139	66.5
2020/21	17,262	79.4	11.7	2835	625	2250	105	17

[1] TN readings in October 2018 (4.9 mg/L) and April 2019 (1.4 mg/L) appear incorrect, so have not been included in calculating TN averages for those years.
[2] Data from 2019/20 has been derived from the NIMP (360 Environmental, 2020)

The AERs that have been submitted for the reporting periods 2016 - 2019 state that irrigation has occurred on 146.5 ha of land in each reporting period. The Nutrient Irrigation Management Plan (NIMP) that was submitted with the application reports on more recent data, from 2019/20. This states that irrigation only occurred on 79.4 ha for the year. Of the above parameters to be monitored, the existing licence only stipulates limits on TN, TP and BOD. A review of the most recent AERs has determined that the licence holder has been within these limits (Figure 4) (data is averaged over the data collection period).



***** TN readings in October 2018 (4.9 mg/L) and April 2019 (1.4 mg/L) appear incorrect, so have not been included in calculating TN averages for those years.

Figure 4: Nutrient loading rates and current licence limits

2.3.2 Nutrient Irrigation Management Plan

The licence holder submitted a Nutrient Irrigation Management Plan (NIMP) (360 Environmental, 2020) to support the application to replace the licence. The NIMP has been reviewed and summarised below as part of the risk assessment for the replacement licence.

Soil and geology

The geology of the site can broadly be described as containing sandy clay and thin Bassendean sand with most of the site underlain with sandy clay. Soil sampling was conducted at seven locations on Lots 52 and 115 to assess the soil suitability for wastewater irrigation and to characterise the soil type and conditions. The key findings from the soil sampling are:

- The phosphorous retention index (PRI) indicated that the phosphorous fixation properties of the soils are strongly to very strong adsorbing;
- Electrical conductivity indicated nil soil salinity as defined in the Use of Effluent by Irrigation Guidelines (DEC, NSW 2004);
- The pH varied between 5.6 and 7.6, indicating “moderate” limitations on effluent irrigation at some sites and “nil” limitation at the other sites (DEC, NSW 2004); and
- The average infiltration rate recorded during the sampling program at one site was 0.2 m/day which equates to the soil exhibiting a saturated hydraulic conductivity of 8.3 mm/hr. This is consistent with the saturated hydraulic conductivity recommended by DEC NSW (1998).

Surface water

The premises is located approximately 140m north of the nearest waterway, Mundella Brook. The brook is an ephemeral waterway that enters the Serpentine River to the south of the site. The Oaklands Main Drain runs on the western corner of the site and most of the escarpment flows accumulate to Manjedup Brook, Cardup Brook and Beenyup Brook, where they traverse the Swan Coastal Plain in an east-west direction, and discharge to the Oaklands Main Drain.

The premises is mapped as a Multiple Use Category wetland, and a portion of which is within an Environmentally Sensitive Area (ESA) associated with a Conservation Category Wetland. Any impacts to the ESA are controlled by managing irrigation to avoid spray drift off the site and not irrigating to waterlogged areas.

There are no DWER surface water quality monitoring locations near the site.

Groundwater

Groundwater is not monitored at the premises. The nearest bore is approximately 1.2 km northeast of the premises which has measured a maximum depth to groundwater of 3 m below ground level (bgl) between 2011 and 2020. Groundwater quality has not been addressed in the NIMP.

Irrigation and nutrient loading rates

According to the NIMP, wastewater is irrigated using a mobile water tanker on Lots 52 (54.3 ha), 115 (14.9 ha) and 123 (10.2 ha), totaling 79.4 ha. The NIMP states that if required, the option to irrigate to Lots 51 (80.96 ha) and 511 (35.33 ha) is also possible, however the site does not currently produce enough wastewater for those areas to be regularly irrigated with wastewater. However, this information varies from the most recent AERs which reported that irrigation has previously occurred over a total of 146.5 ha, including part of Lot 511 (Table 1).

The schedule and volume of wastewater irrigated is dependent on rainfall and volume of wastewater produced. The 2020 AER reported a daily irrigation rate of 85.8 kL over 146.5 ha (0.59 kL/ha/day). However, the NIMP states that on average, approximately 56.7 kL is irrigated each day over 79.4 ha (0.71 kL/ha/day) and that the monthly average wastewater irrigation currently ranges from a minimum of 1113 kL in July to a maximum of 2394 kL in November (total of 20,746 kL per year).

Although the volume and rate of wastewater irrigation stated in the NIMP varies to what the 2020 AER reported as actually occurring on site, the water balance in the NIMP is considered conservative as it assumes a higher hydraulic loading rate (i.e. 0.71 kL/ha/day compared with 0.59 kL/ha/day).

2.3.3 Department of Water and Environmental Regulation (DWER) technical review

The principal components of a sustainable wastewater irrigation scheme are:

- The annual loads of nitrogen and phosphorous applied in wastewater do not exceed the uptake of these nutrients by vegetation in the irrigated area. This generally means that wastewater is irrigated to a sufficiently large area that nutrients are taken up by the crop and removed from the area in harvested biomass;
- The irrigated area should be sufficiently large to enable the applied wastewater to be fully utilised by the crop. This generally means that irrigation does not take place in the southern part of Western Australia during winter months, when rainfall exceeds the rate of evapotranspiration, and when there is a significant risk that nutrients will be leached into groundwater. Wastewater produced in winter months is often stored for use during warmer months, and sufficient land area should be available to enable both the stored and ongoing production of wastewater to be discharged; and
- The chemical composition of the wastewater will cause adverse effects in soil quality and structure in the irrigated area.

Hydraulic loading

As a first approximation, the below equation gives the area of land required for irrigating a given production rate of wastewater (US EPA, 2006).

$$A = (3.65 \times Q) / (L \times T_{app})$$

Where: A = land area (hectares)
Q = flow rate of wastewater (m^3/day)
L = wastewater hydraulic loading to soil (cm/week)
T_{app} = period of wastewater application each year (weeks)

The daily production rate of wastewater at the premises is about 56 m^3/day averaged throughout the year. As a first approximation, the acceptable hydraulic loading rate for soils can be assumed to be about 4 cm/week (US EPA, 2006). Substituting these values into the above equation, gives a required land area of about 1 ha. Given that the total irrigation area currently available at the premises is 79.4 ha, there is a sufficiently large area available to accommodate the annual hydraulic loading of wastewater.

However, this loading assessment does not consider the fact that rainfall exceeds evaporation for a period of about four months each year (May to August) at the premises. This means, soils during this period are likely to be close to their field capacities, particularly during June and July when monthly rainfall is almost twice as high as the monthly evaporation rate. Consequently, there would be a high risk that wastewater that was applied to land during these months would infiltrate past the crop root zone and would infiltrate into groundwater.

Irrigation at the premises occurs throughout the year and there is currently no capacity to store wastewater for a period of several weeks during winter when soils are mostly saturated. Therefore, there is a high risk that nutrients (TN and TP), TSS and TDS are being leached into the groundwater from irrigated land in the winter months. Additionally, the relatively small size of the washdown effluent storage tank at the facility means that the quality of the stored effluent is highly variable over time. This can make it difficult to develop accurate nutrient balances for the site to ensure that the nutrients that are applied to land in the wastewater are efficiently removed by the irrigated crop.

These problems could be minimised by ensuring that wastewater irrigation does not take place during June and July each year. Therefore, a reduction in wastewater production and/or additional storage for wastewater during those winter months would be required.

Contaminant loading

- Nitrogen

A preliminary estimate of the land area required to ensure that a particular crop takes up all of the nitrogen applied in a disposal area is given by the following formula (refer to Appendix 6 in NSW EPA, 1998; NSW DEC, 2004):

$$A = \frac{C \times Q}{L_N}$$

Where: A = land area (m^2)
C = concentration of N in wastewater (mg/L)
Q = treated wastewater flow rate (L/d)
L_N = critical loading rate (uptake rate) for N for a specific crop (mg/m^2/d)

As a first approximation, L_N can be considered to be about 25 mg/m^2/day (see Appendix 6 in NSW EPA, 1998). The nitrogen concentration in the washdown wastewater varies from about 77 to 349 mg/L, with an average concentration of about 194 mg/L. The daily flow rate of treated effluent is about 56,000 L/day. Substituting the average total nitrogen concentration and daily flow rate into the above equation gives a required land area of about 44 ha.

This indicates that there is currently sufficient land area for crops to remove the average content of nitrogen in the washdown effluent. However, it would be important that the wastewater is applied at suitable times of the year to minimise the leaching of nitrogen compounds from soil into groundwater (refer to the discussion on hydraulic loading).

The above assessment of the potential for crop uptake to remove nitrogen from the irrigated wastewater is subject to large errors. This is due to the simplifying assumptions that were used. It is therefore important that the actual nitrogen content of both soils and leaf tissue in irrigated crops at the site is monitored on an ongoing basis. This would be necessary to ensure that nitrogen removal rates match the amount of nitrogen that is discharged in the irrigation water.

- Phosphorous

By contrast to nitrogen loadings to soil, much of the applied phosphorus is adsorbed on ferruginous and clay minerals within the soil profile. As the rate at which crops remove phosphorus from this soil storage may be relatively low, adsorption sites within the soil profile may progressively become saturated with this nutrient. This can limit the lifespan of wastewater irrigation schemes when the entire soil profile between the land surface and the water table becomes saturated with phosphorus. However, the lifespan of a wastewater irrigation scheme can often be prolonged by reducing the rate of phosphorus application in wastewater to match the rate at which crops remove this nutrient from soil storage.

As a first approximation, the extent to which the crop uptake rate of phosphorus in the Mundella irrigation area matches the application rate in wastewater can be assessed using data provided in the NSW wastewater irrigation guidelines (NSW DEC, 2004). According to these guidelines, irrigated hay crops produce about 4 tonnes/ha of dry matter each year, that contains on average about 0.4% of phosphorus. Assuming this applies to the Mundella irrigation area, the annual rate of removal of phosphorus in harvested biomass each year from the 79 ha irrigation area would be about 1264 kg. According to data provided in the NIMP, the average phosphorus concentration in the wastewater throughout the year is about 77 mg/L, and the daily flow rate is 56,000 L/day. Using these data, the total amount of phosphorus that is applied annually in wastewater to the irrigation area is about 1573 kg, about 300kg above the crop uptake rate.

The phosphorous loading limit on the existing licence is 10 kg/ha/yr, and a review of the last three reporting periods demonstrates that the licence holder has stayed within this limit. However, as discussed above, the current phosphorus application rate to land in the irrigation area is not sustainable. Therefore, an increase in the level of treatment of the wastewater is required to lower the phosphorous concentrations to below 30 mg/L content prior to irrigation.

- BOD, TSS and TDS

Milk processing facilities are characterised by high concentrations of organic matter including BOD, TSS and TDS, which have an inherent risk of emitting odour. At the Mundella premises, solid wastes are separated from liquid wastes via a drainage system after daily processing. The remaining wastewater does not currently undergo any treatment before irrigation and therefore has elevated levels of organic matter.

The National Water Quality Management Strategy guidelines for sewerage systems and effluent management (1997) recommends that for primary treatment systems (such as the system at the Mundella site), typical BOD ranges for treated effluent should range between 120-250 mg/L. Wastewater from the Mundella site is 10-40 times above this typical BOD range.

The most recent AER reported TSS results of 600 mg/L (30/04/20) and 650 mg/L (22/10/20), The above guideline recommends that typical TSS concentrations for primary treated effluent should range between 80-200 mg/L. Wastewater from the Mundella site is 3-7 times above this typical TSS range.

The National Water Quality Management Strategy: Australian guidelines for water recycling and managing health and environmental risk (2006), recommends a critical limit of 1500 mg/L for TDS, above which operational corrective actions are recommended. The most recent AER reported TDS results of 2290 mg/L (30/04/20) and 3380 mg/L (22/10/20), up to nearly 3 times above this critical limit.

Chemical composition

- pH

The pH of the wastewater that is produced by the Mundella facility has varied between about 5 and 12, but commonly exceeds 9. This is of concern, as highly alkaline pH values can:

- limit the adsorption of phosphorus by soil minerals;
- cause the release of toxic levels of naturally occurring arsenic, selenium, molybdenum, and vanadium from soil minerals into infiltrating water; and
- can increase the risk of structural damage to soils. These impacts are especially problematic when the pH of wastewater exceeds 10.

The pH of wastewater that is used for irrigation should generally be maintained in the range of about 5 to 8.5 (NSW DEC, 2004) to be beneficial for healthy plant growth, and to minimise the risks of adverse environmental impacts. Additional treatment of the wastewater from the facility would be required to lower pH to a sustainable level for irrigation long term.

Monitoring programs

Based on the above analytical results, it appears the wastewater treatment at the premises is not fit for purpose and requires action to improve the quality of wastewater being irrigated. Similarly, the current monitoring program is inadequate for assessing the potential impacts of the wastewater irrigation scheme on water and soil quality near the site. Consequently, additional soil and water monitoring measures are required.

- Wastewater

As per the current licence conditions, wastewater is to be monitored at the holding tank prior to irrigation for volumetric flow rate (monthly), pH, TSS, TDS, BOD, TN and TP (six monthly; April and October). A review of the most recent three AERs has determined that the licence holder has been within their licensed loading limits (Figure 4). However, according to the soil sampling report within the NIMP, the P-sorbing capacity of the soils at Lots 52 and 115 may become limiting with the continuance of current irrigation practices at the premises, suggesting that further controls should be included in the replacement licence to ensure the risk to the environment remains acceptable into the future.

The NSW wastewater irrigation guidelines (NSW DEC, 2004) indicates that wastewater from the facility should be classified as a “high strength” effluent based on its content of nitrogen and phosphorus compounds, its BOD and its TDS content. Consequently, this wastewater has the potential to cause significant environmental harm, and therefore some above parameters would need to be monitored on a more frequent basis to ensure that water quality of the effluent remains stable over time. Additionally, there is the requirement to measure cation concentrations in the wastewater (i.e. sodium, calcium and magnesium ions). These chemical analyses are necessary to calculate the sodium adsorption ratio (SAR) value of the wastewater, which will indicate whether irrigating the wastewater has the potential to damage the soil structure in the irrigation area, leading to waterlogging.

- Soil

There is currently no requirement to monitor soils at the premises under the existing licence. As discussed above, despite the licence holder complying with their existing nutrient loading limits, the P-sorbing capacity of the soils at Lots 52 and 115 may become limiting with the continuance of current practices at the premises. Soil monitoring is required to determine whether revised treatment practices and contaminant loading limits are proving effective in enhancing the level of sustainability of irrigation at the premises.

- Groundwater

There is currently no requirement to monitor groundwater at the premises under the existing licence. Due to the size of the Mundella wastewater irrigation scheme and the high-strength

characteristics of the wastewater, it is recommended that monitoring bores are installed at the site. It is recommended that a minimum of three shallow bores with six metre length screened intervals are installed in the approximate locations shown in Figure 5. This arrangement of bores will allow the groundwater flow direction to be accurately determined. It will also allow a direct comparison to be made between the quality of groundwater that enters the irrigation area from the north to the quality of groundwater that flows from the southern boundary of the area to quantify the effect of irrigation on the groundwater quality.

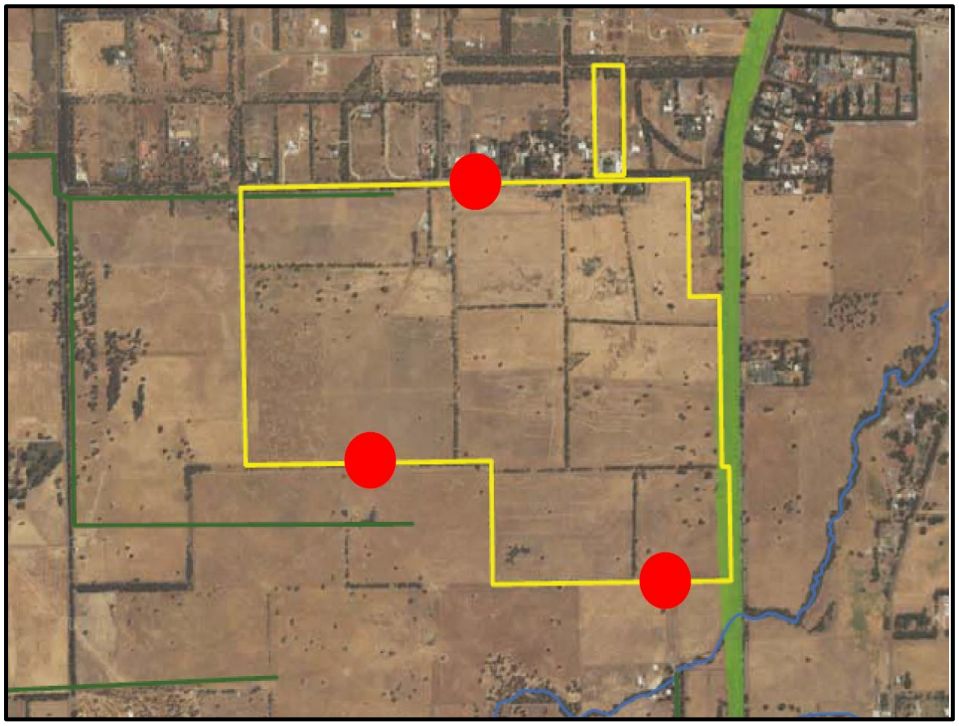


Figure 5: DWER recommended locations of monitoring bores.

3. 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.

3.1 Source-pathways and receptors

3.1.1 Emissions and controls

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

Table 2: Existing licence controls and applicant proposed controls

Emission	Sources	Potential pathways	Existing licence controls	Additional controls proposed by the applicant (from application)
Operation				
Wastewater/ milk discharge to land with excessive contaminants	Wastewater and milk storage and irrigation infrastructure	Breach of containment (spills, leaks, overtopping)	Nil	• Immediate clean up • Completion of an incident report • Spill responses to be reviewed to determine if improvements can be made
	Disposal of nutrient and salt rich wastewater to land via irrigation	Direct discharge	Wastewater must pass through grease traps prior to irrigation Nutrient loading limits on: • TN (140 kg/ha/year) • TP (10 kg/ha/year) • BOD (30 kg/ha/day)	Should monitoring indicate elevated contaminant levels: • Review dissolved air flotation (DAF) unit performance • Identify reason for elevated nutrients in wastewater
Wastewater discharge to land with excessive hydraulic loading			• No soil erosion or ponding to occur • Irrigation is not to occur on land that is waterlogged	• Adjust irrigation frequency and rate according to rainfall • Investigate possibilities of developing off-site irrigation areas or third-party re-use strategies • Maintain healthy pasture/groundcover to ensure maximum

Emission	Sources	Potential pathways	Existing licence controls	Additional controls proposed by the applicant (from application)
				nutrient uptake
Odour	High BOD concentrations in wastewater indicating little to no treatment is occurring	Air/wind dispersion	Odour shall not unreasonably interfere with the health, welfare, convenience, comfort or amenity of any person who is not on the premises	Nil

3.1.2 Receptors

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

Table 3 below provides a summary of potential human and environmental receptors that may be impacted because of activities upon or emission and discharges from the prescribed premises *(Guideline: Environmental Siting* (DWER 2020)).

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

Human receptors	Distance from prescribed activity
9 rural houses within 500 m of processing facility	40 m east of processing facility; 110m west of processing facility 200 m west of processing facility; 225 m NE of processing facility 260 m east of processing facility; 300 m SE of processing facility 350 m west of processing facility; 420 m north of processing facility 460 m west of processing facility
Closest residential area	Whitby: 650m northeast of processing facility; 455m northeast of irrigation areas (at closest point)
4 rural houses within 350 m of irrigation area (note that some of these houses are also within 500 m of the processing facility)	135m north of irrigation area; 180m north of irrigation area 195m north of irrigation area; 320m northwest of irrigation area
Environmental receptors	**Distance from prescribed activity**
Bush Forever site 365	Bush forever site is on the boundary of Lot 52 and Lot 511 irrigation areas
Serpentine River	2.8 km southwest of the Lot 511 irrigation area boundary (at closest point)
Medulla Brook	140m south of the Lot 511 irrigation area boundary (at closest point)

Human receptors	Distance from prescribed activity
	1.3 km southeast of the Lot 511 processing facility (at closest point)
Conservation Category Wetland	Serpentine River: 2.8 km southwest of the Lot 511 irrigation area boundary (at closest point)
Groundwater	Premises is within the Serpentine Groundwater Area, proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act). Depth to water table in irrigation area 4 - 4.7m (20 - 29m AHD) (Perth Groundwater Atlas) Groundwater salinity: 1500- 3000 mg/L Garden bore suitability: unsuitable
Soil type	Guildford clay: alluvium (clay, loam, sand and gravel) (Perth Groundwater Atlas)
Surface water	Lot 511 boundary is 35m northwest (at closest point) of the Serpentine River System proclaimed under the RIWI Act. Only Lots 52, 115 and 123 are currently used for irrigation. Lot 52 is the closest- 84m northwest of the Serpentine River System at closest point

3.2 Risk ratings

Licence L8015/2003/4 that accompanies this decision report authorises emissions associated with the operation of the premises i.e., milk processing activities as assessed under the existing risk assessment documented in the original decision report.

Table 4 outlines the risk ratings determined as part of the pending CEO initiated licence review and serves as a register of likely conditions to be implemented once the review is complete. The risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for each identified emission source and takes into account potential source-pathway and receptor linkages as identified in Section 3.1. Where linkages are in-complete they have not been considered further in the risk assessment.

Where there are existing licence conditions or the licence holder has proposed mitigation measures/controls (as detailed in Section 3.1), these have been considered when determining the final risk rating. Where the delegated officer considers the existing conditions or licence holder's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the pending CEO initiated licence amendment as regulatory controls.

Additional regulatory controls may be imposed on the CEO initiated licence amendment where the licence holder's controls and existing conditions are no longer deemed sufficient. Where this is the case the need for additional controls will be documented in the decision report to accompany the pending CEO initiated amendment.

The conditions likely to be implemented on the pending CEO initiated licence amendment, as outlined in Table 4 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

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

Risk Event					Risk rating[1] C = consequence L = likelihood	Existing controls sufficient?	Conditions of CEO initiated licence amendment[2]	Justification for additional regulatory controls
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Existing controls**				
Operation								
Milk processing facility and wastewater storage and irrigation infrastructure	Raw milk and wastewater with excessive contaminants (TN, TP, BOD, TSS and TDS) and high pH	Breach of containment (spills, leaks, overtopping) of milk processing and wastewater infrastructure (tanks, pipes, etc), resulting in direct discharge of nutrient rich wastewater to land may cause soil contamination. This may cause secondary impacts by infiltrating into the soil profile, potentially contaminating groundwater, and nearby surface water.	In situ soils Groundwater: approximately 4 – 4.7 mbgl Medulla Brook: 150m south	Refer to Section 3.1	C = Moderate L = Possible **Medium Risk**	N	*Set minimum infrastructure requirements eg. covered tanks with capacity to hold water in winter months (June-July), bunding, secondary containment for pipe outlet to fill tanker, etc*	The wastewater storage capacity is limited to one 22 kL tank, yet the licence holder has advised that irrigation to land is restricted according to rainfall, when the paddocks are prone to waterlogging. In winter months (June – July), the facility currently irrigates about 1100 kL a month (~37 kL/day) (360 Environmental, 2020). Based on this, the premises only has the capacity to store less than one day's worth of wastewater. Therefore, there is an inherent risk of the tank overfilling and causing an uncontrolled release of wastewater to land. Similarly, there is risk of spills of wastewater when filling the water tanker, which if done directly over land may have detrimental impacts to the environment. Raw milk and wastewater from the facility is classified as "high strength" based on its content of nitrogen and phosphorus compounds, its BOD and its TDS content (NSW DEC, 2004). Consequently, it has the potential to cause significant environmental harm upon uncontrolled release from failed infrastructure such as that described above. To maintain an acceptable level of risk, the delegated officer has determined that the inclusion of infrastructure controls is necessary in the amended licence that will be issued after the CEO initiated review is complete. This will include additional wastewater storage capacity, secondary containment, and tanks to be covered and within a bunded area.
Irrigation using a mobile spray tanker truck of wastewater to land: - Lot 52: 54.3 ha - Lot 115: 14.9 ha - Lot 123: 10.2 ha	Wastewater with excessive contaminants (TN, TP, BOD, TSS and TDS) and high pH	The discharge of nutrient rich wastewater through irrigation has the potential to contaminate the land. Particularly when the volume of wastewater irrigated exceeds evapotranspiration, pooling/waterlogging of the nutrient rich wastewater may cause secondary impacts by infiltrating into the soil profile, potentially contaminating groundwater, and nearby surface water.		Refer to Section 3.1	C = Moderate L = Possible **Medium Risk**	N	*Install a wastewater treatment system;* *Investigate and reduce TDS levels in wastewater;* *Set pH limits;* *Install and monitor groundwater monitoring bores;* *Soil sampling across the irrigation areas.*	Despite the licence holder being compliant with current licensed nutrient loading limits, the current phosphorous application rate to land in the irrigation area is proving unsustainable as the soils become saturated with phosphorous. This causes an increase in risk of nutrients leaching into groundwater, and thus discharging to the nearby Mundella Brook where eutrophication of this kind can have detrimental effects on ecosystem health. Therefore, the delegated officer determines that existing phosphorous limits are not suitable for the ongoing sustainability of the irrigation scheme. Therefore, the licensed phosphorous limit prior to irrigation will be decreased under new licence conditions following the completion of the CEO initiated amendment. This will require an increase in the level of treatment of the wastewater. There are currently no licensed limits on wastewater pH prior to irrigation. The pH of the wastewater is commonly greater than 9, conditions which further limit the ability of phosphorous to be immobilised in the soil profile. Therefore, to maintain an acceptable level of risk to the environment, the delegated officer has determined that the requirement to maintain pH in the range of 5 – 8.5 will be implemented upon the completion of the CEO initiated amendment. Additional parameters to be monitored in the wastewater prior to irrigation will also be included in the CEO initiated licence amendment. In particular, the requirement to measure cation concentrations are deemed necessary to calculate the SAR value which indicates whether irrigating the wastewater has the potential to further damage the soil structure, thus eventually impacting on groundwater. The delegated officer will include a soil monitoring regime in the CEO initiated licence amendment to determine whether the above revised nutrient loading limits and treatment practices are proving effective in enhancing the level of sustainability of irrigation at the premises, and to enable early detection of nutrient saturation in the soils before it impacts on groundwater. Due to size of the irrigation scheme and the high-strength nutrient composition of the wastewater, the delegated officer has determined that a network of monitoring bores will be required by the CEO initiated licence amendment. The new network will comprise a minimum of three shallow bores with 6 m length screened intervals in the approximate locations shown in Figure 5. This arrangement of bores and the below monitoring regime will allow groundwater flow direction to be accurately determined. It will also enable early detection and proactive management of possible contamination from leachate at the irrigation areas. Following the issuance of the CEO initiated licence amendment, the suite of parameters to be monitored on an annual basis when the highest water table elevation occurs (September – October), will be: • EC, pH, TDS, TN, TP, ammonium-nitrogen, nitrate-nitrogen, molybdenum, selenium, and arsenic; • major ions (Na, K, Ca, Mg, Cl, HCO_3, SO_4).
	Excessive hydraulic			Refer to Section	C = Moderate	N	*Restrict irrigation during wet*	The irrigation area is prone to becoming waterlogged during periods of high rainfall, which increases the risk of nutrients leaching through the soil profile and into groundwater. The delegated officer has

Risk Event					Risk rating[1] C = consequence L = likelihood	Existing controls sufficient?	Conditions of CEO initiated licence amendment[2]	Justification for additional regulatory controls
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Existing controls**				
	loading to land through tanker irrigation			3.1	L = Possible **Medium Risk**		*winter months of June and July;* *Wastewater reduction measures;* *Install additional wastewater storage;* *Measures to ensure even distribution of wastewater over entire available irrigation area to prevent waterlogging;* *Install a rainwater gauge and restrict irrigation during and immediately after a rainfall event.*	determined that to maintain an acceptable level of risk of wastewater leaching into groundwater, irrigation will be restricted during June and July each year when monthly rainfall is almost twice as high as the monthly evaporation rate under the pending CEO initiated licence amendment. In addition, the use of a rain gauge to determine when a rainfall event has occurred, immediately after which, irrigation will be restricted, will be required. To support these irrigation restrictions, additional wastewater storage with the capacity to store washdown effluent that is produced during these times will be required, subject to conditions to be detailed in the CEO initiated licence amendment. Additionally, the licence holder will be required to evenly distribute wastewater over the entire irrigation area, to ensure waterlogging is prevented.
	Odour from storage and irrigation from untreated/ excessively high BOD levels in wastewater	Air/windborne pathway causing impacts to amenity of nearby human receptors	9 houses within 500m of processing facility 4 houses within 350m of the irrigation areas Residential area of Whitby: 650m northeast of processing facility and 455m northeast of irrigation areas (at closest point)	Refer to Section 3.1	C = Minor L = Possible **Medium Risk**	N	*Install a wastewater treatment system to reduce BOD to acceptable levels;* *Storage infrastructure controls.*	Milk processing facilities are characterised by high concentrations of organic matter (BOD) which have an inherent risk of emitting odour. At the Mundella premises, solid wastes are separated from liquid wastes via a drainage system after daily processing. The remaining wastewater does not currently undergo any treatment before irrigation, and therefore has elevated levels of BOD. Potential odour emissions generated from the premises include handling and temporary storage of solids (in grease traps and skips bins, emptied every three months and twice weekly, respectively) and the irrigation of wastewater. Wastewater from the Mundella site is 10-40 times above the typical BOD range of 120-250 mg/L for treated effluent. Wastewater with higher BOD loads may contribute to odour emissions. Due to the proximity of residential receptors to the processing facility (where solid wastes are temporarily stored), wastewater storage and irrigation areas, the delegated officer determines that there is an inherent risk of odour impacting on amenity. Therefore, to reduce the risk of odour emissions the licence holder will be required to improve the quality of wastewater largely to reduce BOD levels to an acceptable level under the CEO initiated licence amendment. Untreated wastewater will be also required to be stored in covered/enclosed tanks to reduce odour emissions.

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

Note 2: Conditions likely to be imposed on the amended licence following the completion of the pending CEO initiated review process.

4. Decision

In assessing the application for a replacement licence, the delegated officer has determined that current waste containment and wastewater irrigation activities at the premises pose a medium risk of impacts to the environment. This is largely accountable to the high strength effluent that is stored and discharged to land under the existing irrigation scheme at the premises. The wastewater is largely untreated and has very high levels of nutrients (TP and TN), BOD, TSS, and TDS which is rendering the current irrigation scheme unsustainable as the P-sorbing capacity of the receiving soils is likely to become limiting with the continuance of current practices, as stated in the Soil Sampling Report provided in the NIMP (360 Environmental, 2020). This increases the risk of contaminants leaching into groundwater, and thus discharging to the nearby surface waterways where eutrophication of this kind can have detrimental effects on ecosystem health. Waterlogging of the irrigation paddocks in winter months, when the amount of wastewater irrigated exceeds evapotranspiration, occurs at the premises which also increases the risk of nutrients leaching through the soil profile and into groundwater. BOD levels in the irrigated wastewater are 10-40 times above the typical BOD range (120-250 mg/L), which has an inherent risk of causing odour emissions that may negatively affect the amenity of nearby human receptors.

The preliminary risk assessment outlined in section 3 of this report has identified material changes to licence conditions that are required to be made to manage the ongoing environmental risk. Such changes include the addition of conditions to increase the treatment of wastewater so that levels of contaminants and pH are decreased; additional wastewater storage to coincide with winter irrigation restrictions; and a revised monitoring regime to include soil and groundwater monitoring and more comprehensive monitoring of wastewater prior to irrigation.

The current licence is due to expire on 14 July 2021. Due to there being insufficient time to finalise the assessment and implement the proposed material changes, the delegated officer has determined to roll over the licence for 3 years to allow the review process to be completed and an amended licence to be issued. Thus, until the CEO initiated licence amendment is issued, the obligations of the licence holder have not changed in this replacement licence. The new expiry date will be 14 July 2024.

References

1. 360 Environmental, 2020. *Mundella Foods Pty Ltd Nutrient Irrigation Management Plan*. Prepared for Sunbeam Foods Group.
2. Department of Environmental Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
3. DER 2016, *Guidance Statement: Licence duration*, Perth, Western Australia.
4. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
5. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.
6. NSW EPA, 1998. *On-site Sewage Management for Single Households: Environment & Health Protection Guidelines*. The technical guidelines are available from web site https://www.liverpool.nsw.gov.au/__data/assets/pdf_file/0014/112208/Environment-and-Health-Protection-Guidelines-1998-Onsite-Sewage-Management-for-Single-Households.pdf.
7. NSW DEC, 2004. *Environmental Guidelines: Use of Effluent by Irrigation*. The technical guidelines produced by the NSW Department of Environment and Conservation are available from web site https://www.epa.nsw.gov.au/publications/water/effguide.

8. US EPA, 2006. *Process Design Manual, Land Treatment of Municipal Wastewater Effluents*. US EPA Report EPA/625/R-06/016. The report is available from web site https://www.researchgate.net/publication/264300380_Process_Design_Manual_Land_Treatment_of_Municipal_Wastewater_Effluents.

Appendix 1: Application validation summary

SECTION 1: APPLICATION SUMMARY			
Application type			
Renewal	☒	Current licence number:	L8015/2003/3
Date application received		14/10/2020	
Applicant and Premises details			
Applicant name/s (full legal name/s)		Mundella Foods Pty Ltd	
Premises name		Mundella Foods	
Premises location		Lot 2 on Plan 51860 (Randell Road), Lot 51 on Plan 226010, Lot 52 and 115 on Plan 226115, Lot 123 on Plan 5045, and Lot 511 on Plan 249485 Mardella WA 6125	
Local Government Authority		Shire of Serpentine Jarrahdale	
Application documents			
HPCM file reference number:		A1942788 (Application) 2010/002296-1~2 (File)	
Key application documents (additional to application form):		Certificate of Title ASIC extract Approval for consultant to act on behalf of licence holder Prescribed Premises boundary and irrigation area map ESA map Application supporting document Wastewater Plan Nutrient Irrigation Management Plan Soil test report	
Scope of application/assessment			
Summary of proposed activities or changes to existing operations.		Licence is due to expire on 14 July 2021 and therefore needs to be renewed. No changes to the premises are proposed as part of the renewal.	

Category number/s (activities that cause the premises to become prescribed premises)

Table 1: Prescribed premises categories

Prescribed premises category and description	Assessed production or design capacity	Proposed changes to the production or design capacity (amendments only)
Category 17: Milk processing: premises on which- (a) milk is separated or evaporated (other than a farm); or (b) evaporated or condensed milk, butter, ice cream, cheese or any other dairy product is manufactured, and from which liquid waste is or is to be discharged onto land or into waters.	5,000 tonnes per year	Application is for a licence renewal only, no increase in production or design capacity proposed.

Legislative context and other approvals

Has the applicant referred, or do they intend to refer, their proposal to the EPA under Part IV of the EP Act as a significant proposal?	Yes ☐ No ☒	Referral decision No: Managed under Part V ☐ Assessed under Part IV ☐
Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?	Yes ☐ No ☒	Ministerial statement No: EPA Report No:
Has the proposal been referred and/or assessed under the EPBC Act?	Yes ☐ No ☒	Reference No:
Has the applicant demonstrated occupancy (proof of occupier status)?	Yes ☒ No ☐	Certificate of title ☒ General lease ☒ Expiry: 30 September 2025 (irrigation areas) Mining lease / tenement ☐ Expiry: Other evidence ☐ Expiry:
Has the applicant obtained all relevant planning approvals?	Yes ☐ No ☐ N/A ☒	If N/A explain why? Application is for a licence renewal, all planning still relevant as no change to existing infrastructure or operations. Any future expansions of changes will require planning approval.
Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes ☐ No ☒	CPS No: N/A No clearing is proposed.

Has the applicant applied for, or have an existing CAWS Act clearing licence in relation to this proposal?	Yes ☐ No ☒	Application reference No: N/A Licence/permit No: N/A No clearing is proposed.
Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes ☐ No ☒	Licence/permit No: GWL154519 GWL154519, issued on 31/8/2020, is in the name of Peter Hector for 1,350 kL from the Perth-Leederville aquifer and covers the whole of the irrigation area.
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes ☐ No ☒	Name: N/A Type: Proclaimed Groundwater Area/Surface Water Area Has Regulatory Services (Water) been consulted? Yes ☐ No ☐ N/A ☐
Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes ☐ No ☒	Name: N/A Priority: P1 / P2 / P3 / N/A Are the proposed activities/ landuse compatible with the PDWSA (refer to WQPN 25)? Yes ☐ No ☐ N/A ☐
Is the Premises subject to any other Acts or subsidiary regulations	Yes ☐ No ☒	
Is the Premises within an Environmental Protection Policy (EPP) Area?	Yes ☐ No ☒	
Is the Premises subject to any EPP requirements?	Yes ☐ No ☒	
Is the Premises a known or suspected contaminated site under the *Contaminated Sites Act 2003*?	Yes ☐ No ☒	Classification: N/A Date of classification: N/A