Prime Meat Co Pty Ltd

Waroona Abattoir

Works Approval Application Supporting Attachments

Part V, Division 3, *Environmental Protection Act 1996*

Lot 21 on Diagram 86238

86 Waterous Road, WAGERUP WA 6215

28 November 2020

57842/123,456 (Rev 0)

JBS&G Australia Pty Ltd T/A Strategen-JBS&G

Table of Contents

List of Tables

List of Figures

Appendices

1. Attachment 3B: Proposed activities

1.1 Introduction and background

Prime Meat Co Pty Ltd (the applicant) occupies an abattoir (the premises) located at 86 Waterous Road in Wagerup. The premises has not operated since 2009 and is currently in 'care and maintenance'. The applicant wishes to reopen the premises, aiming to process approximately 4,000 sheep and 700 cattle per day, five days a week.

The premises previously operated under Licence L8230/2008/1 (the previous licence) granted by the Department of Water and Environmental Regulation (DWER) under Part V of the *Environmental Protection Act 1986* (EP Act). The previous licence was issued to South West Meat Processors Pty Ltd on 26 June 2008 and expired on 29 June 2011.

To allow for the reopening of the premises, the applicant has applied for a works approval for the categories and production/design capacities under Schedule 1 of the Environmental Protection Regulations 1987 (EP Regulations) which are defined in Table 1.1.

Table 1.1: Prescribed premises categories

Category number	Description of category	Production or design capacity threshold	Expected production or design capacity
15	Abattoir: premises on which animals are slaughtered.	1,000 tonnes or more per year (hot carcass weight)	83,500 tonnes per year (hot carcass weight)

Category 55 (livestock saleyard or holding pen) has not been included as it is understood that this category applies to separate premises used to hold large numbers of animals (e.g. several thousand) in relatively confined areas for extended periods of time prior to their shipping (export yards), sale (saleyards), or onward transport to an abattoir.

The lairage of cattle at the abattoir and the associated environmental aspects (e.g. generation of wastewater, manure and odour) are directly related to the category 15 primary activities. As such, the emissions and discharges and environmental risks associated with the lairage can be adequately considered and assessed through this works approval application.

The previous licence included category 16 (rendering); however, the rendering plant will not be reopened at this stage, and no rendering activities will be carried out at the premises. Category 83 (fellmongering) has also been excluded from this application as all skins and hides will be removed off-site for processing or disposal.

1.2 Process summary

The premises will slaughter sheep and cattle for meat production and will operate for 10 hours a day (07:00 to 17:00), five days a week, 50 weeks a year with a production capacity of approximately 86,500 tonnes per year (hot standard carcase weight). Initial production is expected to start at a throughput of approximately 25% of total capacity (1,000 sheep and 175 cattle per day), ramping up to full capacity after six months. The layout of the premises is shown on the site plan in Appendix A.

1.2.1 Animal delivery

Animals will be delivered to the premises in road trucks and will be offloaded into the holding pens or covered lairage. Any animals that are injured, sick or dead on arrival will be quarantined and either removed from the site or, after assessment, accepted for slaughter in the abattoir. Modern welfare and health standards mean that very few animals that arrive at the facility will be injured or dead (estimated to be less than 0.5%).

Animal delivery trucks will not be washed out at the abattoir and will leave the site once the delivery is complete. Deliveries will be scheduled to match slaughter capacity and demand and to minimise the time animals are held at the abattoir prior to slaughter. If the abattoir has to be shut down, animals will be diverted to alternative holding yards or abattoirs.

1.2.2 Stock holding pens and lairage

Cattle will be held in the external holding pens and covered lairage for 12 to 18 hours prior to slaughter.

Animals scheduled for imminent slaughter will be held in the covered lairage area. The lairage pens have a concrete floor and drainage channels. The animals will not generally be fed prior to slaughter but will be watered as needed. Wastewater from the lairage will be collected in a sump connected to the wastewater treatment system. Manure from the lairage will dry-scraped and collected daily and stored on a bunded concrete pad prior to removal off-site for disposal.

External holding pens will be used to hold the overflow of animals not scheduled for imminent slaughter. The external pens have a compacted natural surface graded to allow wastewater to runoff to drainage channels, which are connected to the lairage wastewater sump. Manure will be incorporated into the soil, scraped, and excess collected and stored as described above.

1.2.3 Abattoir

The animals will enter the abattoir, and mechanical means will be used to stun them before they are bled. The skins and hides will then be removed from the carcasses followed by the internal organs, heads and hooves (offal). The undigested contents from the stomach (paunch) are also removed. The carcasses will then be sectioned, and waste fat and bone removed. Either the whole carcase or the sections will be stored in cool rooms prior to being transported off-site.

Blood will be collected in a dedicated holding tank and removed off-site daily for processing. The skins will be pulled from the carcase and collected in enclosed skip bins for removal off-site. Unwanted offal, paunch, fat and bone will be stored in covered hoppers and trailers and removed off-site daily for rendering.

For hygiene reasons, the abattoir will use a large amount of water for wash down, cleaning and sterilisation. Raw water will be supplied by Harvey Water and stored in an onsite dam (section 1.5). Wastewater from the abattoir will be treated in a new advanced wastewater treatment system (section 1.6).

1.3 Premises infrastructure and equipment

Relevant items of infrastructure and equipment within the boundary of the premises relevant to this application are shown in Table 1.2 below.

Table 1.2: Infrastructure and equipment

Location	Key infrastructure	Relevant categories	Site plan reference	Critical containment infrastructure	Environmental commissioning
31	Stock holding yards	15	Appendix A, Site Plan	☐	☐
32	Covered lairage			☐	☐
33	Abattoir entry/stun area/bleed			☐	☐
34	Kill floor			☐	☐
38	Paunch room			☐	☐
40	Tripe room			☐	☐
43-49	Carcass chillers and freezers			☐	☐
73	Boning room			☐	☐
77-81	Meat product chillers and freezers			☐	☐
3	Wastewater treatment plant		Appendix A, Wastewater Treatment Plant Site Plan (Drawing 200326-PMC-CD-DW-001)	☐	☒
4	Equalisation pond			☒	☐
5	Emergency pond			☒	☐
D2	Water supply dam (Harvey Water)		Appendix A, Feature Survey (Drawing 22204-04)	☐	☐

The existing infrastructure associated with the abattoir is in generally good condition and only requires electrical works and building improvements. With regard to other premises infrastructure, works are required regarding the wastewater treatment system and wastewater and freshwater ponds.

1.4 Solid waste management

All solid wastes will be removed from the site to be disposed at licensed facilities. The schematic diagram below (Figure 1.1) shows the quantities and destinations for solid waste streams and by-products from the abattoir.

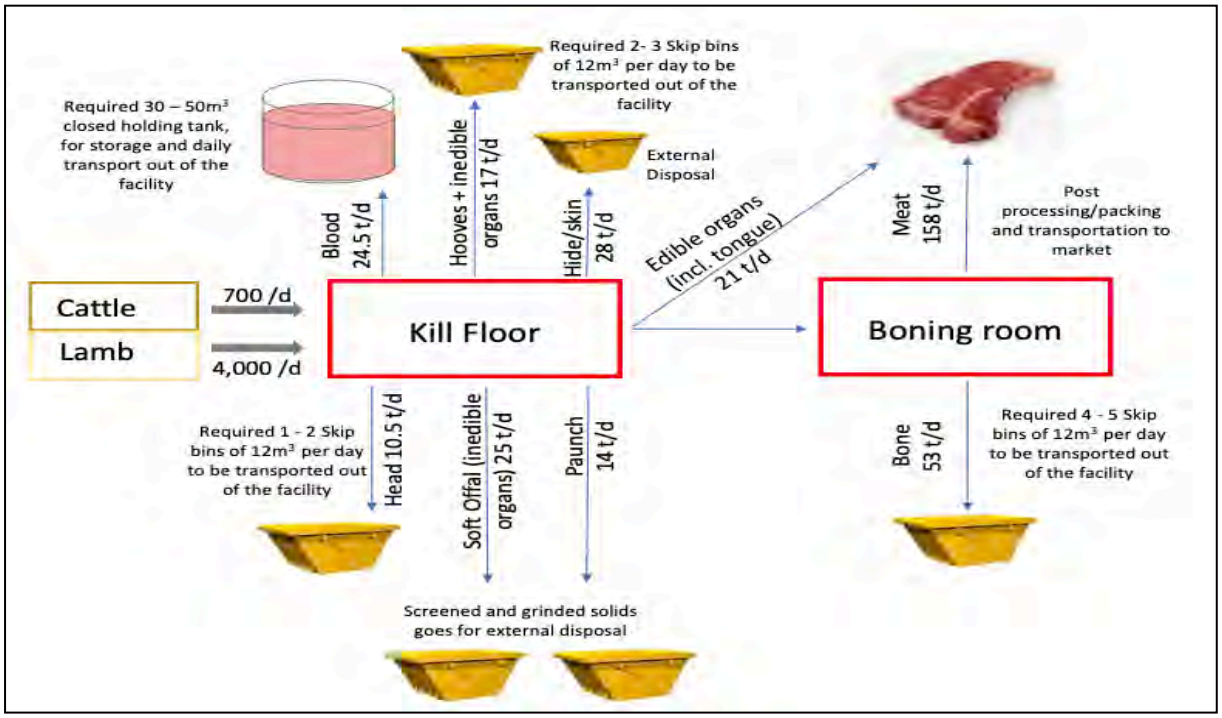


Figure 1.1: Solid waste management

The quantities of each waste type and waste storage infrastructure and location are specified in Table 1.3 below.

Table 1.3: Waste types

	Waste type	Quantity	Storage infrastructure	Management	Monitoring (if applicable)	Location[1]
1	Blood	24.5 tpd	Double skinned tank	Removed off-site for processing	Quantity of waste removed from premises	9
2	Soft offal (inedible organs)	25 tpd	Hopper/covered chute and trailer	Removed off-site for processing		7
3	Hooves & inedible organs	17 tpd	Hopper/covered chute and trailer	Removed off-site for processing		13
3	Paunch	14 tpd	Via WWTP	Via WWTP		7
4	Heads	11 tpd	Hopper/covered chute and trailer	Removed off-site for processing		13
5	Fat & solids (WWTP)	10-15 tpd	Hopper/skip bin	Removed off-site for processing		12
6	Bone	53 tpd	Hopper/covered chute and trailer	Removed off-site for treatment		1
7	Hides and skins	28 tpd	Hopper/skip bin	Removed off-site for processing	Number of skins and hides removed from premises	106[2]

	Waste type	Quantity	Storage infrastructure	Management	Monitoring (if applicable)	Location[1]
8	Lairage manure	1-2 tpd	Bunded concrete pad	Removed in a maximum of fortnightly period for disposal off-site	Quantity of waste removed from premises	2
9	Screened wastewater solids	33 tpd	Skip bin	Removed off-site for processing		11
10	Dead animals	No. of animals per day as needed	Quarantine area	Removed off-site for disposal	Number of animals removed from premises	6

(1) Appendix A, Wastewater Treatment Plant Site Plan (Drawing 200326-PMC-CD-DW-001)
(2) Appendix A, Site Plan

1.5 Water supply

The premises will use approximately 1,600 kL of water per day based on an estimated consumption of 1,700 L per head cattle and 100 L per sheep and production rate of 700 cattle and 4,000 sheep per day, five days a week.

Freshwater will be supplied to the premises by Harvey Water from the Drakesbrook and Waroona dams. The freshwater will be used for all applications in the facility and then discharged to the wastewater treatment plant. Further to treatment, treated wastewater will be stored in three tanks prior to offtake by Harvey Water.

Freshwater supplied by Harvey Water will be transported via pipeline to the premises and stored in an existing structure (previously an anaerobic wastewater treatment pond) which will be repurposed as a 13 ML storage dam (D2; Appendix A, Feature Survey [Drawing 22204-04]).

The dam is currently grass and earth lined with some incursion of weeds and trees. The dam will be cleared of weeds, grasses and trees and lined with a 2 mm thick HDPE liner anchored into the dam perimeter.

The freshwater supply package is detailed in application Attachment 8B.

1.6 Wastewater treatment plant

A new wastewater treatment plant will be constructed at the premises, which has been designed to achieve medium risk (Class C) water recycling quality as per nationally recognised guidelines for non-potable uses of recycled water in Western Australia (DoH 2011).

The proposed wastewater treatment plant, including infrastructure and equipment, is detailed in application Attachment 8A.

A schematic flow diagram of the plant is shown in Figure 1.2 below.

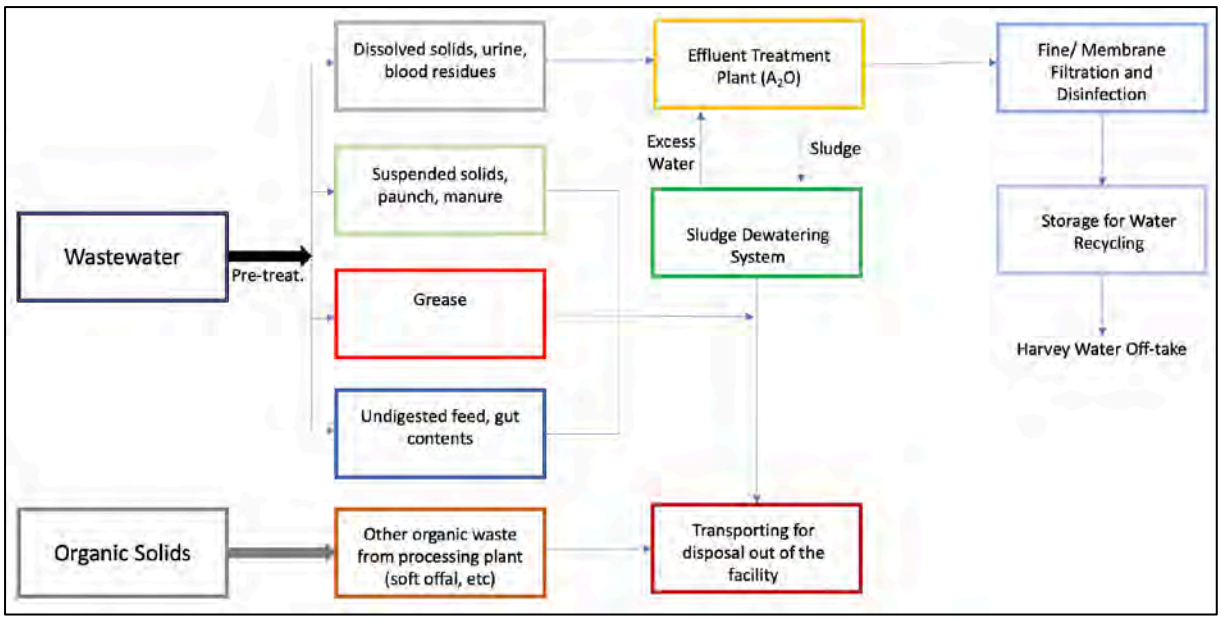


Figure 1.2: Schematic flow diagram for the wastewater treatment plant

In summary, the proposed system includes secondary and tertiary treatment followed by membrane filtration and multi-barrier disinfection and polishing for the production of high-quality recycled water. The proposed treatment steps are as follows:

1. Pre-treatment:
    a. Static screen – coarse.
    b. Rotary screen.
    c. Balancing tank (flow equalisation).
    d. Dissolved air flotation (DAF).
2. Secondary and tertiary treatment:
    a. Three-stage [A_2O] Phoredox system (anaerobic/anoxic/aerobic nutrient removal).
    b. Secondary clarifier (DAF).
3. Polishing System: recycled water production:
    a. Coarse filtration.
    b. Fine filtration.
    c. Ultrafiltration (UF).
    d. Double barrier disinfection (UV irradiation and chlorination).

1.6.1 Wastewater treatment plant design performance

Considering the type of effluent (high flow, low to medium strength), the minimum expected treatment efficiency of the three-stage reactor and secondary DAF is:

- BOD > 90%;
- > TSS 95%;
- ≥ TN 90%; and
- ≥ TP 90%.

The treated effluent will be directed to a polishing system to provide quality of recycled water in accordance with the 'Medium' risk category from the Department of Health (DoH 2011) guidelines for offtake by Harvey Water for uses including urban irrigation (golf courses, recreation areas), fire-fighting storage, fountains and water features, and agricultural and horticultural (orchards) use.

The wastewater treatment plant will be designed to achieve the following non-potable recycled water quality objectives:

- Soluble BOD_5 of <20 mg/L;
- Suspended solids of <30 mg/L;
- pH of 6.5 to 8.5;
- Turbidity <5 NTU (95% of sampling);
- Either UV dose of 40 to 70 mJ/cm^2 (to achieve log removal values after multimedia filtration systems with transmittance >75%); or maintenance of a chlorine residual (0.2-2.0 mg/L) and *E. coli* concentration of <10 CFU/100 mL;
- Virus: 5 log reduction;
- Protozoa: 3.5 log reduction; and
- Bacteria: 4.0 log reduction.

Monitoring of treated wastewater quality will be carried out in accordance with Table 1.4 below.

Table 1.4: Wastewater treatment plant performance monitoring

Emission point	Monitoring point	Parameter	Unit	Frequency
Outlet (UV.001)	UV.001 flowmeter	Volumetric flow rate	kL/day	Continuous
	Treated water outlet	pH	-	Monthly
		E.Coli	NMP/100 mL	
		Total dissolved solids	mg/L	
		Total suspended solids		
		Total nitrogen		
		Total phosphorous		
		Total oil and grease		

All recycling water schemes will be operated and managed under relevant approvals from the DoH (including preparation and implementation of Recycled Water Quality Management Plans [RWQMPs]) and DWER (Category 61 – liquid waste facility prescribed premises including preparation and implementation of Nutrient Irrigation Management Plans [NIMPs]).

1.6.2 Critical containment infrastructure

The wastewater treatment plant will use two existing ponds that formed part of the original wastewater treatment system for wastewater storage/equalisation and for treated water storage. The ponds have been assessment will be refurbished and relined by Harvey Water to act as an equalisation pond (EP.001) and emergency [storage] pond (EP.002). Both ponds are considered to be critical containment infrastructure for the purposes of this application as described in 1.6.4.

Table 1.5: Critical containment infrastructure

	Infrastructure	Design and construction / installation requirements	Appendix A, Wastewater Treatment Plant Site Plan (Drawing 200326-PMC-CD-DW-001)
1	Equalisation pond	Dimensions: 51.8 m x 30.7 m x 4.5 m Pond area: 1,590 m^2 Catchment area: 1,890 m^2 Embankment slope: 2.5 V:H Freeboard: 500 mm Operational volume: 4,134 kL Liner: New 1.5 mm HDPE liner laid over existing liner; new liner to conform with the requirements of Water Quality Protection Note (WQPN) 26 Liners for containing pollutants, using synthetic membranes (DoW 2013); see example liner specification in application Attachment 8B for new liner.	4
2	Emergency pond	Dimensions: 51.4 m x 30.5 m x 4.5 m Pond area: 1,568 m^2 Catchment area: 1,748 m^2 Embankment slope: 2.5 V:H Freeboard: 500 mm Operational volume: 4,057 kL Liner: Existing 1.5 mm HDPE liner repaired to conform with the requirements of WQPN 26; see example liner specification in application Attachment 8B for replacement liner.	5

On completion of the works to reline and repair the ponds, the applicant will prepare a Critical Containment Infrastructure Report (CCIR) for submission to DWER. The CCIR will, as a minimum, include:

- as constructed plans and a detailed site plan showing the location and dimensions for each pond
- photographic evidence of the installation of the pond liners
- a Quality Control / Quality Assurance Certificate from a suitably qualified independent third party which demonstrates that the pond liners meet the required specification.

The applicant will not commence time-limited-operations [use] of the ponds until DWER has provided notification that the CCIR for each pond meets the requirements of the works approval.

1.6.3 Water balance

A water balance has been completed, which also considers losses in the process. Process losses will occur mainly at the stockyards to evaporation losses; and a portion of the water used in the process will be lost through solid wastes and wet sludge, which will be transported off-site. The process-related losses are estimated to be around 2%, being higher in summer.

Within the wastewater treatment plant, a portion of the water will be lost with the sludge produced, which will be disposed of off-site, with an estimated solids content of 20%.

The detailed water balance for the premises is shown in Figure 1.3 below.

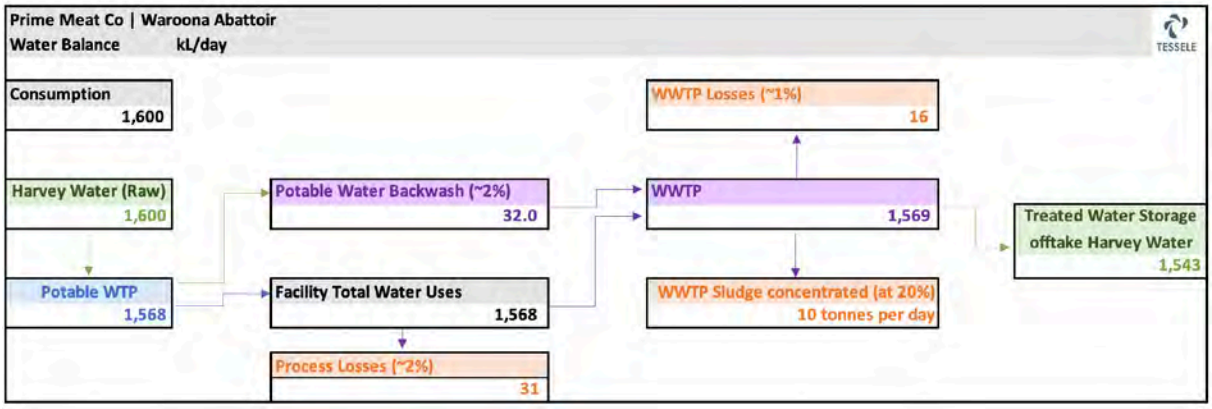


Figure 1.3: Water balance

1.6.4 Pond capacities

Operational capacities of the equalisation pond and emergency pond have been calculated using seasonal rainfall data (see Figure 3.2). Both the equalisation pond and emergency pond are elevated above natural ground level with raised embankments to prevent the ingress of stormwater.

1.6.4.1 Equalisation pond

The equalisation pond will balance the flow of wastewater entering the wastewater treatment plant. The abattoir will operate five days a week, 50 weeks per year; therefore, the flow of wastewater produced in 250 days has been distributed across 365 days for the water balance purposes.

The average required equalisation time is 12 hours; therefore, even during wet winter months, the equalisation pond is capable of accommodating the capacity as shown in Figure 1.4 below, which shows the percentage of the equalisation pond volume utilised including rainfall, evaporation and the wastewater contributions.

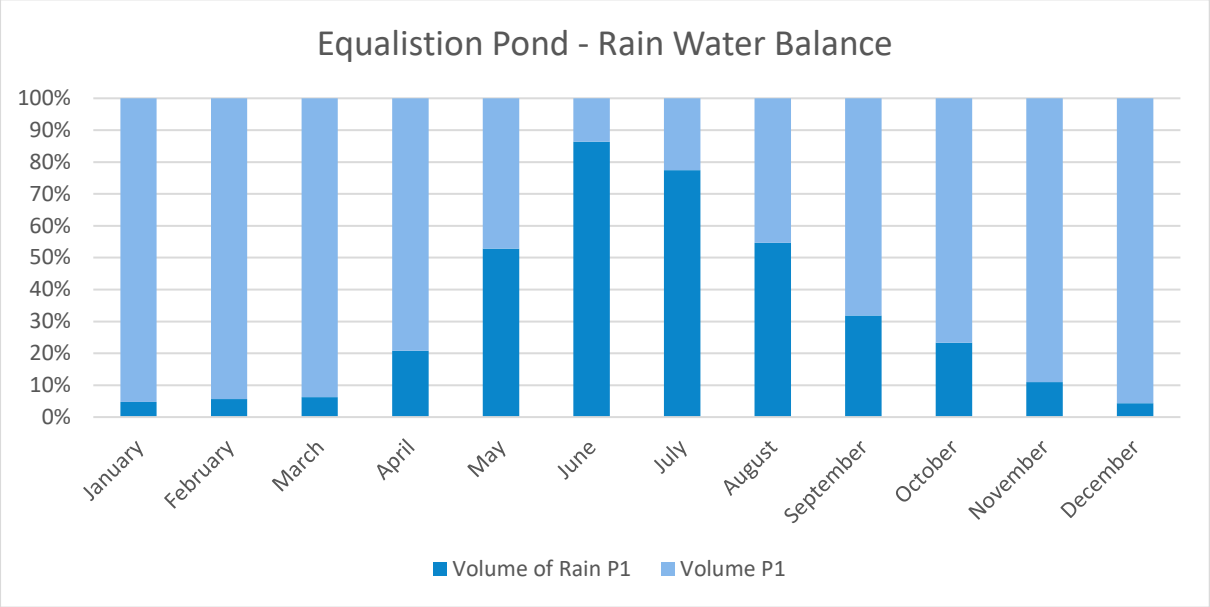


Figure 1.4: Equalisation pond water balance

The detailed calculation results are presented in Table 1.6 below. The amount of wastewater entering the pond is equal to the amount exiting the wastewater treatment plant.

Table 1.6: Equalisation pond water balance

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall (mm per month)	11	18	20	56	137	211	189	139	86	63	35	15
Volume of rain (m^3/month)	208	340	378	1,058	2,589	3,988	3,572	2,627	1,625	1,191	662	284
Raw wastewater (m^3/day)[1]	1,075	1,075	1,075	1,075	1,075	1,075	1,075	1,075	1,075	1,075	1,075	1,075
Epan (monthly)	200	200	200	100	80	50	50	70	100	100	200	250
Evap (monthly)	121	121	121	60	48	30	30	42	60	60	121	151
Evap volume (m^3)	1,918	1,918	1,918	959	767	479	479	671	959	959	1,918	2,397
Available volume (m^3)	4,134	5,712	5,674	4,035	2,312	626	1,041	2,178	3,468	3,902	5,390	6,248
Storage (hours)	92	128	127	90	52	14	23	49	77	87	120	140

(1) Total volume distributed along 365 days

The equalisation pond will be equipped with recirculation pumps and mixing system. This will maintain solids in suspension, which will then be sent to the WWTP for processing. Minimal sludge is expected to accumulate in the pond, and there is no anticipated need for de-sludging of the pond. During wastewater treatment, solids separation steps will occur, and the resulting solids will be removed off-site for processing.

1.6.4.2 Emergency pond

The emergency pond is provided as a contingency measure in case the equalisation pond overflows, or in case there is excess treated water being produced by the wastewater treatment plant. The emergency pond will be, on average, 35% utilised by rainwater along the year as shown in Figure 1.5 below (percentage of the volume of the emergency pond utilised including rainfall and evaporation balance).

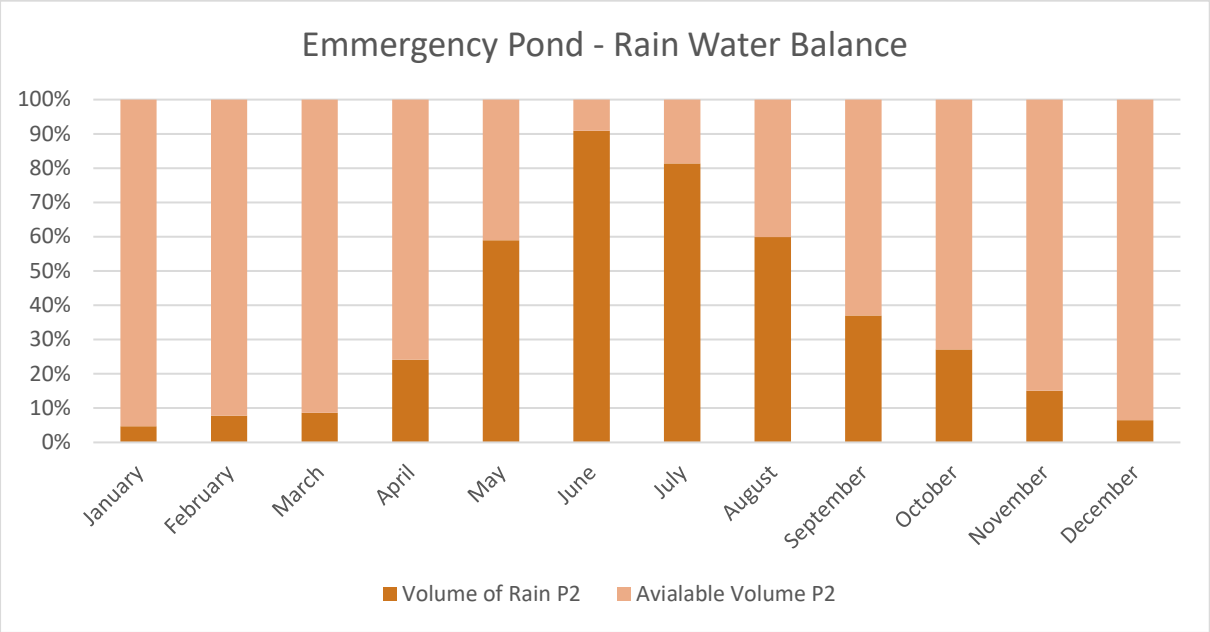


Figure 1.5: Emergency pond water balance

The detailed calculations results are presented in Table 1.7 below. The amount of surplus water entering the pond was considered zero for water balance purposes.

Table 1.7: emergency pond water balance

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
mm per month	11	18	20	56	137	211	189	139	86	63	35	15
Volume of rain (m^3/month)	192	315	350	979	2,394	3,688	3,303	2,429	1,503	1,101	612	262
Emergency water (m^3/day)[1]	-	-	-	-	-	-	-	-	-	-	-	-
Epan (monthly)	200	200	200	100	80	50	50	70	100	100	200	250
Evap (monthly)	121	121	121	60	48	30	30	42	60	60	121	151
Evap volume (m^3)	1,891	1,891	1,891	945	756	473	473	662	945	945	1,891	2,363
Available volume (m^3)	3,865	3,742	3,707	3,078	1,663	369	754	1,628	2,554	2,956	3,445	3,795

(1) Total volume distributed along 365 days

1.6.5 Contingency measures

In order to avoid interruption of the treatment process for prolonged periods, the wastewater treatment system is designed with built-in redundancy for critical components; for example, pumps and blowers will be provided with duty and stand-by capacity. The equalisation pond will typically operate at low capacity. In the case of equipment failure, the system will be able to accommodate extra water flow from the wastewater treatment plant.

In case a plant issue can't be resolved in a timely manner, abattoir production capacity will be reduced by 50% to generate lower wastewater volumes, which will then be stored in the emergency pond. In case the problem is chronic, and in order to prevent an overflow to the environment, production will be stopped until the issue is sorted, and the wastewater treatment plant is back in operation.

The wastewater treatment plant is designed to operate five days a week, having extra treatment capacity of 40% if operated seven days a week, providing additional safety for water quality in case of overflow events, as well as keeping the equalisation pond volume low at the start of every production week.

The plant has been designed based on theoretical wastewater quality, and there is a contingency for installing an extra treatment step consisting of a containerised reverse osmosis plant to produce direct potable reuse quality if necessary.

The assumed water losses described above are based on industry averages and can vary between summer and winter, and also depending on the solid waste transport method. This will be verified and adjusted once the plant is operating.

1.6.6 Environmental commissioning

The Environmental Commissioning Plan for the wastewater treatment plant is contained in application Attachment 3A.

1.7 Groundwater monitoring infrastructure

Four groundwater monitoring bores are installed at the premises. The bore installation details are shown in Table 1.8 and the locations are shown on Figure 1.6.

Table 1.8: Groundwater monitoring bores

Bore	Easting	Northing	Depth (m)	Screen from (m)	Screen to (m)	Ground (mAHD)	Top of casing (mAHD)
MW1	400127.250	6361326.219	16.8	10	13.0	73.94	74.45
MW2	400125.408	6361169.933	8.4	3.0	6.0	65.86	66.46
MW3	400002.742	6361322.956	13.2	5.5	8.5	68.47	68.92
MW4	399880.094	6361387.017	12.0	4.0	7.0	64.10	64.75

(1) Monitoring well location MW1 is blocked

The applicant intends to reinstate monitoring well location MW1 prior to commencement of operations at the premises. Groundwater monitoring was carried out in November 2019 and in May, August and November 2020 (section 3.7.1). The applicant will implement a formal groundwater monitoring program prior to commencement of premises operations based on the monitoring carried out to date.

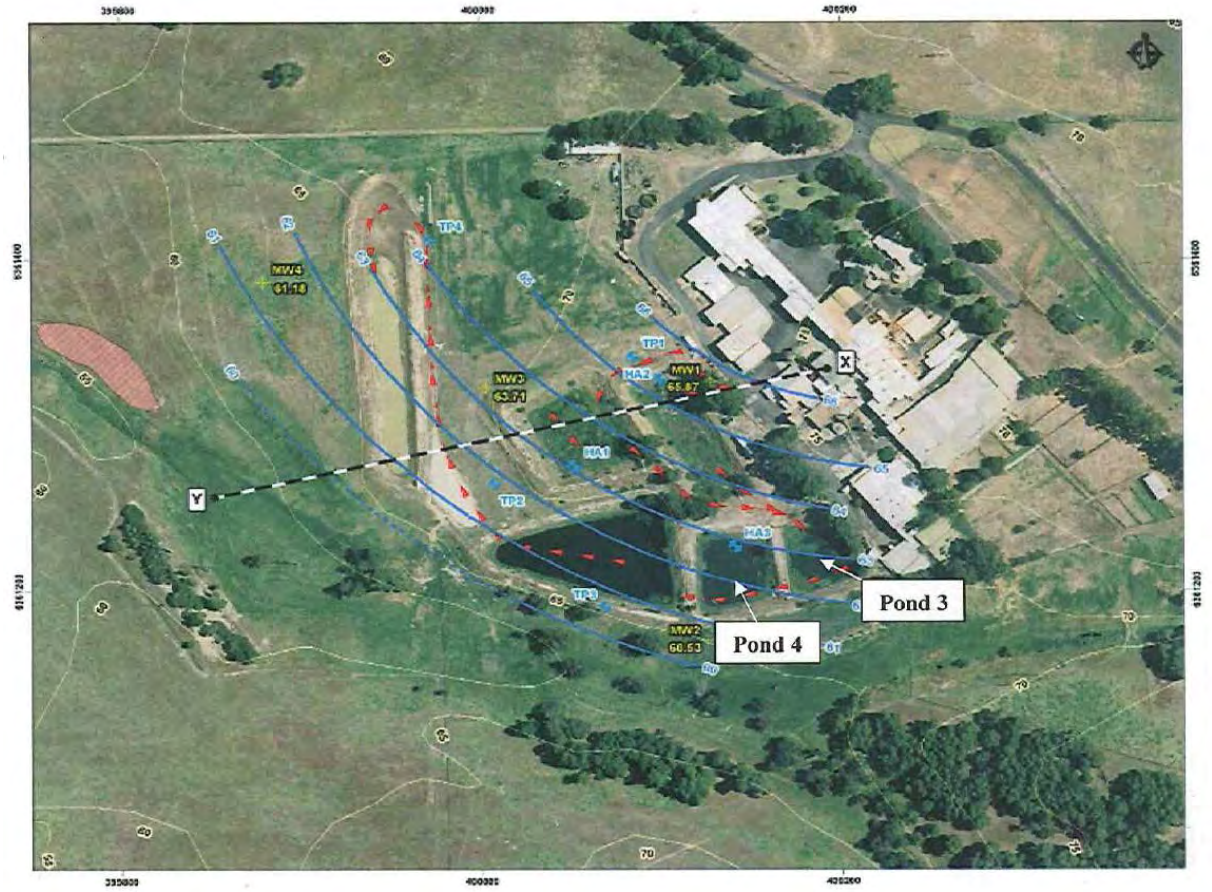


Figure 1.6: groundwater monitoring bore locations

2. Attachment 6A: Emissions and discharges

2.1 Emissions and controls

The key emissions and associated actual or likely pathways during premises construction, commissioning and operation are detailed in Table 2.1. The proposed control measures required to manage the identified emissions are also provided in the table.

Table 2.1: Emissions and controls

Emission	Sources	Activity	Potential pathways	Proposed controls
Construction				
Dust	Wastewater treatment plant and ponds (earthworks)	Earthworks	Air/windborne pathway	Water cart and sprinklers retained onsite; wetting down of roads when required; short-duration, temporary activities.
Noise	Wastewater treatment plant	General construction activity	Air/windborne pathway	All onsite machinery fitted with appropriate acoustic treatment; construction activities only between day-time hours (7am to 7pm, Mon – Sat); short-duration, temporary activities.
Commissioning (WWTP)				
Odour	Wastewater treatment plant, including ponds	Treatment and storage of wastewater	Air/windborne pathway	Start-up to occur at 25% capacity; recycling pumps and aerators used in equalisation pond; optimisation of bioreactor; weekly monitoring of plant performance; solid waste and sludge stored in enclosed bins; waste removed from site daily.
Wastewater			Leak or spill; seepage to soil and groundwater	Wastewater treatment plant in bunded concrete compound; leak detection system and alarm; wet-commissioning (with water) will be completed prior to process commissioning with effluent to capture any issues; start-up to occur at 25% capacity; regular inspection, monitoring and maintenance of tanks and vessels during commissioning; weekly monitoring of plant performance.
Operation				
Manure and wastewater	Animal delivery and lairage	Delivery and holding animals	Seepage to soil and groundwater	Concrete floors in lairage; compacted external holding pens; manure dry-scraped and collected daily and removed in a maximum of fortnightly period for disposal off-site; wastewater directed to wastewater treatment plant.
Odour			Air/windborne pathway	Lairage covered and partially enclosed; manure dry-scraped and collected daily; dead animals quarantined and removed from premises daily.
Dust			Air/windborne pathway	Lairage covered and partially enclosed; external holding pens compacted; water available for dust suppression.
Noise			Air/windborne pathway	Lairage covered and partially enclosed; high welfare standards (less animal stress).
Leachate		Storage of manure	Seepage to soil and groundwater	Manure stored on bunded concrete area.
Odour			Air/windborne pathway	Manure stored for short duration (< 2 weeks) and removed from site.

Emission	Sources	Activity	Potential pathways	Proposed controls
Odour	Abattoir	Slaughter of animals and processing of carcasses	Air/windborne pathway	Enclosed buildings; high hygiene and cleaning standards; abattoir cleaned daily.
Noise			Air/windborne pathway	Enclosed buildings; low noise equipment selected on replacement; equipment maintained; noise enclosures on air compressors.
Odour		Generation and storage of waste (e.g. blood, offal, paunch, bone and fat)	Air/windborne pathway	Solid wastes stored in enclosed hoppers and containers; blood separated from other wastewater streams and stored in double-skinned holding tank; waste removed from site daily.
Leachate/blood			Leak or spill; seepage to soil and groundwater	Wastes stored in enclosed hoppers, containers and tanks in controlled drainage areas; solid waste removed from premises daily.
Wastewater		Wash down, cleaning and sterilisation	Leak or spill; seepage to soil and groundwater	Wastewater contained and drained to wastewater treatment plant.
Odour	Wastewater treatment plant	Treatment and storage of wastewater	Air/windborne pathway	Pre-treatment to remove solids and fats; enclosed tanks and vessels; jet-mixers in equalisation pond to prevent anaerobic conditions; solid waste and sludge stored in enclosed bins; waste removed from site daily.
Wastewater			Leak or spill; seepage to soil and groundwater	Wastewater treatment plant in bunded concrete compound; leak detection system and alarm; regular inspection and maintenance of tanks and vessels.
		Storage of wastewater in ponds	Seepage to soil and groundwater	Ponds lined with HDPE to minimise seepage; CCIR reports completed for ponds prior to use; groundwater monitoring program; periodic inspection of pond liner (~5 year intervals).
			Overtopping; direct overland flow; seepage to soil and groundwater	Sufficient pond capacity for foreseeable normal operation; maintenance of 500 mm freeboard; pond embankments to prevent stormwater ingress.

2.2 Odour analysis report

An odour analysis assessment has been carried out using the procedures detailed in DWER's Guideline Odour Emissions (the odour guideline) (DWER 2019). The odour guideline advises that a screening analysis must be carried out as the first step in the assessment, which may be followed by a detailed analysis if further information is required from the screening analysis.

2.2.1 Odour screening analysis

A screening analysis has been carried out in accordance with the odour guideline. The analysis considered the odour guideline screening distance for a category 15 abattoir with wastewater treatment ponds (1,000 m).

As the boundary of the nearest sensitive receptor (rural residence; refer to section 3.1) is approximately 650 m from the abattoir wastewater treatment ponds, the screening analysis confirms that a detailed analysis is required.

2.2.2 Detailed analysis

A summary of the detailed analysis tools used in this assessment is provided in Table 2.2.

Table 2.2: Summary of detailed analysis tools

Detailed analysis tools	Check if used	Comments
Emission source		
Operational odour analysis (OOA) (priority tool)	☒	Refer to section 2.2.4
Odour source assessment (OSA)	☒	Refer to section 2.2.3
Pathway and receptor		
Location review	☒	Local topography and meteorology are described in sections 3.3 and 3.4; and residential and sensitive premises in section 3.1. The identified receptors are in an established rural/agricultural area with previous history of abattoir operations and odours characteristic of such activities.
Odour field assessment (OFA)	☐	No OFAs have been conducted specific to the premises. There are no other significant sources of odour in the local area; however, over the regional area, the following odour sources may be detected: • farming and livestock operations in other properties • combustion emissions from vehicle traffic, wood-burning heaters, bushfires and prescribed burns • biogenic (living trees and plants) emissions from forests and bushland • breakdown and rotting vegetation in the natural and agricultural environments • solid waste storage and disposal activities – both domestic and commercial/industrial • fuel storage and distribution activities • Wagerup Alumina Refinery.
Complaints data analysis	☐	The premises has not operated since 2009 and no recent complaints data has been recorded.
Community surveys	☐	No community surveys have been completed. There are limited residential receptors in the locality, the majority of which represent individual rural residences. Discussion with the Shire of Waroona has not raised any concerns regarding odour emissions.
Comparative dispersion modelling	☐	No computer modelling to compare different emissions scenarios has been completed.
Comparison with similar operations	☒	The proposed activities have been compared with other abattoirs in the south-west of WA. Other abattoirs have rendering plants on site, and stabilisation ponds for treating wastewater; therefore, the levels of odours are expected to be considerably lower at the premises, with no rendering and all wastewater treated in enclosed tanks and vessels.

2.2.3 Odour source assessment

The premises is a proposed sheep and cattle abattoir, including wastewater treatment. The production will be continuous for 10 hours per day, 5 days per week, 50 weeks per year. Livestock will be placed in pens in the south-east side of the premises, with a planned short rotation time. There will be no rendering on site, and all the solid waste, including skins, hides and manure will be regularly removed from the site for disposal in licensed facilities or reuse.

Table 2.3 below presents the identification of all proposed operations on the premises likely to emit odour, as well as the ranking in terms of expected rates and concentrations, according to the Environmental Best Practice Manual: Odour (AMPC 2010).

Table 2.3: Odour sources

Odour source	Emission rate	Concentration
Holding pens/yards	Low	Very low
Solid waste handling and storage	Moderate	Moderate
Blood tank vent	Very low	Moderate
Wastewater screening	Low	Low
WWTP (covered tanks)	Low	Low
Equalisation pond (aerated)	Low	Very Low
Treated wastewater storage	Very low	Very low
Emergency pond	Low	Very low

In the event of a premises shutdown, the facilities will be cleaned, and all wastes will be removed from the site for disposal.

2.2.4 Operational odour analysis

Details of the operational odour analysis are shown in Table 2.4 for wastewater treatment plant commissioning and Table 2.5 for normal operations. The residual odour impact potential is considered in Table 2.6.

Table 2.4: Operational odour analysis – wastewater treatment plant commissioning

Aspect	Response
Odour sources and emissions	Refer to Table 2.1
Process controls	Refer to Table 2.1
Triggers and corrective actions	Triggers: • receipt of off-site complaint • premises inspection – detection of odour intensity outside premises boundary above pre-determined trigger level/threshold (daily inspection). Corrective actions: • site inspection to identify any specific operations, actions or abnormal configurations that may be the source of the elevated odour emissions and consequent off-site impacts • implement actions to resolve issue (e.g. adjust wastewater treatment plant parameters, adjust aeration in equalisation pond).
Corrective action evaluation	Reinspect premises – confirm odour intensity outside premises boundary below pre-determined trigger level/threshold.
Contingency actions	Commissioning will be stopped if the off-site odour intensity level remains above the trigger level/threshold and no operations, actions or abnormal configurations have been identified onsite.

Table 2.5: Operational odour analysis – normal operations

Aspect	Response
Odour sources and emissions	Refer to Table 2.1
Process controls	Refer to Table 2.1
Triggers and corrective actions	Triggers: • receipt of off-site complaint • premises inspection – detection of odour intensity outside premises boundary above pre-determined trigger level/threshold (as defined in standard operational procedure to be developed). Corrective actions: • site inspection to identify any specific operations, actions or abnormal configurations that may be the source of the elevated odour emissions and consequent off-site impacts • implement actions to resolve issue (e.g. remove or enclose waste, close doors, adjust wastewater treatment plant parameters, adjust aeration in equalisation pond; increase frequency and intensity of cleaning).
Corrective action evaluation	Reinspect premises – confirm odour intensity outside premises boundary below pre-determined trigger level/threshold.
Contingency actions	The premises operations will be stopped if the off-site odour intensity level remains above the trigger level/threshold and no operations, actions or abnormal configurations have been identified onsite.

The residual odour impact potential is determined from a risk assessment carried out using DWER risk assessment guidelines (DER 2017). The risk ratings are provided with controls in place. Quantitative consequence criteria for acceptable or unacceptable odour impacts are not provided in the odour guideline. Qualitative criteria described in Table 1 of the DWER risk assessment guidelines relating to amenity have been used to provide consequence ratings. The likelihood ratings are based on the likelihood of odour impacts being experienced at sensitive receptors from commissioning and operation of the premises.

Table 2.6: Residual odour impact potential

Operation / odour source	Consequence	Likelihood	Impact potential
Wastewater treatment plant commissioning	Minor – low level impact to amenity	Possible – the risk event could occur at some time	Medium
Normal operation	Minor – low level impact to amenity	Possible – the risk event could occur at some time	Medium

3. Attachment 7: Siting and location

The premises is located on Waterous Road, 3 km south of Waroona and to the east of the South Western Highway. The premises is in a predominantly rural agricultural area, with a history of mineral sands mining. The Alcoa Wagerup Alumina Refinery is located approximately 3 km south-west of the premises.

3.1 Residential and sensitive premises

The distances to residential and sensitive receptors are shown in Table 3.1 and Figure 3.6.

Table 3.1: Receptors and distance from prescribed activity

Residential and sensitive premises	Distance from premises (measured from boundary)
Rural residence	275 m SE (650 m from abattoir complex)
Rural residence	975 m SE
Rural residences	480 m; 940 m N
Hamel Town	870 m NW
Waroona Town	2.8 km N

3.2 Specified ecosystems

Specified ecosystems are areas of high conservation value and special significance that may be impacted because of activities at or emissions and discharges from the premises. Specified ecosystems have been identified in accordance with DWER Guidance Statement on Environmental Siting (DER 2016). The distances to specified ecosystems and other relevant ecosystem values are shown in Table 3.2 and on Figure 3.6.

Table 3.2: Environmental values

Specified Ecosystem	Distance from premises (measured from boundary)
Geomorphic Wetland – Multiple Use (Palusplain) ID 15231	50 m W; 400 m N; 690 m SW
Geomorphic Wetland – Multiple Use (Lake) ID 6013	425 m NW

3.3 Topography and landform

The abattoir is located on the foot slopes of the Darling Scarp with ground elevations ranging from 55 – 90 m AHD from west to east (Figure 3.1). The area is termed the Ridgehill Shelf and comprises an undulating terrain of palaeo-shoreline and colluvial outwash from the escarpment. This area is the eastern fringe of the Perth Basin in the vicinity of the Darling Fault.

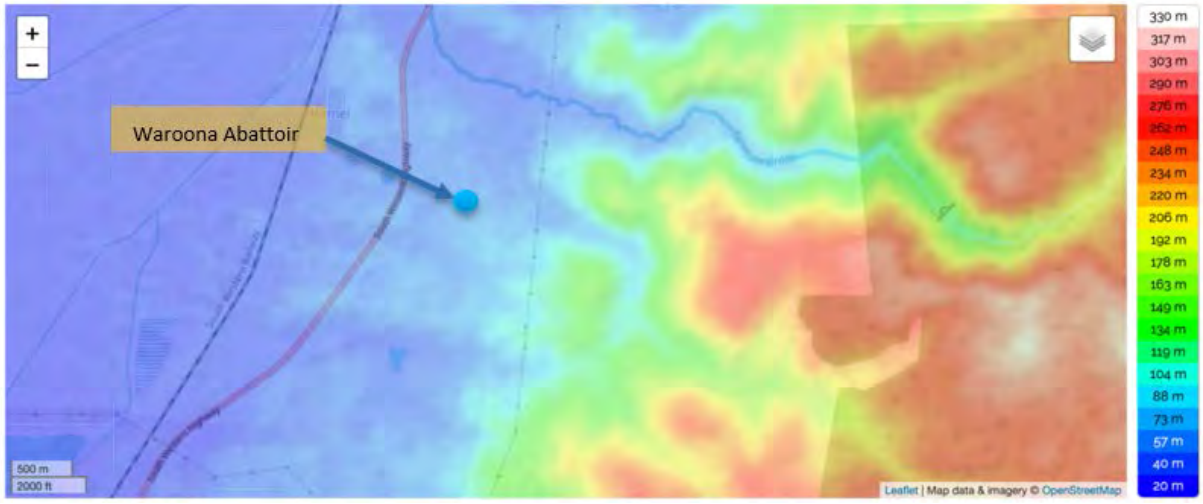


Figure 3.1: Local topography

3.4 Local meteorology

According to the Bureau of Meteorology[1], climate statistics for the nearest weather operational station at Dwellingup (site no. 9538) show that mean maximum daily temperatures vary from 29.7 °C in January and February to 15.1 °C in July; and mean minimum daily temperatures vary from 14.6 °C in February to 5.5 °C in July and August. Mean annual rainfall is approximately 1229 mm with the majority falling between May and September. Seasonal rainfall is shown in Figure 3.2 below.

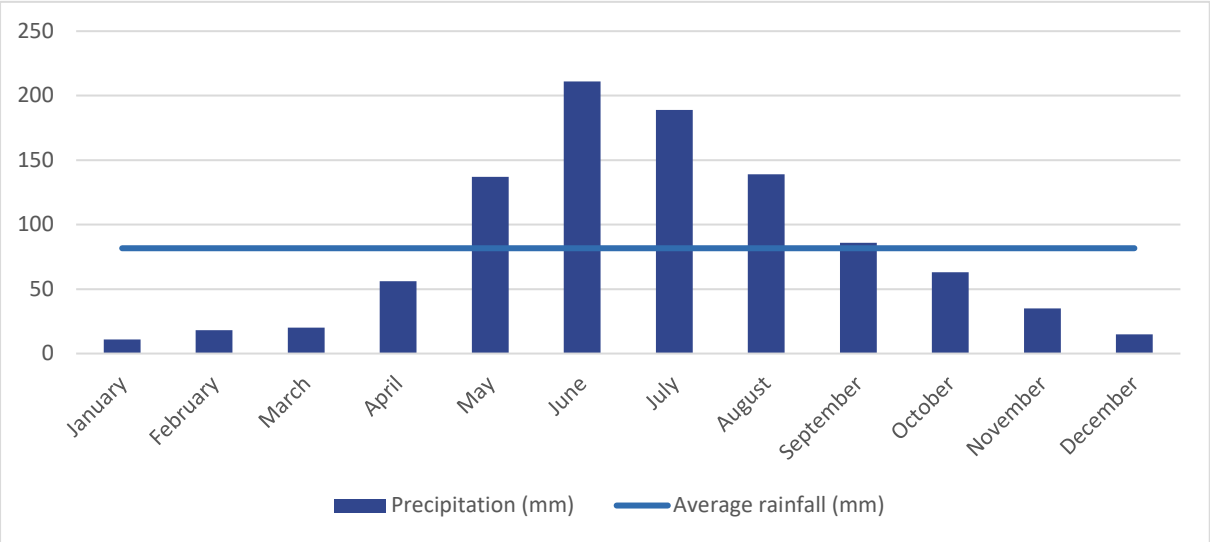


Figure 3.2: Average monthly rainfall in Waroona (1985-2012)

The winds at Waroona at the base of the scarp are controlled by the synoptic weather patterns and local features such as the topography and sea and land breezes.

In the summer, the passage of high-pressure systems to the south generate synoptic easterlies over the region, whilst in the winter months, the passage of cold fronts and low-pressure systems result in more frequent westerly synoptic flows between periods of lighter winds. At the base of the Darling Scarp, topographical features are important in modifying these larger-scale winds.

The meteorology of the foothill region near the Darling Scarp has been described previously in reports for both the Alcoa Pinjarra and Wagerup refineries (SKM [2003], CSIRO [2004] and Air Assessments [2005a, 2005b]).

Annual morning and afternoon wind roses are shown in Figure 3.3, and seasonal wind roses[2] are shown in Figure 3.4 below.

Wind speed and direction data show the dominant wind directions in the summer are from the south-east and east in the morning (9 am) and south-east and south-west in the afternoon (3 pm). The strongest winds occur from the east to south-east, due to the development of the foothill winds in summer and to lesser extent autumn and spring. The most frequent winds are from the east to south-east (occurring primarily in summer, autumn and spring) and from the south-west (occurring in summer and spring associated with the afternoon sea breeze); there is a relatively low frequency of winds from the west through to the north-west.

[1] http://www.bom.gov.au/climate/data
[2] https://www.willyweather.com.au/climate/weather-stations/wa/peel/dwellingup

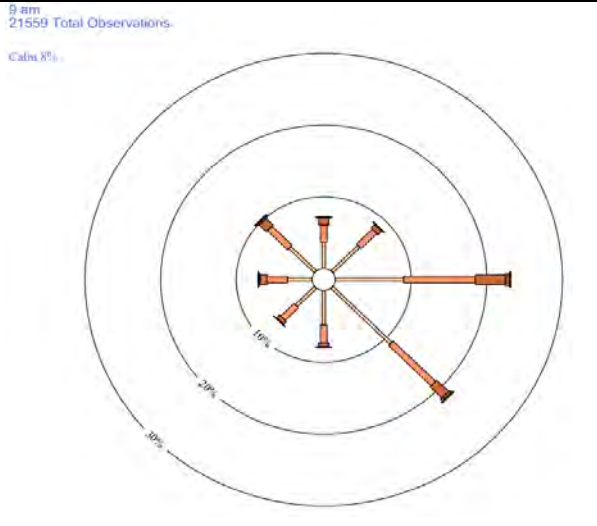
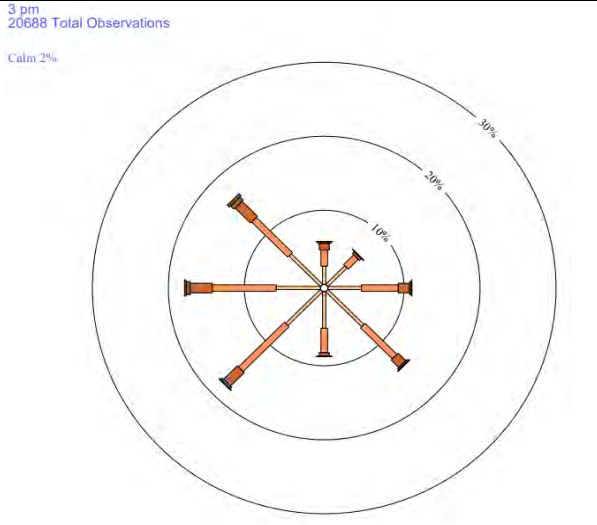
Morning	Afternoon
	

Figure 3.3: Roses of wind direction versus wind speed in km/h (1 Jan 1957 to 10 Aug 2019)

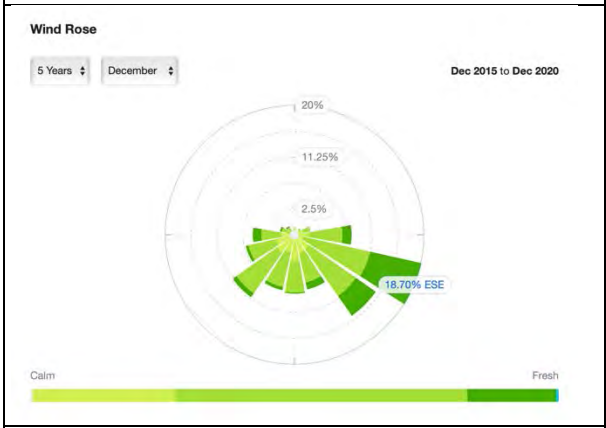
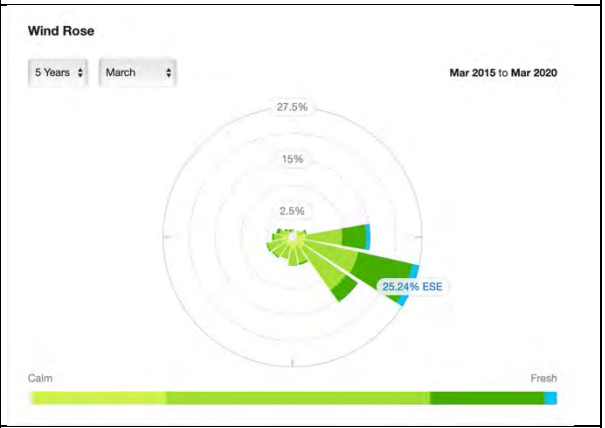
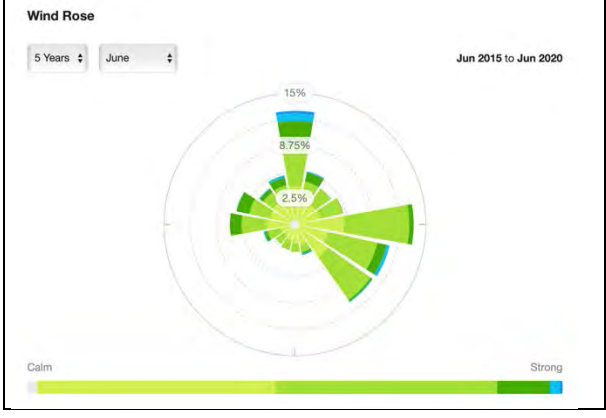
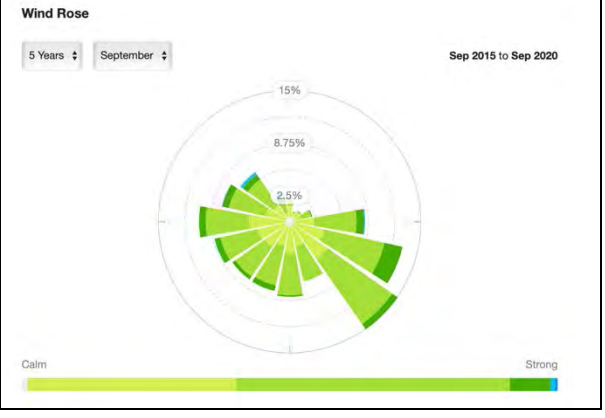
Summer	Autumn
	
Winter	Spring
	

Figure 3.4: Seasonal roses of wind direction versus wind speed in km/h

3.5 Hydrology

The abattoir is in the catchment of the Harvey River. McKnoe Brook runs south-east to north-west approximately 400 m to the north-west of the abattoir. A perennial creek runs along the southwestern boundary of the abattoir, which cuts across the southeastern corner of the premises north of the stormwater dam. Black Tom Brook runs east to west, approximately 700 m south of the abattoir.

One surface water abstraction licence is located approximately 1 km south of the abattoir associated with the Alcoa refinery and Yalup Brook[3], and the nearest public drinking water source protection zone is the Samson Brook Catchment Area 2.8 km east of the abattoir boundary.

3.6 Geology and soils

The Darling Escarpment consists of Archaean basement consisting of crystalline granitic rocks with a laterite profile and thin deposits of coarse alluvial and colluvial material within drainage lines which occur in more elevated parts of the property in the east. The Ridgehill Shelf contains Yoganup Formation – sands and clayey sands of fluvial and Aeolian origins and silty clays and lateritic gravelly clays in colluvial deposits located at the west of the property[4].

Four groundwater monitoring wells were previously constructed at the abattoir. The bore construction logs confirm the abattoir is generally underlain by sand and gravel fill, sands and clayey sands and silty clays as follows:

MW1	Depth from	Depth to	Lithology
	0	0.35	Sandy material – fill
	0.35	3.6	Yellow/brown SAND with some GRAVEL
	3.6	5.4	Dark yellowish/red gravely SANDY CLAY
	5.4	8.4	Yellow/brown SAND with some CLAY and GRAVEL
	8.4	12.9	Moist to wet grey/blue SAND
	12.9	16.8	Moist grey/blue CLAY

MW2	Depth from	Depth to	Lithology
	0	1.2	Sand and gravel – fill
	1.2	3.2	Yellow/brown SAND with some GRAVEL
	3.2	4.8	White/grey SANDY CLAY
	4.8	8.4	Grey CLAY

MW3	Depth from	Depth to	Lithology
	0	2.4	Sand – fill
	2.4	3.0	Dark red/brown SAND with some GRAVEL
	3.0	6.0	Yellowish grey SAND
	6.0	8.4	Grey SAND with some CLAY
	8.4	10.0	White/grey CLAY
	10.0	13.2	Alternating white/grey CLAY and SAND

MW4	Depth from	Depth to	Lithology
	0	1.6	Sand – fill
	2.4	3.9	Dark red/brown SAND
	3.9	5.0	Red and brown SAND and GRAVEL
	5.0	6.8	Grey SAND
	6.8	10.5	Alternating white/grey CLAY and SAND
	10.5	12.0	Dark brown SANDY CLAY

[3] https://maps.water.wa.gov.au/#/webmap/register
[4] Carey Johnston [Department of Water and Environmental Regulation] pers. comm. 29 January 2020

3.7 Hydrogeology and groundwater

The location of the abattoir is interpreted to correspond to the eastern portion of the Ridgehill Shelf, either on or to the east of the Darling Fault (Figure 3.5). Where the Yoganup Formation is present, the profile is expected to be around 20-30 m thick with the weathered bedrock profile likely to be thin (less than 10 m)[5].

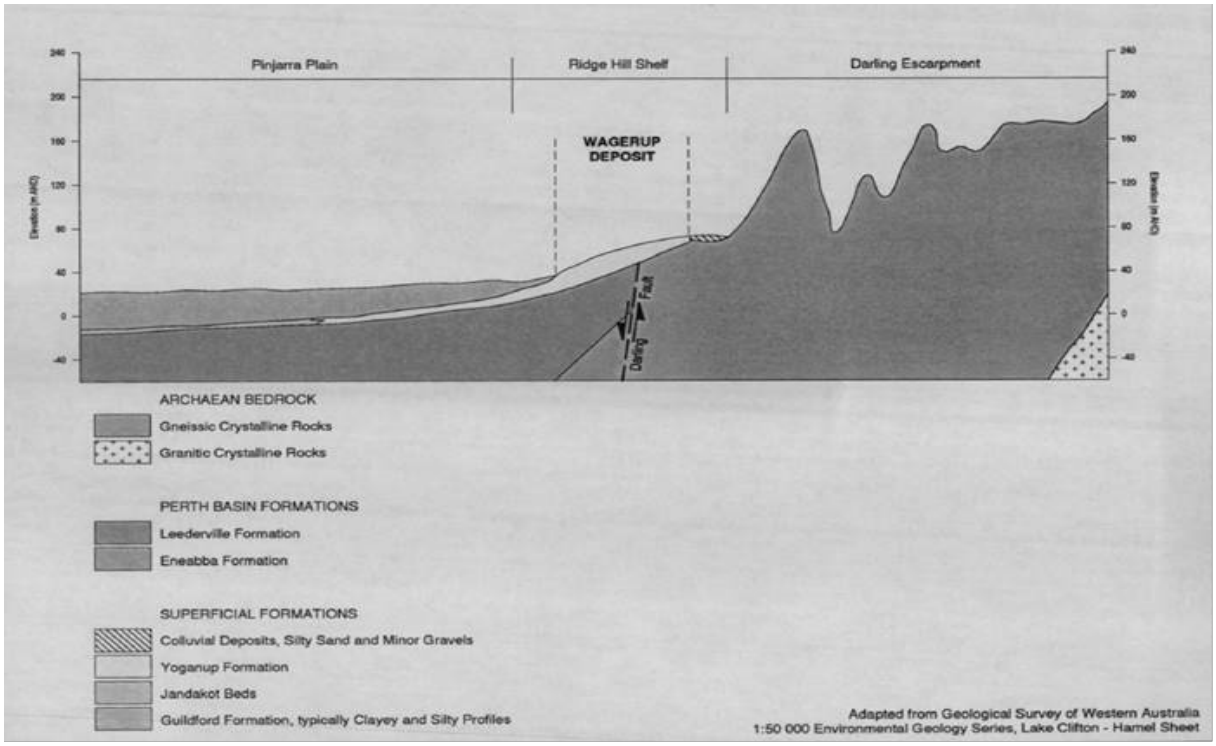


Figure 3.5: Geological cross-section (DWER 2020)

Medium grained, well-sorted sands in the Yoganup Formation may support a productive aquifer; however, the aquifer zones in the weathered and fresh bedrock profiles are expected to be of limited extent and represent perched or seasonal aquifers. The deeper Leederville Formation is only likely to be present near the western boundary of the abattoir and is unlikely to be an aquifer at this location as it consists of dark mudstones and shales[5].

Groundwater is expected to be fresh and slightly acidic, indicative of rapid recharge of rainfall and streamflow through preferred flow zones. There are no active groundwater extraction licences within 3 km of the abattoir.[5]

3.7.1 Groundwater quality monitoring

Groundwater quality monitoring was carried out in November 2019 and May, August and November 2020. The analysis was based on the analytical suite contained in the previous licence and with reference to the Assessment and Management of Contaminated Sites – Appendix B: Potentially Contaminating Industries, Activities and Land Uses (DER 2014). The analysis schedule is summarised in Table 3.3.

[5] https://maps.water.wa.gov.au/#/webmap/register

Table 3.3: Laboratory analysis schedule

Monitoring well location	No. of Samples	Analyses
MW3 MW2 MW4	1 per groundwater monitoring well	• 5-day biological oxygen demand • Total suspended solids (TSS) • Total nitrogen • Total phosphorus • Total recoverable hydrocarbons (TRH), • Benzene, toluene, ethylbenzene, xylenes and naphthalene (BTEXN) • Polycyclic aromatic hydrocarbons (PAH) • Pesticides: organochlorinated pesticides (OCP), and organophosphorus pesticides (OPP) • Heavy metals - As, Cd, Cr, Cu, Ni, Pb, Zn, Hg

During purging of the bores, groundwater field parameters were measured, including salinity (electrical conductivity (EC)), temperature, dissolved oxygen (DO), pH and redox potential. The field parameters recorded following stabilisation and prior to sampling are presented in Table 3.4

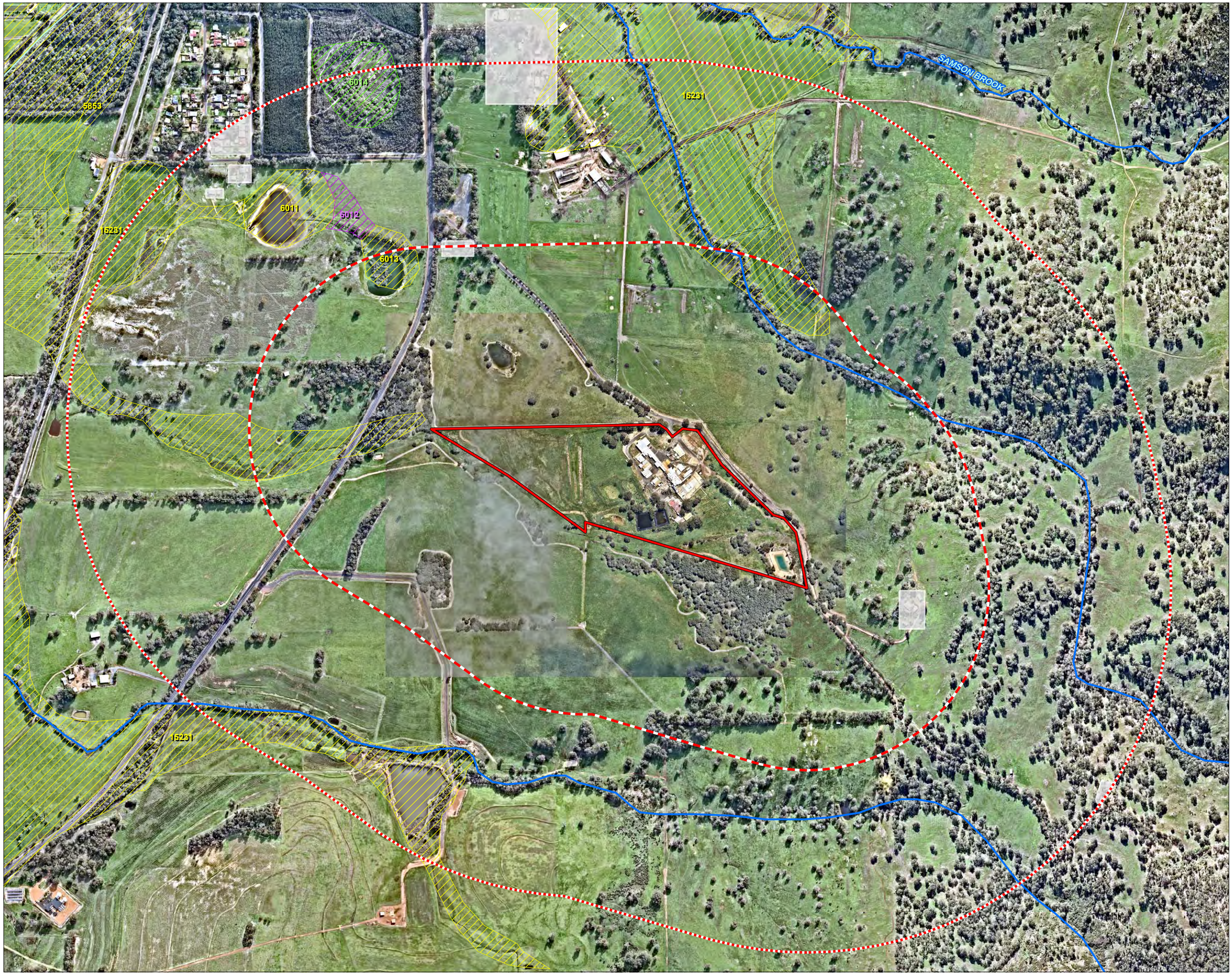
Table 3.4: Groundwater field parameters

Location	Date sampled	SWL	Dissolved oxygen	Temperature	pH	Conductivity	Redox	TDS*
		mbtoc	mg/l	°C	pH Units	µS/cm	mV	mg/L
MW2	15/11/2019	2.394	0.21	19.3	6.9	1289	-93	837.85
	14/05/2020	3.571	1.5	21.6	6.39	1200	33.8	780
	27/08/2020	1.854	9.1	-	6.7	1400	-	910
MW3	15/11/2019	4.447	0.36	20.1	6.51	1709	2.3	1110.85
	14/05/2020	5.856	2.3	20.6	6.20	539.8	112.1	350.87
	27/08/2020	5.171	0.08	19.6	6.29	2373	160.9	104.585
MW4	15/11/2019	2.343	0.15	20.1	6.32	821	-30	533.65
	14/05/2020	3.401	2.0	21.6	6.06	709	112.1	51.35
	27/08/2020	2.666	0.11	19.2	6.07	667	158.7	103.155
*TDS results are approximations based on field EC results: TDS (mg/l) = EC (µS/cm) x 0.65								

The results of the groundwater sampling are tabulated in Appendix B (November 2020 results pending).

In summary, measured groundwater levels were recorded between 2.3 m and 5.8 m below the top of well casing. The gauged levels indicate that groundwater flow is in a south-westerly direction (as shown by the historic groundwater contours in Figure 1.6).

Groundwater concentrations were generally below the adopted criteria, except for total nitrogen which exceeded the long term irrigation guideline of 5 mg/L (DER 2014) in all three wells (highest values recorded in November 2019, MW2 - 61 mg/L; MW3 - 51 mg/L; MW4 - 28 mg/L), indicating the presence of elevated background concentrations potentially resulting from general agricultural activity in the area.



Legend:

- Site boundary
- 500m buffer
- 1km buffer
- Existing residences

Geomorphic Wetlands (DBCA)

- Conservation
- Multiple Use
- Not
- CanalLine
- WatercourseLine

strategen JBS&G

Job No: 57842	
Client: Prime Meat Co	
Version: A	Date: 27-Nov-2020
Drawn By: cthatcher	Checked By: JB

Scale 1:9,500

0 100 200
metres

Coord. Sys. GDA 1994 MGA Zone 50

86 Waterous Road
Wagerup, WA 6215

SITING AND LOCATION

FIGURE: 3.6

File Name: \\008pmpmr004v001.jbsg.aust\JBS Perth\Projects\1)Open\Prime Meat Co\Waroona Abattoir\57842 Waroona approvals\GIS\Maps\R03_Rev_A\57842_03_6_SitingAndLocation.mxd
Image Reference: www.nearmap.com© - Imagery Date: 5 October 2020

4. Attachment 9: Information and data used to calculate proposed fees

The proposed works approval application fee This is based on a cost of works of which equates to (total cost more than but not more than . A breakdown of the estimated cost of works is shown in Table 4.1.

Additional breakdown of the costs associated with the wastewater treatment plant, wastewater and freshwater ponds are contained in application Attachments 8A and 8B respectively.

Table 4.1: Estimated cost of works

Item	[redacted]
Wastewater treatment plant	
Water supply package, including freshwater and wastewater ponds	
General abattoir upgrades (e.g. flooring)	
Refrigeration	
Boilers	
Refurbishment/replacement of pipelines	
Total	

5. Limitations

Scope of services

This report ("the report") has been prepared by Strategen-JBS&G in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and Strategen-JBS&G. In some circumstances, a range of factors such as time, budget, access and/or site disturbance constraints may have limited the scope of services. This report is strictly limited to the matters stated in it and is not to be read as extending, by implication, to any other matter in connection with the matters addressed in it.

Reliance on data

In preparing the report, Strategen-JBS&G has relied upon data and other information provided by the Client and other individuals and organisations, most of which are referred to in the report ("the data"). Except as otherwise expressly stated in the report, Strategen-JBS&G has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ("conclusions") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Strategen-JBS&G has also not attempted to determine whether any material matter has been omitted from the data. Strategen-JBS&G will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to Strategen-JBS&G. The making of any assumption does not imply that Strategen-JBS&G has made any enquiry to verify the correctness of that assumption.

The report is based on conditions encountered and information received at the time of preparation of this report or the time that site investigations were carried out. Strategen-JBS&G disclaims responsibility for any changes that may have occurred after this time. This report and any legal issues arising from it are governed by and construed in accordance with the law of Western Australia as at the date of this report.

Environmental conclusions

Within the limitations imposed by the scope of services, the preparation of this report has been undertaken and performed in a professional manner, in accordance with generally accepted environmental consulting practices. No other warranty, whether express or implied, is made.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

Strategen-JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by Strategen-JBS&G, and should not be relied upon by other parties, who should make their own enquiries.

6. References

Air Assessments. 2005a. *Air Dispersion Modelling of Fugitive Emissions - Wagerup Refinery*. Report prepared for Alcoa World alumina Australia. April 2005. Available by download from http://www.alcoa.com/australia/en/info_page/WAG_environment.asp.

Air Assessments. 2005b. *Air Dispersion Modelling of Fugitive Particulate Waroona Mine*. Report prepared for Iluka Resources Limited.

Australian Meat Processor Corporation (AMPC). 2010. *Environmental Best Practice Manual: Odour*. Retrieved from https://www.ampc.com.au/2010/12/Environmental-Best-Practice-Manual-Odour.

CSIRO. 2004. *Meteorological and Dispersion modelling using TAPM for Wagerup. Phase 1: Meteorology*. November 2004.

Department of Environment Regulation (DER). (2014). *Assessment and management of contaminated sites - Contaminated sites guidelines*. Retrieved from https://www.der.wa.gov.au/your-environment/contaminated-sites/61-contaminated-sites-guidelines.

Department of Environment Regulation (DER). (2016). *Guidance Statement Environmental Siting Part V, Division 3, Environmental Protection Act 1986*. Retrieved from https://www.der.wa.gov.au/our-work/licences-and-works-approvals/publications.

Department of Environment Regulation (DER). (2016). *Guidance Statement Environmental Siting Part V, Division 3, Environmental Protection Act 1986*. Retrieved from https://www.der.wa.gov.au/our-work/licences-and-works-approvals/publications.

Department of Environment Regulation (DER). (2017). *Guidance Statement Risk Assessments*. Retrieved from https://www.der.wa.gov.au/our-work/licences-and-works-approvals/publications.

Department of Health (DoH). (2011). *Guidelines for the Non-potable Uses of Recycled Water in Western Australia.* Retrieved from https://ww2.health.wa.gov.au/Articles/N_R/Recycled-water-publications.

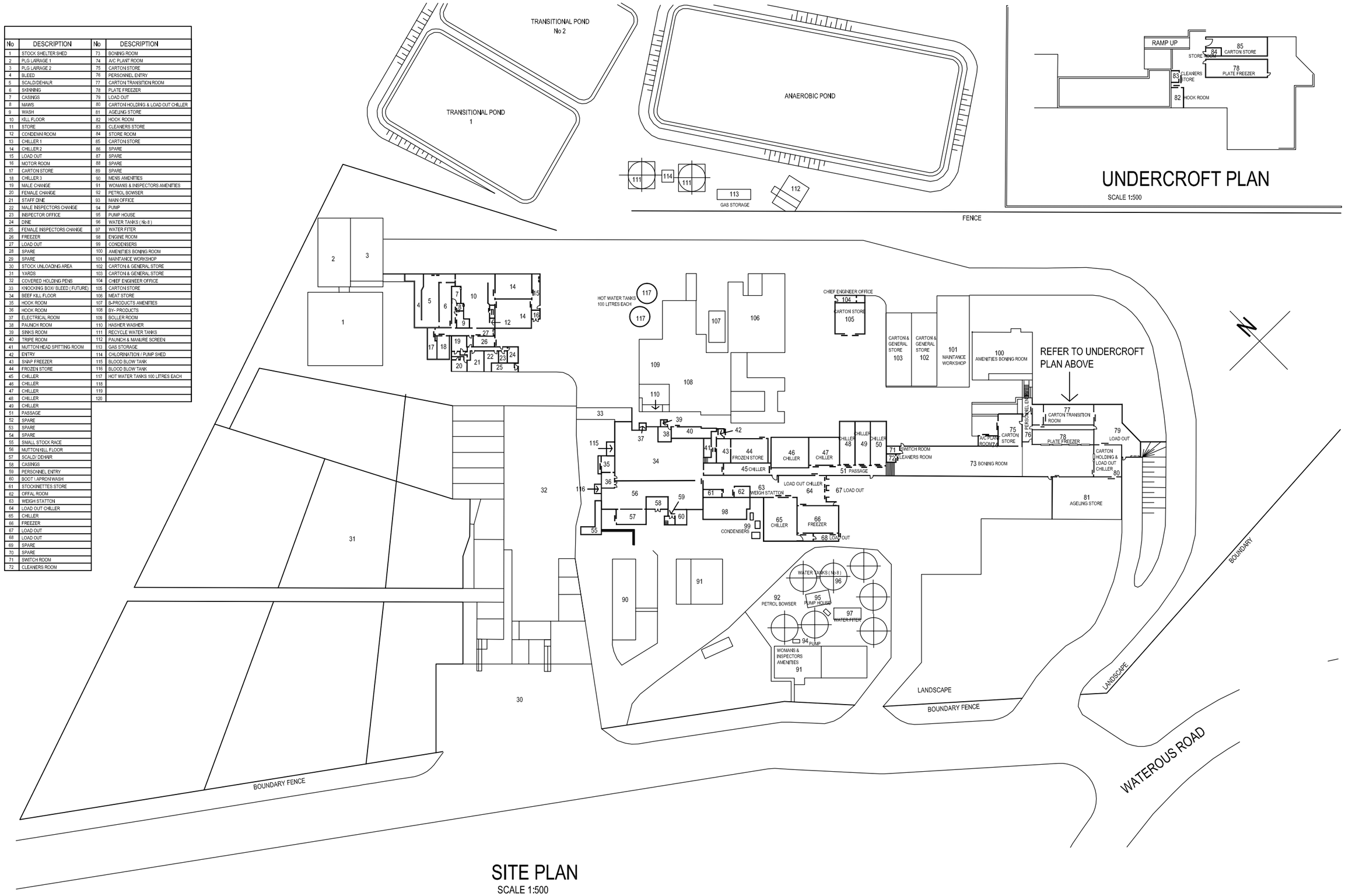
Department of Water (DoW). (2013). *Water quality protection note 26 Liners for containing pollutants, using synthetic membranes.* Retrieved from https://www.wa.gov.au/organisation/department-of-water-and-environmental-regulation/water-services.

Department of Water and Environment Regulation (DWER). (2019). *Guideline: Odour Emissions.* Retrieved from https://www.der.wa.gov.au/our-work/licences-and-works-approvals/publications.

Sinclair Knight Merz (SKM). 2003. *Pinjarra Refinery Upgrade - Air Dispersion Modelling. Final Report*. 3 December 2003.

Appendix A Site plans

No	DESCRIPTION	No	DESCRIPTION
1	STOCK SHELTER SHED	73	BONING ROOM
2	PLG LAIRAGE 1	74	A/C PLANT ROOM
3	PLG LAIRAGE 2	75	CARTON STORE
4	BLEED	76	PERSONNEL ENTRY
5	SCALD/DEHAIR	77	CARTON TRANSITION ROOM
6	SKINNING	78	PLATE FREEZER
7	CASINGS	79	LOAD OUT
8	MAWS	80	CARTON HOLDING & LOAD OUT CHILLER
9	WASH	81	AGEING STORE
10	KILL FLOOR	82	HOOK ROOM
11	STORE	83	CLEANERS STORE
12	CONDEMN ROOM	84	STORE ROOM
13	CHILLER 1	85	CARTON STORE
14	CHILLER 2	86	SPARE
15	LOAD OUT	87	SPARE
16	MOTOR ROOM	88	SPARE
17	CARTON STORE	89	SPARE
18	CHILLER 3	90	MENS AMENITIES
19	MALE CHANGE	91	WOMANS & INSPECTORS AMENITIES
20	FEMALE CHANGE	92	PETROL BOWSER
21	STAFF DINE	93	MAIN OFFICE
22	MALE INSPECTORS CHANGE	94	PUMP
23	INSPECTOR OFFICE	95	PUMP HOUSE
24	DINE	96	WATER TANKS (No 8)
25	FEMALE INSPECTORS CHANGE	97	WATER FITER
26	FREEZER	98	ENGINE ROOM
27	LOAD OUT	99	CONDENSERS
28	SPARE	100	AMENITIES BONING ROOM
29	SPARE	101	MAINTANCE WORKSHOP
30	STOCK UNLOADING AREA	102	CARTON & GENERAL STORE
31	YARDS	103	CARTON & GENERAL STORE
32	COVERED HOLDING PENS	104	CHIEF ENGINEER OFFICE
33	KNOCKING BOX/ BLEED (FUTURE)	105	CARTON STORE
34	BEEF KILL FLOOR	106	MEAT STORE
35	HOOK ROOM	107	B-PRODUCTS AMENITIES
36	HOOK ROOM	108	BY- PRODUCTS
37	ELECTRICAL ROOM	109	BOILLER ROOM
38	PAUNCH ROOM	110	HASHER WASHER
39	SINKS ROOM	111	RECYCLE WATER TANKS
40	TRIPE ROOM	112	PAUNCH & MANURE SCREEN
41	MUTTON HEAD SPITTING ROOM	113	GAS STORAGE
42	ENTRY	114	CHLORINATION / PUMP SHED
43	SNAP FREEZER	115	BLOOD BLOW TANK
44	FROZEN STORE	116	BLOOD BLOW TANK
45	CHILLER	117	HOT WATER TANKS 100 LITRES EACH
46	CHILLER	118	
47	CHILLER	119	
48	CHILLER	120	
49	CHILLER		
51	PASSAGE		
52	SPARE		
53	SPARE		
54	SPARE		
55	SMALL STOCK RACE		
56	MUTTON KILL FLOOR		
57	SCALD/ DEHAIR		
58	CASINGS		
59	PERSONNEL ENTRY		
60	BOOT \ APRON WASH		
61	STOCKINETTES STORE		
62	OFFAL ROOM		
63	WEIGH STATTON		
64	LOAD OUT CHILLER		
65	CHILLER		
66	FREEZER		
67	LOAD OUT		
68	LOAD OUT		
69	SPARE		
70	SPARE		
71	SWITCH ROOM		
72	CLEANERS ROOM		



UNDERCROFT PLAN

SCALE 1:500

SITE PLAN

SCALE 1:500

Harley Dykstra
PLANNING & SURVEY SOLUTIONS

rev	details	approved	date
A	Original drawing	SB	27/05/20

survey	cad file
SB	22204-01A.dgn
drawn	checked
NP 27/05/20	BdR 27/05/20
horiz datum	level datum
MGA94	AHD

scale at A2 — all distances are in metres

1 : 750 (0 5 10 15 20 25 30)

plan type

FEATURE SURVEY

client

HARVEY WATER

description

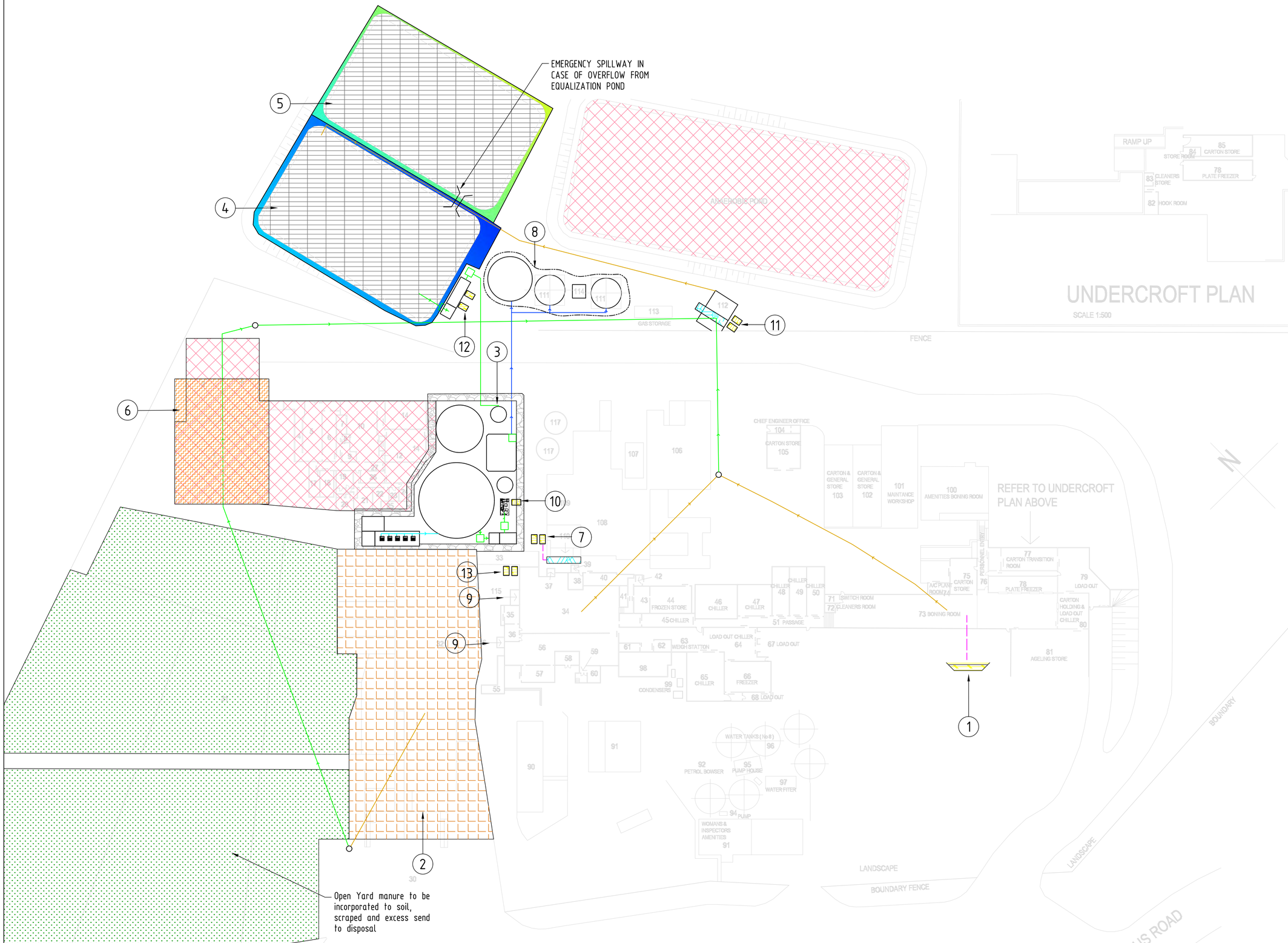
LOT 21 ON D 86238
86 WATEROUS ROAD
WAGERUP

drawing no

22204-01

BUNBURY OFFICE:
HARLEY DYKSTRA PTY LTD
21 Spencer Street, BUNBURY WA 6230
T: 08 9792 6000
E: bunbury@harleydykstra.com.au
W: www.harleydykstra.com.au

ALBANY | BUNBURY | BUSSELTON | FORRESTDALE | PERTH



NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. HORIZONTAL DATUM: TBC.

WWTP & OTHER FACILITIES:

1	Bones Loading (External Disposal)
2	Holding Pens
3	Wastewater Treatment Plant Site
4	Re-purposed Equalisation Pond
5	Re-Purposed Emergency Overflow
6	Dead Animals Quarantine Area
7	Paunch/Offal External Disposal)
8	Treated Water Storage Tanks and Distribution
9	Blood Tanks (External disposal)
10	WWTP Sludge (External Disposal)
11	Screened Solids from washsdown and others from effluent (External Disposal)
12	DAF Solids/Fat (External Disposal)
13	Head/hooves (External Disposal)

LEGEND:

- Covered Holding Pen
- Yards
- Decomissioned
- Skip Bin (SB)
- Re-purposed Ponds
- Dead Animals Quarentine Area
- WWTP Premises
- Rotary Screen (RS)
- Catchment area Pond 1
- Catchment area Pond 2
- Effluent Sump
- Pressurized Effluent Pipeline
- Gravity Effluent Pipeline
- Air Pipeline (Aerobic Reactor)
- Air Pipeline to Biofilter
- Treated Wastewater for Disinfection and Storage
- Screw Conveyor

DATE	DESCRIPTION	REV
09.10.20	ISSUED FOR FINAL REPORT	

TESSELE CONSULTANTS
ABN No. 38 611 436 536
phone +61 8 9317 8413
BICTON, WA
www.tessele.com

NORTH:

PROJECT TITLE:
WASTEWATER TREATMENT AND FACILITIES
LIQUID AND SOLID STREAM MANAGEMENT
WAROONA ABATTOIR
WAGERUP, WA

SCALE@A1:	PLOT DATE:	PROJECT NO:
NTS	16.11.2020	200326

DRAWN:	CHECKED:	APPROVED:	SHEET:
GT	FT		1 OF 1

DRAWING TITLE:
WASTEWATER TREATMENT PLANT
SITE PLAN

DRAWING NUMBER: 200326-PMC-CD-DW-001
REVISION: 0

/Users/gt/Dropbox/200426-001 | Wastewater Treatment Plant | Waroona Abattoir/03 Tessele Docs/11-Drawings/Final Report Rev0/200326-PMC-CD-DW-001-REV0.dwg

Appendix B Groundwater monitoring data

GROUNDWATER SUMMARY TABLE
Project Number: 57908
Project Name: Waroona GME

			Metals & Metalloids								TPHs (NEPC 1999)					TRHs (NEPC 2013)						
			Arsenic (Total) (Filtered)	Cadmium (Filtered)	Chromium (Total) (Filtered)	Copper (Filtered)	Lead (Filtered)	Mercury (Inorganic) (Filtered)	Nickel (Filtered)	Zinc (Filtered)	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Total)	>C10-C16 Fraction	>C16-C34 Fraction	>C34-C40 Fraction	>C10-C40 Fraction (Total)	>C10-C16 less Naphthalene (F2)	C6-C10 Fraction	C6-C10 less BTEX (F1)
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL			0.001	0.0002	0.001	0.001	0.001	0.0001	0.001	0.005	0.02	0.05	0.1	0.1	0.1	0.05	0.1	0.1	0.1	0.05	0.02	0.02
DoH 2014 - Non-Potable Groundwater Use (NPUG)			0.1	0.02		20	0.1	0.01	0.2	3												
WA - DER 2014 - Drinking Water Health			**0.01**[#1]	**0.002**[#1]		**2**[#1]	**0.01**[#1]	**0.001**[#1]	**0.02**[#1]													
WA - DER 2014 - Long Term Irrigation			0.1[#2]	0.01[#2]	0.1[#2]	0.2[#2]	2[#2]	0.002[#2]	0.2[#2]	2[#2]												
Field ID	**Sampled Date**	**Lab Report Number**																				
TP2 (MW3)	15/11/2019	688412	<0.001	<0.0002	<0.001	0.01	<0.001	<0.0001	0.01	0.039	<0.02	<0.05	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2
TP3 (MW2)	15/11/2019	688412	<0.001	<0.0002	<0.001	<0.001	<0.001	<0.0001	<0.001	0.025	<0.02	<0.05	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2
TP4 (MW4)	15/11/2019	688412	<0.001	<0.0002	<0.001	0.012	<0.001	<0.0001	0.011	0.051	<0.02	<0.05	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2
Statistical Summary																						
Number of Results			3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Number of Detects			0	0	0	2	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration			<0.001	<0.0002	<0.001	<0.001	<0.001	<0.0001	<0.001	0.025	<0.02	<0.05	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2
Minimum Detect			ND	ND	ND	0.01	ND	ND	0.01	0.025	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration			<0.001	<0.0002	<0.001	0.012	<0.001	<0.0001	0.011	0.051	<0.02	<0.05	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2
Maximum Detect			ND	ND	ND	0.012	ND	ND	0.011	0.051	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration			0.0005	0.0001	0.0005	0.0075	0.0005	0.00005	0.0072	0.038	0.01	0.025	0.05	0.05	0.05	0.025	0.05	0.05	0.05	0.025	0.1	0.1
Median Concentration			0.0005	0.0001	0.0005	0.01	0.0005	0.00005	0.01	0.039	0.01	0.025	0.05	0.05	0.05	0.025	0.05	0.05	0.05	0.025	0.1	0.1
Standard Deviation			0	0	0	0.0061	0	0	0.0058	0.013	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

			BTEXN							Polycyclic Aromatic Hydrocarbons																				
			Benzene	Ethylbenzene	Toluene	Xylene (o)	Xylene (m & p)	Xylene (Total)	Naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b,j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Phenanthrene	PAHs (Total)	Pyrene	4,4-DDE	Aldrin	Aldrin + Dieldrin (Sum of Total)	alpha-BHC	beta-BHC
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L
EQL			0.001	0.001	0.001	0.001	0.002	0.003	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.1	0.0001	0.0001	0.0001	0.0001
DoH 2014 - Non-Potable Groundwater Use (NPUG)			0.01	0.003	0.025			0.02						0.0001														0.003		
WA - DER 2014 - Drinking Water Health			**0.001**[#1]	**0.3**[#1]	**0.8**[#1]			**0.6**[#1]						**0.00001**[#1]														**0.0003**[#1]		
WA - DER 2014 - Long Term Irrigation																														
Field ID	**Sampled Date**	**Lab Report Number**																												
TP2 (MW3)	15/11/2019	688412	<0.001	<0.001	<0.001	<0.001	<0.002	<0.003	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.1	<0.0001	<0.0001	<0.0001	<0.0001
TP3 (MW2)	15/11/2019	688412	<0.001	<0.001	<0.001	<0.001	<0.002	<0.003	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.1	<0.0001	<0.0001	<0.0001	<0.0001
TP4 (MW4)	15/11/2019	688412	<0.001	<0.001	<0.001	<0.001	<0.002	<0.003	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.1	<0.0001	<0.0001	<0.0001	<0.0001
Statistical Summary																														
Number of Results			3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Number of Detects			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration			<0.001	<0.001	<0.001	<0.001	<0.002	<0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.1	<0.0001	<0.0001	<0.0001	<0.0001
Minimum Detect			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration			<0.001	<0.001	<0.001	<0.001	<0.002	<0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.1	<0.0001	<0.0001	<0.0001	<0.0001
Maximum Detect			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration			0.0005	0.0005	0.0005	0.0005	0.001	0.0015	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.05	0.00005	0.00005	0.00005	0.00005
Median Concentration			0.0005	0.0005	0.0005	0.0005	0.001	0.0015	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.05	0.00005	0.00005	0.00005	0.00005
Standard Deviation			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances			0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Env Stds Comments
prime

GROUNDWATER SUMMARY TABLE
Project Number: 57908
Project Name: Waroona GME

JBS&G

Organochlorine Pesticides

Field ID	Sampled Date	Lab Report Number	Chlordane	DDD	DDT	Dieldrin	DDT+DDE+DDD (Sum of Total)	delta-BHC	Endosulfan alpha	Endosulfan beta	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	Heptachlor	Heptachlor Epoxide	Lindane	Methoxychlor	Toxaphene
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL			0.001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.01
DoH 2014 - Non-Potable Groundwater Use (NPUG)			0.02		0.09										0.003		0.1		
WA - DER 2014 - Drinking Water Health			**0.002**[#1]		**0.009**[#1]										**0.0003**[#1]		**0.01**[#1]		
WA - DER 2014 - Long Term Irrigation																			
TP2 (MW3)	15/11/2019	688412	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.01
TP3 (MW2)	15/11/2019	688412	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.01
TP4 (MW4)	15/11/2019	688412	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.01
Statistical Summary																			
Number of Results			3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Number of Detects			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration			<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.01
Minimum Detect			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration			<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.01
Maximum Detect			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration			0.0005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.005
Median Concentration			0.0005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.005
Standard Deviation			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Organophosphorus Pesticides

Field ID	Sampled Date	Lab Report Number	Azinphos methyl	Chlorfenvinphos	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Demeton-O	Demeton-S	Diazinon	Dichlorvos	Dimethoate	Disulfoton	EPN	Ethion	Ethoprophos	Fenitrothion	Fensulfothion	Fenthion	Malathion	Merphos	Mevinphos	Monocrotophos	Naled	Omethoate	Parathion	Parathion methyl	Phorate	Pirimiphos methyl	Pyrazophos	Ronnel
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL			0.002	0.002	0.02	0.002	0.02	0.002	0.02	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.02	0.002	0.002
DoH 2014 - Non-Potable Groundwater Use (NPUG)			0.3	0.02	0.1					0.04	0.05	0.07	0.04		0.04	0.01	0.07		0.07	0.7		0.06			0.01	0.2	0.007		0.9	0.2	
WA - DER 2014 - Drinking Water Health			**0.03**[#1]	**0.002**[#1]	**0.01**[#1]					**0.004**[#1]	**0.005**[#1]	**0.007**[#1]	**0.004**[#1]		**0.004**[#1]	**0.001**[#1]	**0.007**[#1]		**0.007**[#1]	**0.07**[#1]		**0.006**[#1]			**0.001**[#1]	**0.02**[#1]	**0.0007**[#1]		**0.09**[#1]	**0.02**[#1]	
WA - DER 2014 - Long Term Irrigation																															
TP2 (MW3)	15/11/2019	688412	<0.002	<0.002	**<0.02**	<0.002	<0.02	<0.002	<0.02	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	**<0.002**	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	**<0.002**	<0.002	**<0.002**	<0.002	<0.02	<0.002	<0.002
TP3 (MW2)	15/11/2019	688412	<0.002	<0.002	**<0.02**	<0.002	<0.02	<0.002	<0.02	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	**<0.002**	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	**<0.002**	<0.002	**<0.002**	<0.002	<0.02	<0.002	<0.002
TP4 (MW4)	15/11/2019	688412	<0.002	<0.002	**<0.02**	<0.002	<0.02	<0.002	<0.02	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	**<0.002**	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	**<0.002**	<0.002	**<0.002**	<0.002	<0.02	<0.002	<0.002
Statistical Summary																															
Number of Results			3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Number of Detects			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration			<0.002	<0.002	<0.02	<0.002	<0.02	<0.002	<0.02	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.002
Minimum Detect			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration			<0.002	<0.002	<0.02	<0.002	<0.02	<0.002	<0.02	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.002
Maximum Detect			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration			0.001	0.001	0.01	0.001	0.01	0.001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.01	0.001	0.001
Median Concentration			0.001	0.001	0.01	0.001	0.01	0.001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.01	0.001	0.001
Standard Deviation			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances			0	0	3	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0
Number of Guideline Exceedances(Detects Only)			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Env Stds Comments
prime

GROUNDWATER SUMMARY TABLE
Project Number: 57908
Project Name: Waroona GME

							Chlorinated Benzenes	Non-Metallic Inorganics			Major Anions	Other	Other	VIC - IWRG	
			Sulprofos	Tertufos	Tetrachlorvinphos	Tokuthion	Trichloronate	Hexachlorobenzene	Nitrate & Nitrite (as N)	Total Kjeldahl Nitrogen (as N)	Total Nitrogen (as N)	Phosphate total (as P)	Biochemical Oxygen Demand (BOD-5 Day)	Total Suspended Solids	Organochlorine Pesticides EPAVic	Other Organochlorine Pesticides EPAVic
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L
EQL			0.002	0.002	0.002	0.002	0.002	0.0001	0.05	0.2	0.2	0.01	5	1	1	1
DoH 2014 - Non-Potable Groundwater Use (NPUG)			0.1	0.009												
WA - DER 2014 - Drinking Water Health			**0.01**[#1]	**0.0009**[#1]												
WA - DER 2014 - Long Term Irrigation											5[#2]	0.05[#2]				
Field ID	**Sampled Date**	**Lab Report Number**														
TP2 (MW3)	15/11/2019	688412	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0001	44	17	61	0.02	5	640	<1	<1
TP3 (MW2)	15/11/2019	688412	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0001	<0.05	51	51	0.02	5	13	<1	<1
TP4 (MW4)	15/11/2019	688412	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0001	24	4.4	28.4	<0.01	5	2.7	<1	<1
Statistical Summary																
Number of Results			3	3	3	3	3	3	3	3	3	3	3	3	3	3
Number of Detects			0	0	0	0	0	0	2	3	3	2	3	3	0	0
Minimum Concentration			<0.002	<0.002	<0.002	<0.002	<0.002	<0.0001	<0.05	4.4	28.4	<0.01	5	2.7	<1	<1
Minimum Detect			ND	ND	ND	ND	ND	ND	24	4.4	28.4	0.02	5	2.7	ND	ND
Maximum Concentration			<0.002	<0.002	<0.002	<0.002	<0.002	<0.0001	44	51	61	0.02	5	640	<1	<1
Maximum Detect			ND	ND	ND	ND	ND	ND	44	51	61	0.02	5	640	ND	ND
Average Concentration			0.001	0.001	0.001	0.001	0.001	0.00005	23	24	47	0.015	5	219	0.5	0.5
Median Concentration			0.001	0.001	0.001	0.001	0.001	0.00005	24	17	51	0.02	5	13	0.5	0.5
Standard Deviation			0	0	0	0	0	0	22	24	17	0.0087	0	365	0	0
Number of Guideline Exceedances			0	3	0	0	0	0	0	0	3	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)			0	0	0	0	0	0	0	0	3	0	0	0	0	0

Env Stds Comments
prime

GROUNDWATER SUMMARY TABLE
Project Number: 58776
Project Name: Waroona GME

	Heavy Metal								Inorganic						OCP																											
	Arsenic (Total)	Cadmium	Chromium (Total)	Copper	Lead	Mercury (Inorganic)	Nickel	Zinc	Nitrate & Nitrite (as N)	Phosphate total (as P)	Total Kjeldahl Nitrogen (as N)	Total Nitrogen (as N)	Biochemical Oxygen Demand (BOD 5 Day)	Total Suspended Solids	Hexachlorobenzene	4,4-DDE	Aldrin	Aldrin + Dieldrin (Sum of Total)	alpha-BHC	beta-BHC	Chlordane	DDD	DDT	Dieldrin	DDT+DDE+DDD (Sum of Total)	delta-BHC	Endosulfan alpha	Endosulfan beta	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	Heptachlor	Heptachlor Epoxide	Lindane	Methoxychlor	Toxaphene	Organochlorine Pesticides EPAVic	Other Organochlorine Pesticides EPAVic
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L
EQL	0.001	0.0002	0.001	0.001	0.001	0.0001	0.001	0.005	0.05	0.01	0.2	0.2	5	1	0.0001	0.1	0.0001	0.0001	0.0001	0.0001	0.001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.01	1	1
DoH 2014 - Non-Potable Groundwater Use (NPUG)	0.1	0.02		20	0.1	0.01	0.2	3										0.003			0.02		0.09											0.003		0.1				
WA - DER 2014 - Drinking Water Health	**0.01**	**0.002**		**2**	**0.01**	**0.001**	**0.02**											**0.0003**			**0.002**		**0.009**										**0.0003**		**0.01**				
WA - DER 2014 - Long Term Irrigation	0.1	0.01	0.1	0.2	2	0.002	0.2	2		0.05		5																												
Field_ID **LocCode** **WellCode** **Sampled_Date-Time**																																								
MW02 MW02 MW02 14/05/2020	**0.018**	<0.0002	0.005	0.004	**0.015**	<0.0001	0.002	0.012	0.18	0.02	53	53.18	<20	190	<0.0001	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.01	<1	<1
MW03 MW03 MW03 14/05/2020	<0.001	<0.0002	<0.001	<0.001	<0.001	<0.0001	<0.001	<0.005	24	<0.01	25	49	6.9	17	<0.0001	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.01	<1	<1
MW04 MW04 MW04 14/05/2020	<0.001	<0.0002	<0.001	<0.001	<0.001	<0.0001	<0.001	<0.005	18	<0.01	5.1	23.1	<5	10	<0.0001	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.01	<1	<1

GROUNDWATER SUMMARY TABLE
Project Number: 58776
Project Name: Waroona GME

				OPP																																						
				Azinphos methyl	Chlorfenvinphos	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Demeton-O	Demeton-S	Diazinon	Dichlorvos	Dimethoate	Disulfoton	EPN	Ethion	Ethoprophos	Fenitrothion	Fensulfothion	Fenthion	Malathion	Merphos	Mevinphos	Monocrotophos	Naled	Omethoate	Parathion	Parathion methyl	Phorate	Pirimiphos methyl	Pyrazophos	Ronnel	Sulprofos	Terbufos	Tetrachlorvinphos	Tokuthion	Trichloronate
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL				0.002	0.002	0.02	0.002	0.02	0.002	0.02	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.02	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
DoH 2014 - Non-Potable Groundwater Use (NPUG)				0.3	0.02	0.1					0.04	0.05	0.07	0.04		0.04	0.01	0.07		0.07	0.7		0.06			0.01	0.2	0.007		0.9	0.2		0.1	0.009								
WA - DER 2014 - Drinking Water Health				**0.03**	**0.002**	**0.01**					**0.004**	**0.005**	**0.007**	**0.004**		**0.004**	**0.001**	**0.007**		**0.007**	**0.07**		**0.006**			**0.001**	**0.02**	**0.0007**		**0.09**	**0.02**		**0.01**	**0.0009**								
WA - DER 2014 - Long Term Irrigation																																										
Field_ID	**LocCode**	**WellCode**	**Sampled_Date-Time**																																								
MW02	MW02	MW02	14/05/2020	<0.002	<0.002	<0.02	<0.002	<0.02	<0.002	<0.02	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
MW03	MW03	MW03	14/05/2020	<0.002	<0.002	<0.02	<0.002	<0.02	<0.002	<0.02	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
MW04	MW04	MW04	14/05/2020	<0.002	<0.002	<0.02	<0.002	<0.02	<0.002	<0.02	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002

GROUNDWATER SUMMARY TABLE
Project Number: 58776
Project Name: Waroona GME

				Organic									PAH																	TPH				Volatile					
				C6-C9 Fraction	>C10-C16 Fraction	>C16-C34 Fraction	>C34-C40 Fraction	>C10-C40 Fraction (Total)	>C10-C16 less Naphthalene (F2)	C6-C10 Fraction	C6-C10 less BTEX (F1)	Naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b,j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	PAHs (Total)	Pyrene	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Total)	Benzene	Ethylbenzene	Toluene	Xylene (o)	Xylene (m & p)	Xylene (Total)
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL				0.02	0.05	0.1	0.1	0.1	0.05	0.02	0.02	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.05	0.1	0.1	0.1	0.001	0.001	0.001	0.001	0.002	0.003
DoH 2014 - Non-Potable Groundwater Use (NPUG)																	0.0001																	0.01	0.003	0.025			0.02
WA - DER 2014 - Drinking Water Health																	**0.00001**																	**0.001**	**0.3**	**0.8**			**0.6**
WA - DER 2014 - Long Term Irrigation																																						
Field_ID	**LocCode**	**WellCode**	**Sampled_Date-Time**																																				
MW02	MW02	MW02	14/05/2020	<0.02	<0.05	<0.1	<0.1	<0.1	<0.05	<0.02	<0.02	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.05	<0.1	<0.1	<0.1	<0.001	<0.001	<0.001	<0.001	<0.002	<0.003
MW03	MW03	MW03	14/05/2020	<0.02	<0.05	<0.1	<0.1	<0.1	<0.05	<0.02	<0.02	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.05	<0.1	<0.1	<0.1	<0.001	<0.001	<0.001	<0.001	<0.002	<0.003
MW04	MW04	MW04	14/05/2020	<0.02	<0.05	<0.1	<0.1	<0.1	<0.05	<0.02	<0.02	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.05	<0.1	<0.1	<0.1	<0.001	<0.001	<0.001	<0.001	<0.002	<0.003

GROUNDWATER SUMMARY TABLE

Project Number: 58776

Project Name: Prime meat Waroona

			Heavy Metal								Inorganic							
			Arsenic (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Copper (Filtered)	Lead (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Zinc (Filtered)	Phosphorus	BOD	Dissolved oxygen	Electrical Conductivity (Lab)	Nitrogen (Total)	pH (Lab)	Reactive Phosphorus as P	TSS
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	µS/cm	mg/L	pH Units	mg/L	mg/L
EQL			0.001	0.0002	0.001	0.001	0.001	0.0001	0.001	0.005	0.01	5	0.01	10	0.2	0.1	0.01	1
DoH 2014 - Non-Potable Groundwater Use (NPUG)			0.1	0.02	0.5[#1]	20	0.1	0.01	0.2	3								
1(a). Drinking Water - NHMRC (2011 updated 2018) ADWG: Health			**0.01**	**0.002**		**2**	**0.01**	**0.001**	**0.02**									
4(a). Primary Industries - ANZECC (2000) Irrigation, long term			0.1	0.01	0.1	0.2	2	0.002	0.2	2	0.05				5			
Field ID	**Sampled Date**	**Lab Report Number**																
MW2	27/08/2020	740490	<0.001	0.0003	<0.001	0.13	0.002	<0.0001	0.016	0.14	<0.01	<5	9.1	1400	40	6.7	<0.01	42
MW3	27/08/2020	740490	<0.001	<0.0002	<0.001	0.024	<0.001	<0.0001	0.004	0.03	<0.01	<5	-	-	11	-	-	3.7
MW4	27/08/2020	740490	<0.001	0.0003	<0.001	0.14	0.004	<0.0001	0.013	0.11	<0.01	<5	-	-	2.8	-	-	8.8

	OCP																			
	Hexachlorobenzene	4,4-DDE	a-BHC	b-BHC	d-BHC	g-BHC (Lindane)	Aldrin	Dieldrin	Aldrin + Dieldrin	Chlordane	DDT	DDD	DDT+DDE+DDD	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	Heptachlor
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
DoH 2014 - Non-Potable Groundwater Use (NPUG)						0.1			0.003	0.02	0.09									0.003
1(a). Drinking Water - NHMRC (2011 updated 2018) ADWG: Health						**0.01**			**0.0003**	**0.002**	**0.009**									**0.0003**
4(a). Primary Industries - ANZECC (2000) Irrigation, long term																				
MW2	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
MW3	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
MW4	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Env Stds Comments

#1:Trigger value adopted based on CrVI.

#2:Adopted from WHO Petroleum Products in Drinking Water 2008

GROUNDWATER SUMMARY TABLE
Project Number: 58776
Project Name: Prime meat Waroona

	Sampled Date	Lab Report Number	Heptachlor Epoxide	Methoxychlor	Toxaphene	Organochlorine Pesticides EPAVic	Other Organochlorine Pesticides EPAVic	OPP: Azinophos methyl	OPP: Bolstar (Sulprofos)	OPP: Chlorfenvinphos	OPP: Chlorpyrifos	OPP: Chlorpyrifos-methyl	OPP: Coumaphos	OPP: Demeton-O	OPP: Demeton-S
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL			0.0001	0.0001	0.01	0.001	0.001	0.002	0.002	0.002	0.02	0.002	0.02	0.002	0.02
DoH 2014 - Non-Potable Groundwater Use (NPUG)			0.003					0.3	0.1	0.02	0.1				
1(a). Drinking Water - NHMRC (2011 updated 2018) ADWG: Health				**0.3**				**0.03**	**0.01**	**0.002**	**0.01**				
4(a). Primary Industries - ANZECC (2000) Irrigation, long term															
Field ID	**Sampled Date**	**Lab Report Number**													
MW2	27/08/2020	740490	<0.0001	<0.0001	<0.01	<0.001	<0.001	<0.002	<0.002	<0.002	**<0.02**	<0.002	<0.02	<0.002	<0.02
MW3	27/08/2020	740490	<0.0001	<0.0001	<0.01	<0.001	<0.001	<0.002	<0.002	<0.002	**<0.02**	<0.002	<0.02	<0.002	<0.02
MW4	27/08/2020	740490	<0.0001	<0.0001	<0.01	<0.001	<0.001	<0.002	<0.002	<0.002	**<0.02**	<0.002	<0.02	<0.002	<0.02

	OPP: Diazinon	OPP: Dichlorvos	OPP: Dimethoate	OPP: Disulfoton	OPP: EPN	OPP: Ethion	OPP: Ethoprop	OPP: Fenitrothion	OPP: Fensulfothion	OPP: Fenthion	OPP: Malathion	OPP: Merphos
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
DoH 2014 - Non-Potable Groundwater Use (NPUG)	0.04	0.05	0.07	0.04		0.04	0.01	0.07		0.07	0.7	
1(a). Drinking Water - NHMRC (2011 updated 2018) ADWG: Health	**0.004**	**0.005**	**0.007**	**0.004**		**0.004**	**0.001**	**0.007**	**0.01**	**0.007**	**0.07**	
4(a). Primary Industries - ANZECC (2000) Irrigation, long term												
MW2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	**<0.002**	<0.002	<0.002	<0.002	<0.002	<0.002
MW3	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	**<0.002**	<0.002	<0.002	<0.002	<0.002	<0.002
MW4	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	**<0.002**	<0.002	<0.002	<0.002	<0.002	<0.002

	OPP: Methyl parathion	OPP: Mevinphos (Phosdrin)	OPP: Monocrotophos	OPP: Naled (Dibrom)	OPP: Omethoate	OPP: Phorate	OPP: Pirimiphos-methyl	OPP: Pyrazophos	OPP: Ronnel	OPP: Terbufos	OPP: Tetrachlorvinphos	OPP: Tokuthion	OPP: Trichloronate	OPP: Parathion	C6-C9 Fraction	C6-C10
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	0.002	0.002	0.002	0.002	0.002	0.002	0.02	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.02	0.02
DoH 2014 - Non-Potable Groundwater Use (NPUG)	0.007	0.06			0.01		0.9	0.2		0.009				0.2		
1(a). Drinking Water - NHMRC (2011 updated 2018) ADWG: Health	**0.0007**	**0.005**	**0.002**		**0.001**		**0.09**	**0.02**		**0.0009**	**0.1**			**0.02**		
4(a). Primary Industries - ANZECC (2000) Irrigation, long term																
MW2	**<0.002**	<0.002	<0.002	<0.002	**<0.002**	<0.002	<0.02	<0.002	<0.002	**<0.002**	<0.002	<0.002	<0.002	<0.002	<0.02	<0.02
MW3	**<0.002**	<0.002	<0.002	<0.002	**<0.002**	<0.002	<0.02	<0.002	<0.002	**<0.002**	<0.002	<0.002	<0.002	<0.002	<0.02	<0.02
MW4	**<0.002**	<0.002	<0.002	<0.002	**<0.002**	<0.002	<0.02	<0.002	<0.002	**<0.002**	<0.002	<0.002	<0.002	<0.002	<0.02	<0.02

Env Stds Comments
#1:Trigger value adopted based on CrVI.
#2:Adopted from WHO Petroleum Products in Drinking Water 2008

GROUNDWATER SUMMARY TABLE
Project Number: 58776
Project Name: Prime meat Waroona

	Organic							PAH																		TPH				Volatile					
	C10-C16	C16-C34	C34-C40	C10-C40 (Sum of total)	F1 (C6-C10 minus BTEX)	F2 (C10-C16 less Naphthalene)	Naphthalene - MAH	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene - PAH	Phenanthrene	Pyrene	PAHs (Sum of total)	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum of Total)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	0.05	0.1	0.1	0.1	0.02	0.05	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.05	0.1	0.1	0.1	0.001	0.001	0.001	0.001	0.002	0.003
DoH 2014 - Non-Potable Groundwater Use (NPUG)												0.0001																	0.01	0.025	0.003			0.02
1(a). Drinking Water - NHMRC (2011 updated 2018) ADWG: Health	**0.09[#2]**	**0.09[#2]**	**0.09[#2]**	**0.09[#2]**		**0.09[#2]**						**0.00001**													**0.09[#2]**	**0.09[#2]**	**0.09[#2]**	**0.09[#2]**	**0.001**	**0.8**	**0.3**			**0.6**
4(a). Primary Industries - ANZECC (2000) Irrigation, long term																																		
Field ID	**Sampled Date**	**Lab Report Number**																																	
MW2	27/08/2020	740490	<0.05	**<0.1**	**<0.1**	**<0.1**	<0.02	<0.05	<0.01	<0.001	<0.001	<0.001	<0.001	**<0.001**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.05	**<0.1**	**<0.1**	**<0.1**	<0.001	<0.001	<0.001	<0.001	<0.002	<0.003
MW3	27/08/2020	740490	**0.13**	**0.5**	<0.1	**0.63**	<0.02	**0.13**	<0.01	<0.001	<0.001	<0.001	<0.001	**<0.001**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.14**	**0.5**	**<0.1**	**0.62**	<0.001	<0.001	<0.001	<0.001	<0.002	<0.003
MW4	27/08/2020	740490	**0.14**	**0.6**	<0.1	**0.74**	<0.02	**0.14**	<0.01	<0.001	<0.001	<0.001	<0.001	**<0.001**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.21**	**0.6**	**<0.1**	**0.77**	<0.001	<0.001	<0.001	<0.001	<0.002	<0.003

Env Stds Comments
#1:Trigger value adopted based on CrVI.
#2:Adopted from WHO Petroleum Products in Drinking Water 2008

Document Distribution

Rev No.	Copies	Recipient	Date
0	Electronic	Prime Meat Co Pty Ltd; Tessele Consultants Pty Ltd; Department of Water and Environmental Regulation	27/11/2020

Document Status

Rev No.	Author	Reviewer	Approved for Issue		
		Name	Name	Signature	Date
0					27/11/2020

www.jbsg.com.au