



Application for Works Approval

Division 3, Part V *Environmental Protection Act 1986*

Works Approval Number	W6062/2017/1
Works Approval Holder	Scotts Fishing Co Pty Ltd
ACN	125 441 081
File Number	DER2017/001003
Premises	Scotts Fishing Co Pty Ltd Lot 25 on Plan 24065 Willigulli Road Sandy Gully WA 6535
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1. Definitions of terms and acronyms

In this Decision Report, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
ACN	Australian Company Number
ARI	Means the Average Recurrence Interval, and defined as the average, or expected, value of the periods between exceedances of a given rainfall total accumulated over a given duration
AS 1289.6.7.1-2001	means the Australian Standard AS 1289.6.7.1 Methods of testing soils for engineering purposes – Soil strength and consolidation tests – Determination of permeability of a soil
BGL	below ground level
Category	A category number specified in column 1 of Schedule 1 to the EP Regulations
DWER	Department of Water and Environmental Regulation
EPA	Environmental Protection Authority
EP Act	<i>Environmental Protection Act 1986 (WA)</i>
EP Regulations	<i>Environmental Protection Regulations 1987 (WA)</i>
HB-LPS	Shire of Northampton's <i>Horrocks Beach Local Planning Strategy</i> , prepared by Larry Smith Planning in association with Coffey Environments, October 2015
LPS No. 10	Shire of Northampton <i>Local Planning Scheme No. 10</i> , prepared by Department of Planning, Gazetted 6 January 2012
m ³	cubic metre
mg/L	milligrams per litre
NEGP	Australian Pork Limited, <i>National Environmental Guidelines for Piggeries</i> , 2 nd Edition 2010
Noise Regulations	<i>Environmental Protection (Noise) Regulations 1997 (WA)</i>
SPU	Standard Pig Unit
UDR	<i>Environmental Protection (Unauthorised Discharges) Regulations 2004 (WA)</i>
Works	The works that are the subject of the works approval application
WQPN 22	Water Quality Protection Note 22: Irrigation with nutrient-rich wastewater, Department of Water, 2008
WQPN 27	Water Quality Protection Note 27: Liners for containing pollutants, using engineered soils, Department of Water, 2013

2. Purpose and scope of assessment

This Decision Report provides an assessment of the Works Approval Application (the Application) lodged by Scotts Fishing Co Pty Ltd (the Applicant) for a piggery to be located at Lot 25 Willigulli Road, Sandy Gully in the Shire of Northampton. It sets out the risks to the environment at the construction and operational stages and how the risks are to be managed.

2.1 Application details

Table 2 lists the documents that form the application:

Table 2: Documents and information submitted during the assessment process

Document/information description	Date received
Works Approval Application	12 June 2017
Works Approval Supporting Information	12 June 2017
Additional Works Approval Supporting Information: Facultative pond location and dimensions	13 September 2017

3. Background

The Applicant lodged a Works Approval Application with DWER on 12 June 2017 for the construction and operation of a 5,702 SPU farrow-to-finish piggery incorporating conventional style and deep litter sheds. The proposed piggery is to be constructed on part of Lot 25 Willigulli Road, a cleared 400ha lot land currently used for agricultural purposes. The Applicant is proposing to construct the piggery in three stages. Operation of the piggery is planned to commence when construction of stage one has been completed. Stages two and three will be subsequently constructed and stocked over time.

Table 3 lists the proposed activity detailed in Schedule 1 of the *Environmental Protection Regulations 1987* that will make the premises prescribed and for which a works approval is required to be held (before construction commences) and for which a licence is required at the operational stage.

Table 3: Prescribed Premises Categories in the Existing Licence

Classification of Premises	Description	Assessed design capacity
Category 2	Intensive piggery: premises on which pigs are fed, watered and housed in pens.	5,330 animals

The proposed location is on existing farm land that is predominantly cleared (no clearing involved). The location of the piggery complex is shown in Figure 2 and key infrastructure, as shown in Figure 1, includes:

- one conventional piggery shed;
- deep litter sheds (41 dome structures);
- three wastewater storage ponds;
- feed storage and preparation area;
- drinking water supply system for animals;
- animal loading area; and
- hardstand composting area for spent bedding and sludge from desludging events...

4. Overview of Premises

4.1 Operational aspects

The Applicant is seeking approval to construct a farrow to finish piggery in three sequential stages, approximately 6 to 12 months apart.

The three stages proposed by the Applicant are broadly described below:

- Stage 1: proposed to house up to 250 sows, corresponding to about 1,500 animals in total;
- Stage 2: proposed to house up to 300 sows, corresponding to about 2,500 animals in total; and
- Stage 3: proposed to house up to 500 sows, corresponding to no more than the maximum approved numbers of 5,330 animals at any one time.

The piggery is to be partially stocked with animals at the completion of stage 1 and then further stocked with purchased animals or animals retained from the on-site breeding program to progressively increase animal numbers to the piggery's full capacity. Table 4 below shows the different pig classes and stock holding when the piggery is at full production (Stage 3). The Applicant has based pig numbers on a maximum of 500 sows on completion of Stage 3. The Delegated Officer has determined that pig numbers can fluctuate by up to 1.5% due to external influences such as seasonal variations, abattoir kill schedules and public holidays. As a result, the assessment is based on a maximum of 500 sows, $\pm 1.5\%$ greater than average stock.

Table 4: Pig classes and indicative stock holding

Pig class ¹	Age Range (weeks)	SPU Factor ¹	Pig Numbers	SPU	Type of shed
Gilts	24-30	1.8	20	36	Deep litter
Boars	24-128	1.6	10	16	Deep litter
Gestating sows	-	1.6	460	736	Deep litter
Lactating sows	-	2.5	40	100	Conventional
Suckers	0-4	0.1	400	40	Conventional
Weaners	4-10	0.5	1,333	667	Deep litter
Growers	10-16	1.0	1,333	1333	Deep litter
Finishers	16-24	1.6	1,734	2774	Deep litter
Total			5,330	5,702	

Note 1: The pig class descriptors provided in the Application are the same as the descriptors provided in the **NEGP** (Refer to Section 4.3 of NEGP for further explanation of SPU and SPU factors).

The proposed location for the piggery is 490km north of Perth and 2.6km east of the Town of Horrocks as shown in Figures 10 and 11. It is to be located within an area of approximately 400 hectares of agricultural land (approximately 90% cleared). The site is currently used for agricultural purposes which will continue once the piggery is constructed.

4.2 Waste and waste management

At the operational stage, the piggery will generate and manage wastes as outlined in Table 5 below.

Table 5: Waste and waste management

Waste Type	Source	Management	Emission Point
Odour	Pig pens and ponds	Maintain separation distance	Atmosphere
Manure	Pig pens - conventional shed	Washed to wastewater treatment ponds	Land - when ponds are de-sludged.
Spent bedding containing manure, urine and spilt feed and water	Pig pens – deep litter sheds	Stockpiled, periodically applied to land or taken off site	Land
Wastewater	Wastewater treatment ponds	Fully contained ponds	Evaporation
Pond sludge	Periodic pond cleaning	Dried, stockpiled with spent bedding and applied to land	Land
Deceased animals and related materials	Animal mortalities	Burial on site	Land
Construction related waste	General waste	Periodically transferred to landfill	Landfill

Waste Type	Source	Management	Emission Point
General wastes and other related wastes	General waste	Periodically transferred to landfill	Landfill

4.2.1 Solid waste hardstand

The majority of solid waste generated at the operation stage will consist of spent bedding that contains straw, manure, urine, spilt feed and water from the deep litter sheds. The Applicant proposes to clean the deep litter sheds between pig batches approximately every 7 weeks, where the spent bedding will be removed and stored on a hardstand area for long periods (3 to 6 months) prior spreading in the reuse area. Sludge collected during periodic desludging events is proposed to be stored with the spent bedding.

The hardstand area is to be constructed in accordance with the provisions of WQPN 27 and will have a compacted clay base and include a protective gravel cover to ensure the hardstand is not damaged when removing stockpiled material (refer to Table 9 for further details).

The hardstand will be 25m x 10m and surrounded by a one metre high earthen contour bank to contain leachate and prevent the egress of stormwater. All leachate from the stockpiles will be directed to a sump located in the corner of the hardstand where the leachate will be transferred via a pipeline to the operating anaerobic pond.

4.2.2 Spent bedding applied to land

The Applicant is proposing to apply spent bedding to land as a fertilizer replacement (in part). The area of land to which spent bedding is to be applied is shown in Figure 2. The Applicant has advised that the soil in the reuse area is sand to sandy loam in texture.

Table 6 below details the amount of phosphorus and nitrogen contained in manure and spilt feed that the proposed piggery will generate each year when it is at full production. Manure from the conventional sheds has been included to allow for the periodic wastewater pond desludging events. Nutrients contained in the straw in the deep litter piggery pens have also been considered, as detailed in Table 7:

Table 6: Phosphorus and nitrogen waste

Pig class	Animals	P kg/animal/year	P kg/year	N kg/animal/year	N kg/year
Gilts	20	4.6	92	12.0	240
Boars	10	5.3	53	15.0	150
Gestating sows	460	5.2	2,392	13.9	6,394
Lactating sows	40	8.8	352	27.1	1,084
Suckers	400	0.4	160	2.3	920
Weaners	1,333	1.1	1,466	3.9	5,199
Growers	1,333	3.0	3,999	9.2	12,264
Finishers	1,734	5.1	8,843	15.8	27,397
Total	5,330	-	17,358		53,648

Note 1: Delegated Officer calculations where phosphorus and nitrogen output rates were taken from Table 9.1 of NEGP

Table 7: Phosphorus in straw applied to deep litter pig pens

Pig class ²	Animals	Kg straw/animal/day	P content (% dry matter)	P kg/year ¹
Gilts	20	0.5	0.41	15
Boars	10	0.5	0.41	7
Gestating sows	460	0.5	0.41	344
Weaners	1,333	0.5	0.41	997
Growers	1,333	0.5	0.41	997
Finishers	1,734	0.5	0.41	1,297
Total	4,890	-		3,659

Note 1: Delegated Officer calculations where phosphorus content of wheat straw taken from Table 9.2 of NEGP

Note 2: Lactating sows and suckers not included in calculation as they are housed in a conventional shed which does not include straw

At full production the piggery will generate (17,358 + 3,659) 21,017kg of phosphorus and 53,648kg of nitrogen each year. The Applicant has advised that the reuse area is approximately 750 acres (304 ha).

Based on Table 1 of WQPN 22, the characteristics of the soils has been determined to be Risk Category “B”, which is coarse grained soils in an area where the risk of eutrophication of surface waters within 500 metres of the reuse area is low. As phosphorus is the limiting nutrient in Western Australian soils, Table 2 of WQPN 22 recommends a total of 20 kg per hectare per year as the maximum phosphorus application rate for Risk Category “B”.

Table 8 below details the typical analysis of spent bedding from a deep litter piggery. Based on an average of about 1% phosphorus (dry basis) in spent bedding, 2,000kg of spent bedding/hectare/year (2.0 tonnes/ha/year) could be applied to land. This will ensure that the nutrient loading rate does not exceed the maximum phosphorus application rate of 20kg/ha/year detailed in WQPN 22. It equates to a total of 608,000kg (608 tonnes) of spent bedding that could be applied to the reuse area each year. The Delegated Officer noted that this is a conservative but reasonable approach in the first instance. It is due to limited information on the characteristic of spent bedding, soils and planned agricultural activities on the reuse area.

Table 8: Nutrient content of spent bedding from deep litter piggeries

	Unit	Straw	Rice Hulls	Sawdust
Moisture	% wb	41.6 (18 - 64)	36 (21 - 53)	40.8 (21 - 50)
pH		6.8 (5.7 - 8.5)	7.1 (7 - 7.3)	6.3 (6.2 - 6.3)
Total Nitrogen or {TKN}	% db	0.8 (0.2 - 1.3)	0.7 (0.1 - 1.6)	0.9 (0.6 - 1.3)
Ammonium Nitrogen	% db	0.5 (0 - 1.2)	0.3 (0.1 - 0.5)	0.6 (0.4 - 1)
Total Phosphorus	% db	1.1 (0.2 - 2.5)	0.9 (0.6 - 1.3)	1 (0.4 - 1.3)
Ortho-Phosphorus	% db	0.4 (0.2 - 0.6)	0.4 (0.3 - 0.6)	0.4 (0.2 - 0.5)
Potassium	% db	1.8 (0.6 - 2.8)	1.8 (1.2 - 2.1)	1.8 (1.6 - 1.9)
Sulphur	% db	0.4 (0.1 - 0.7)	0.4 (0.3 - 0.5)	0.5 (0.4 - 0.5)
Copper	% db	0 (0 - 0.1)	0 (0 - 0)	0 (0 - 0)
Iron	% db	1.3 (0.1 - 3.2)	1 (0.7 - 1.6)	1.1 (0.5 - 1.6)
Manganese	% db	0.1 (0 - 0.8)	0.2 (0 - 0.8)	0.3 (0 - 0.8)
Zinc	% db	0.2 (0 - 0.4)	0.1 (0 - 0.3)	0.1 (0.1 - 0.2)
Calcium	% db	1.9 (0.4 - 3.1)	1.4 (1 - 2.1)	2.4 (2.1 - 2.7)
Magnesium	% db	0.7 (0 - 1.8)	0.4 (0 - 0.6)	0.4 (0 - 0.7)
Sodium	% db	0.4 (0.1 - 0.7)	0.3 (0.1 - 0.4)	0.4 (0.4 - 0.5)
Chloride	% db	0.8 (0.3 - 1.3)	0.6 (0.4 - 0.8)	0.7 (0.4 - 1.1)
Conductivity	dS/m	11.7 (6.6 - 15.6)	9.6 (9.2 - 10)	13 (12.6 - 13.4)

Note1: Data source is Table 14.3 from NEGP. Units expressed as *dry basis* and includes the average and range (in brackets)

As noted above, the piggery will produce ~21,017kg of P in wastes at full production which means approximately 70% of the spent bedding will need to be removed from the premises.

The Delegated Officer noted that soils in the area are likely to be able to hold or retain phosphorus that is not utilized by agricultural activities and that higher rates of spent bedding to land may be acceptable. If at a later the applicant provides a high degree of certainty and details on the characteristics of:

- spent bedding (nitrogen, phosphorus, potassium, sodium, chloride, metals etc);
- soil in the reuse area; and
- the nutrients (and other components) to be taken up by plants to be grown on the reuse area;

then the applicant may lodge an amendment to any licence granted to increase the application rate of spent bedding applied to land, should that be supported as outlined above.

4.2.3 Wastewater ponds

Three wastewater ponds (two anaerobic ponds and one facultative pond) are proposed to be constructed to treat wastewater (refer to Table 9 for pond dimensions). The two anaerobic ponds will operate alternatively on a cyclical annual basis. One pond is proposed to be in service for a year, while the other is being maintained (dried and then de-sludged) and made ready for the next year.

Wastewater from conventional Shed:

The majority of wastewater will originate from the conventional (farrowing) shed. The conventional shed is proposed to be flushed twice a week (1,000 litres used in each wash-out). Wastewater is to be directed via drains into the operating anaerobic pond and then to the facultative pond.

Wastewater from deep litter sheds:

The Applicant is proposing to remove the spent bedding and wash-out the deep litter sheds prior to new batches of pigs entering sheds. Wash water from the deep litter sheds will be piped to the anaerobic pond for treatment and storage.

4.2.4 Anaerobic pond capacity

The Applicant has proposed to construct two anaerobic ponds that each have approximately 600m³ capacity. NEGP recommends the capacity of an anaerobic pond is based upon at least 2.9m³ per SPU in a hot climate, without wastewater pre-treatment and in circumstances where ponds are to be de-sludged on an annual basis. The Applicant is proposing to stock about 140 SPU in the conventional shed and on this basis, at least 406m³ of capacity is required.

4.2.5 Wastewater treatment system - water balance

The Applicant has estimated approximately 20kL of wastewater in total from all sources will be discharged to the operational anaerobic pond each week. The design of the anaerobic pond at (600m³) and the facultative pond at (625m³) will provide 1,225m³ total capacity. The Delegated Officer accepted that the ponds will have sufficient capacity to hold wastewater during wet winters and also to hold extreme rainfall event.

4.2.6 Deceased animal management

The Applicant is proposing to manage deceased animals (and related material) by burial in pits. Burial pits will be periodically constructed and completed as needed (refer to Figure 2 for the proposed location). A typical burial pit will be about 1m wide x 4m deep x 5m length when first constructed. Deceased animals are to be placed into the pit and immediately covered with 500mm of soil (refer to Figure 9 for the typical arrangement of a burial pit). The proposed final cover on each burial pit is to include a minimum of 500mm of clay and 1,000mm of sand to shed incidental rain and stormwater ingress.

The Delegated Officer considers that by comparison to other piggeries, about 30 tonnes of deceased animals will be buried each year. As burial pits will be required at the operational stage of the piggery, the periodic construction and management of burial pits will be detailed in the subsequent licence and controlled accordingly, rather than via conditions attached to the works approval.

4.3 Infrastructure - piggery shed

The proposed infrastructure has been detailed in Table 9 and includes the pig sheds, the drainage system and wastewater treatment ponds. The Applicant is proposing to construct a dome-shaped structure for both the conventional and deep litter sheds, refer Figure 3. The sheds will be constructed with a hooped metal frame covered with a waterproof fabric, with dimensions of 4m height and 12m width. The sides will be open to a height of approximately 1.2m to allow ventilation.

4.3.1 Conventional shed

The Applicant is proposing to construct one conventional shed to be used for farrowing activities. Sows are to be penned in a farrowing crate in the shed one week prior giving birth

and the sows and piglets will remain in the crate for another two weeks. Afterwards, sows are moved back to the mating shed and the piglets moved to the deep litter sheds.

The shed will incorporate a concrete floor with slatted plastic under the farrowing crates. This allows effluent to be collected in the underfloor drains and flushed into the wastewater treatment system. The underfloor drains require regular cleaning and washing to keep them clean. Refer to Figure 5 for shed dimensions.

4.3.2 Deep litter sheds

Deep litter sheds are proposed to house the majority of pigs including dry sows, boars and pigs up to approximately 24 weeks, at which time the pigs will be taken to an abattoir. The sheds have a concrete floor which incorporates a 100mm raised feeding area (plinth) at one end of the shed which is about 3m in length across the breadth of the shed, as shown in Figure 4. During operations, the floor will be covered with straw or similar loose material designed to absorb manure, urine, spilt feed and water. When a shed is de-stocked, spent bedding will be removed and the shed washed prior to it being re-stocked.

Table 9: Piggery infrastructure

Infrastructure prescribed for Prescribed Activity Category 2	
1.	All sheds <ul style="list-style-type: none"> • A dome-shaped structure constructed from white weather proof, non-reflective PVC plastic; • Shed dimensions 4m (height) x 20m (length) x 12m (width); • The shed walls will be 300mm water proof structural ply and both walls and roof will be supported with 100mm structural steel posts; • The shed walls can be opened at each end to a height of 1.2m to facilitate ventilation; • Mechanical fans fitted in the sheds to assist with cooling; and • A gate is located at one end for access.
2.	Conventional shed <ul style="list-style-type: none"> • One conventional shed suitable to hold a maximum of 40 sows and 400 piglets (less than 4 weeks of age) at any one time. Total SPU in farrowing shed will be 140; • The shed will be constructed with a concrete floor with plastic slatted sections fitted in the farrowing crates to allow manure, urine, spilt feed and water to fall into the drains and be flushed; • The underfloor drains will have a 5 degree fall; • Heat pads installed in farrowing crates to keep suckers warm during cooler months; and • A mist spray system installed in farrowing crates to assist cooling the sows during hot summer months; and • Each farrowing crate to be fitted with a self-feeding system.
3.	Deep litter sheds <ul style="list-style-type: none"> • 41 x deep litter sheds with; • Sheds constructed with a concrete floor with a raised feed area at one end, 3m in width and 100mm above floor level; • Floors to have a slope of 3° fall from the centre to the edges; and • Water will be used to flush the sheds between pig batches where gravity will feed the washdown water into the effluent drainage system at the side of each shed.
4.	Anaerobic ponds <ul style="list-style-type: none"> • Two anaerobic ponds, operating on an annual basis in alternative years; • Approximate dimensions for each pond are 25m x 12m x 2m with a total capacity of about 600m³, excluding 100cm freeboard; • Ponds to have a compacted clay liner of 300mm thickness with a permeability of equal to or less than 1 x 10⁻⁹m /second; • Clay liner to be covered with 100mm of gravel to ensure desludging events do not damage the clay liner; and • Pond sides constructed with a 1:3 slope.
5.	Facultative pond <ul style="list-style-type: none"> • Approximate dimensions are 25m x 25m x 1m with a total capacity of about 625m³, excluding 100cm freeboard; • Ponds to have a compacted clay liner of 300mm thickness with a permeability of equal to or less than 1 x 10⁻⁹m /second; and • Pond sides constructed with a 1:3 slope.
6.	Effluent drainage system <ul style="list-style-type: none"> • Drains will be open and constructed from smooth concrete to facilitate good drainage; • Drains will be 200mm deep and 300mm wide; • All drains will feed into the main drain leading to the operational anaerobic pond; and • Drains constructed in an area where the natural topographic decline will allow

Infrastructure prescribed for Prescribed Activity Category 2		
		the effluent to gravity feed to the operational anaerobic pond.
7.	Solid waste hardstand area	<ul style="list-style-type: none"> • 1 x hardstand constructed with a 300mm compacted clay lining with a permeability of equal to or less than $1 \times 10^{-9} \text{m}^2/\text{second}$; • Dimensions will be 25m x 10m; • Hardstand to have a 100mm gravel lining over the clay liner; • Hardstand will be surrounded by a 1m high embankment to prevent egress of stormwater runoff and contain any leachate from the stockpiles; and • Leachate collected in a bund and returned to operational anaerobic pond.
8.	Reuse area	<ul style="list-style-type: none"> • An area approximately 750 acres (304ha) will be used for spreading composted spent bedding/sludge.
Other Infrastructure not related to the activity to be licensed		
9.	Grain silos	<ul style="list-style-type: none"> • 4 x silos used to store grain
10.	Transport shelter including truck loading area and parking	<ul style="list-style-type: none"> • To be located near the deep-litter piggery sheds
11.	Water tanks	<ul style="list-style-type: none"> • 2 x tanks used for water storage

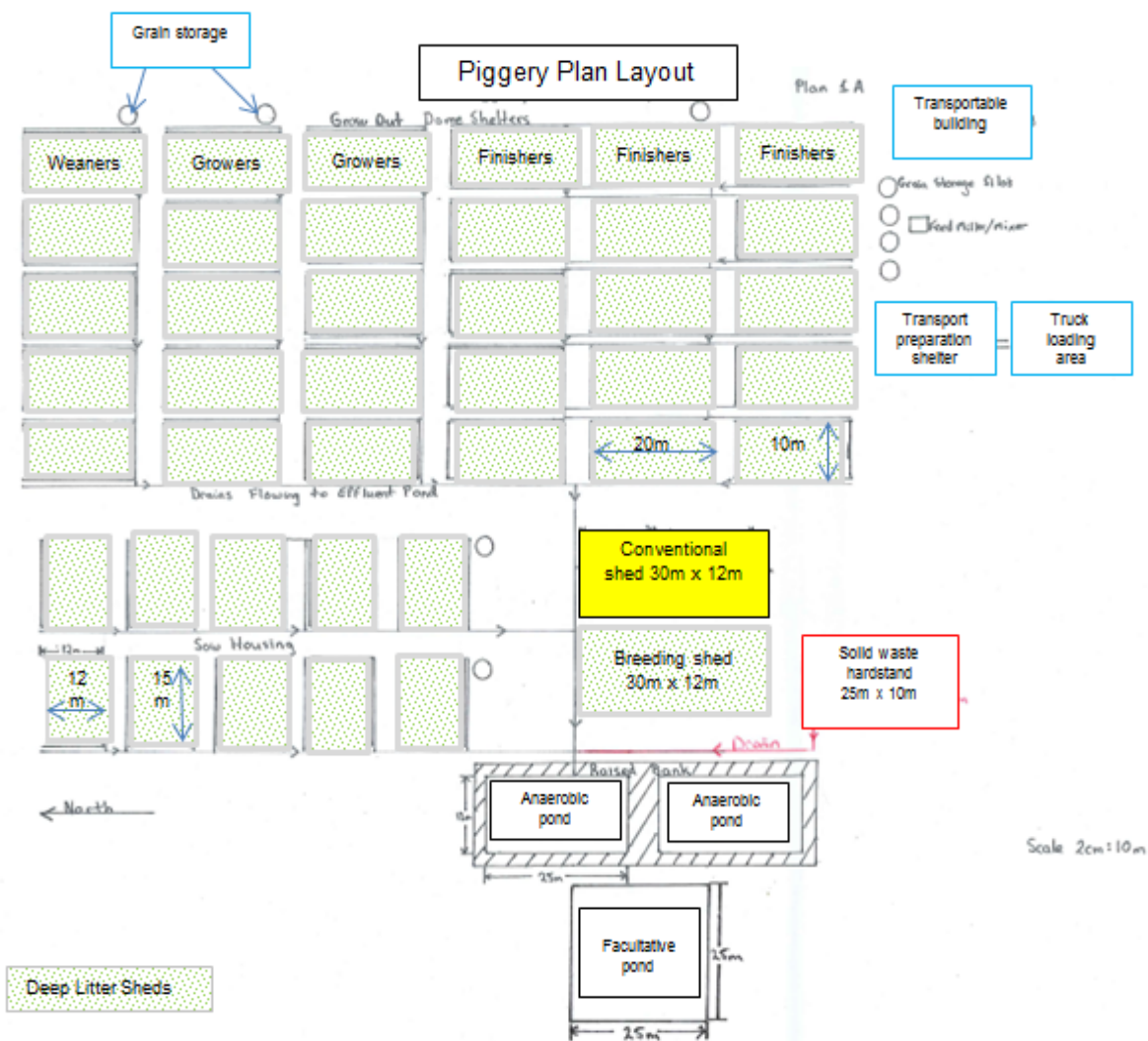


Figure 1: General arrangement of the Piggery (from Application)

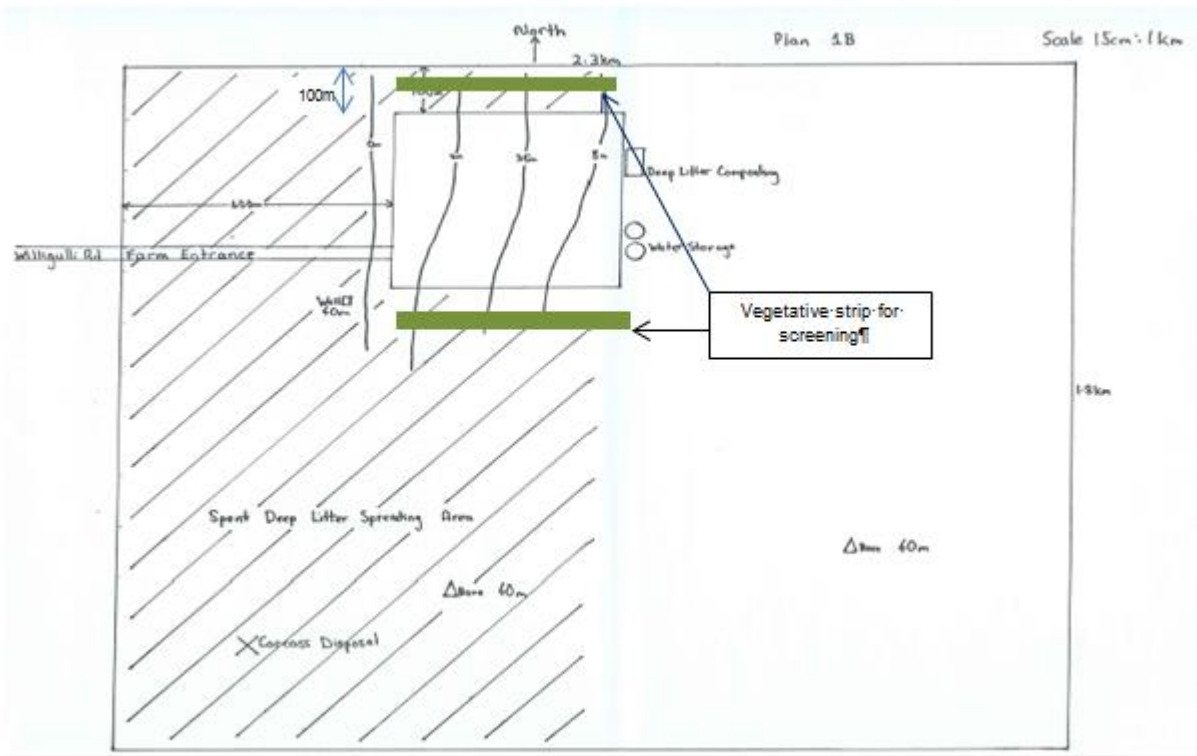


Figure 2: General Location of the Piggery (from Application)

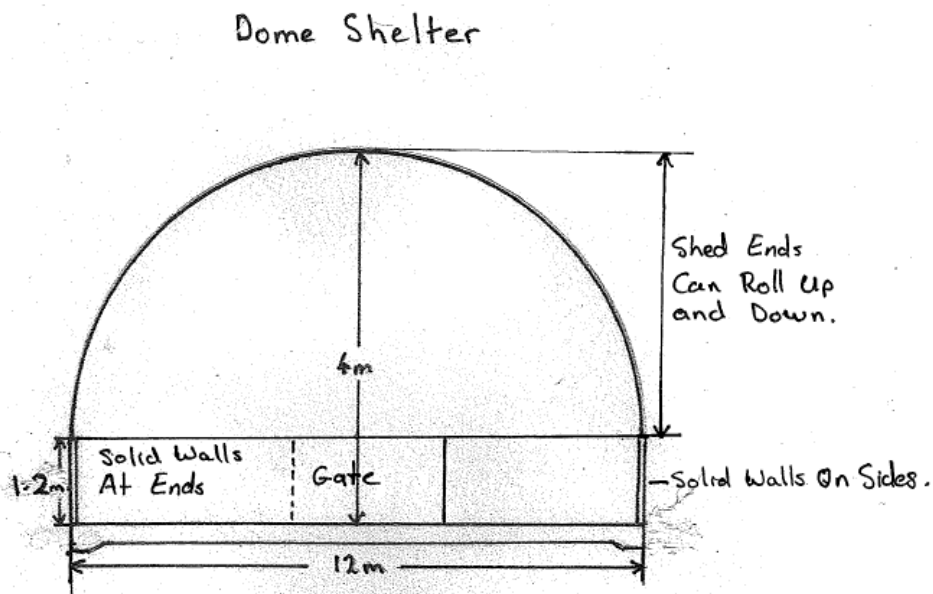


Figure 3: Conventional and deep litter piggery shed over view (from Application)

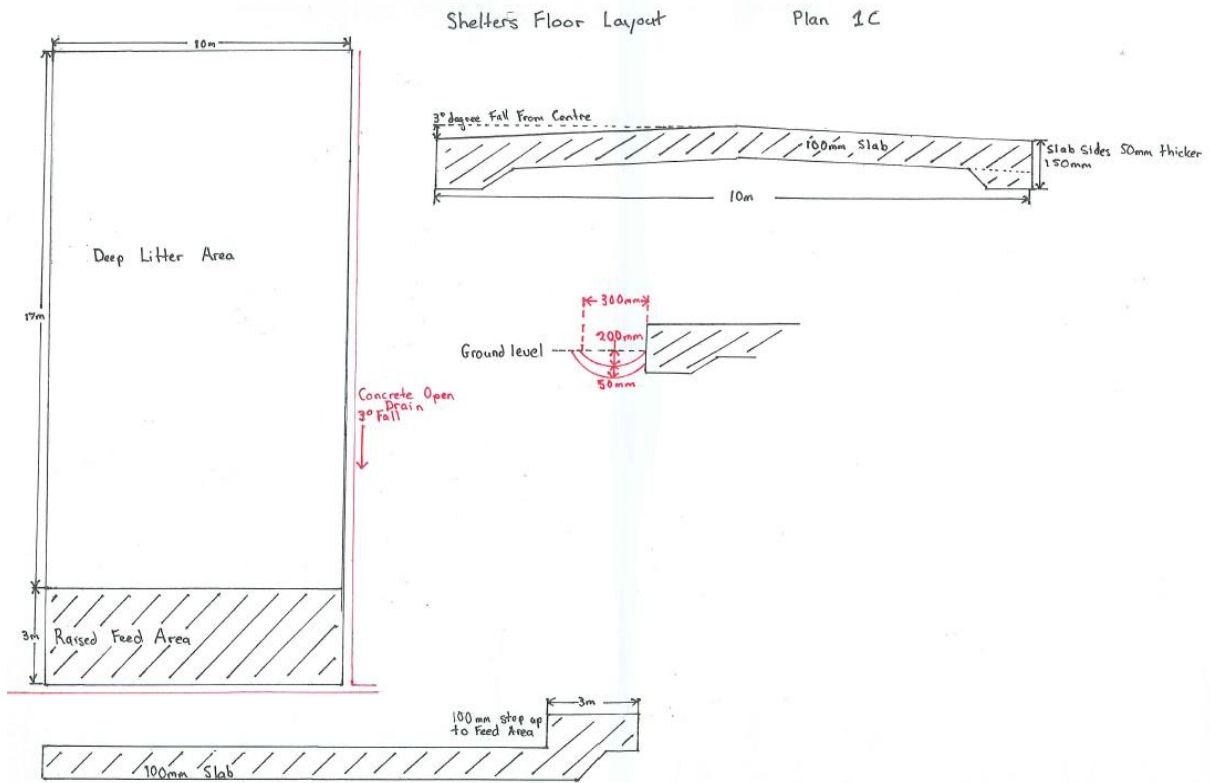


Figure 4: Deep litter piggy shed layout (from Application)

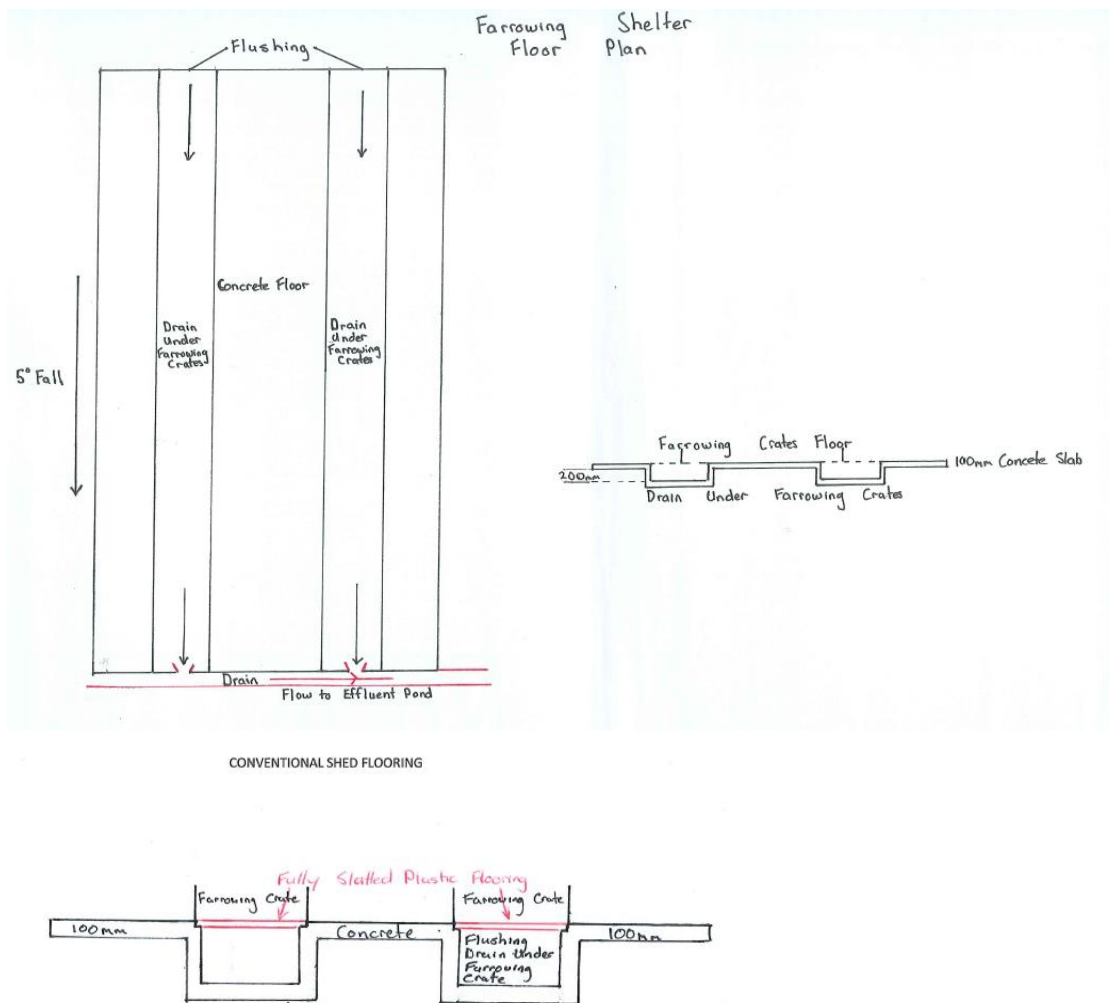


Figure 5: Conventional shed layout and farrowing crate design (from Application)



Figure 6: Wastewater pond infrastructure (from Application)

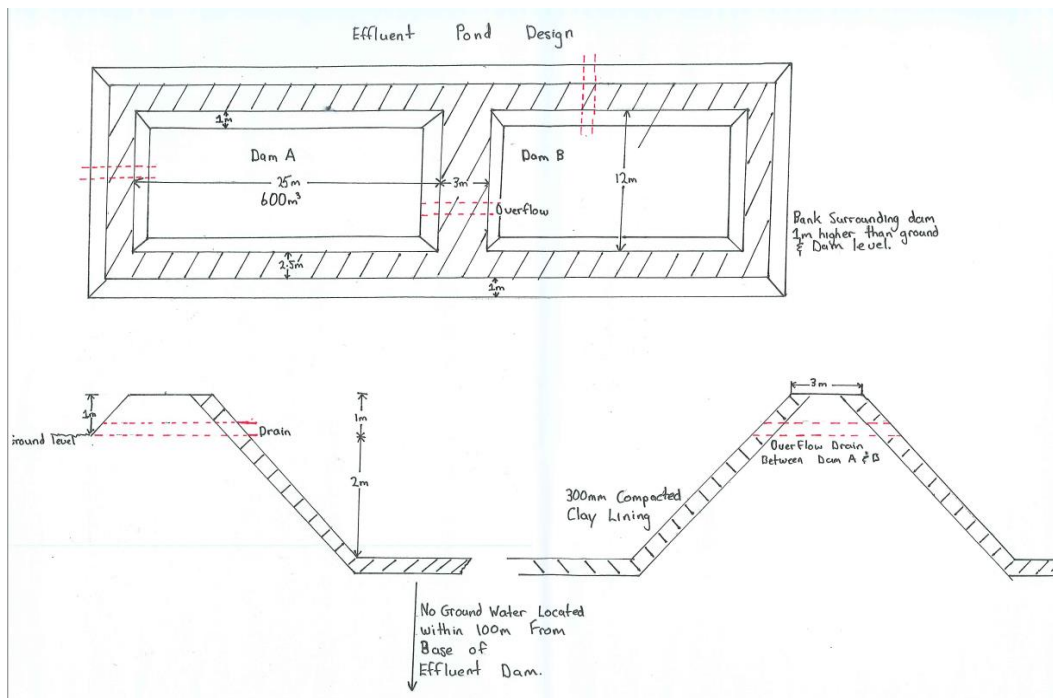


Figure 7: Anaerobic wastewater pond design (from Application)

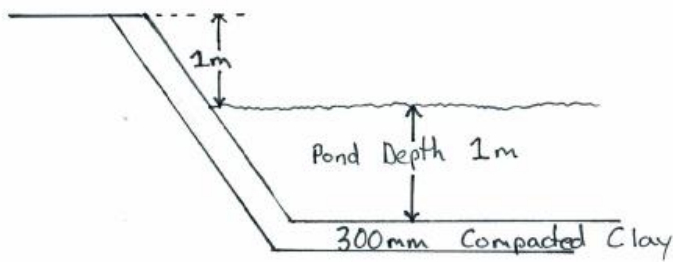
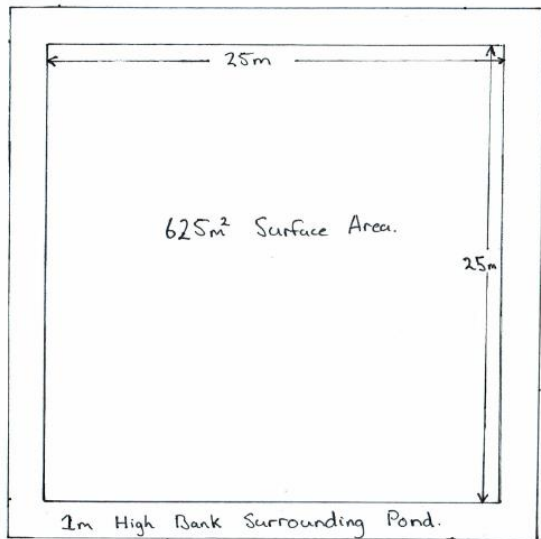


Figure 8: Facultative pond design (from Application)

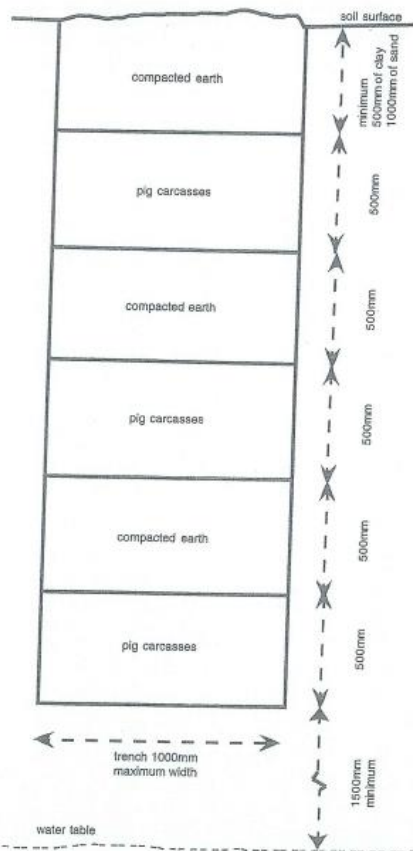


Figure 9: Carcass burial pit (from Application)

Key Finding: *The Delegated Officer has reviewed the information regarding the application and has determined:*

- 1. Both the deep litter sheds and the conventional shed will be further considered in the risk assessment as part of the Category 2 prescribed activity; and*
- 2. The items listed under 'Other Infrastructure' in Table 9 are considered to be outside of the prescribed activities and, as such, will not be included in the risk assessment.*

5. Legislative context

5.1 Other relevant approvals

5.1.1 Planning approvals

The proposed piggery is within the Shire of Northampton. The local scheme pertinent to the proposed location of the piggery is LPS No. 10 which provides an overarching framework for the long-term planning directions for Horrocks and its surrounding areas.

Construction and operation of a piggery at the proposed location requires Development Approval which was granted on 15 September 2017, subject to conditions. Some of the conditions included in the Shire's approval are:

- Construction is to be substantially commenced within a 2-year period commencing from when Approval granted;
- Approval provided for all three stages, with a capacity up to 5,000 pigs at any one time;
- Applicant to provide an Environmental Management Plan which includes:
 - Wastewater, solid waste, odour, noise, nutrient and fire management; and
 - Groundwater and environmental monitoring and reporting.

The Delegated Officer noted that the Application has been assessed on the basis of 5,330 animals (5702 SPU) but, conditions will be added to the licence to limit the number of animals to 5,000 consistent with the Shire's approval.

5.1.2 Water Abstraction Licence

The Applicant proposes to abstract groundwater for operational use which will require a groundwater abstraction licence under the *Rights in Water and Irrigation Act 1914*.

5.2 Part V of the EP Act

5.2.1 Applicable regulations, standards and guidelines

The overarching legislation relevant to the assessment of the Application is the EP Act and its subordinate regulations. DWER guidance statements that inform the assessment have been listed in the Key Documents set out in Appendix 1.

5.2.2 Clearing

The Applicant has not sought approval to clear native vegetation as the proposed location for the piggery is on land that was previously cleared for agricultural purposes.

6. Consultation

The Application was advertised in the West Australian newspaper on 31 July 2017 for comments. The Shire was also advised of the Application.

The Shire of Northampton proved comments and one member of the public responded to the advertisement in the West Australian newspaper. These submissions have been summarized and considered as set out in Appendix 3.

7. Location and siting

7.1 Siting context

The Applicant proposes to construct the piggery on an existing farm of about 400 ha. The proposed piggery will be within an area referred to as the ‘*activity boundary*’ which will contain all infrastructure associated with the piggery. The activity boundary will occupy an area of approximately 25ha as shown on Figure 2. The remainder of the farm will continue to be used for agricultural activities, which will include the application of the spent bedding, management of deceased animals and agriculture activities.

The location of the proposed piggery is approximately 3km from the Town of Horrocks, a Mid-West regional town with a population of approximately 130 people. The population of the Town fluctuates as many of the houses are holiday homes and the population increases during the summer months.

The *Horrocks Beach Local Planning Strategy* (HB-LPS) is a specific planning strategy for Horrocks and the surrounding area.

The adjacent lot (Lot 27) to the west of the farm has been zoned for future development in the HB-LPS, as shown in Figure 10. On the plan, Lot 27 has two areas being:

- the “*Rural Tourism Enterprise Precinct*” with a minimum lot size of 5ha; and
- the “*Low Density Cluster Precinct 1*” where the average lots will be 1ha with a minimum lot size of 0.3ha.

Lot 27 may accommodate up to 133 dwellings in the future.

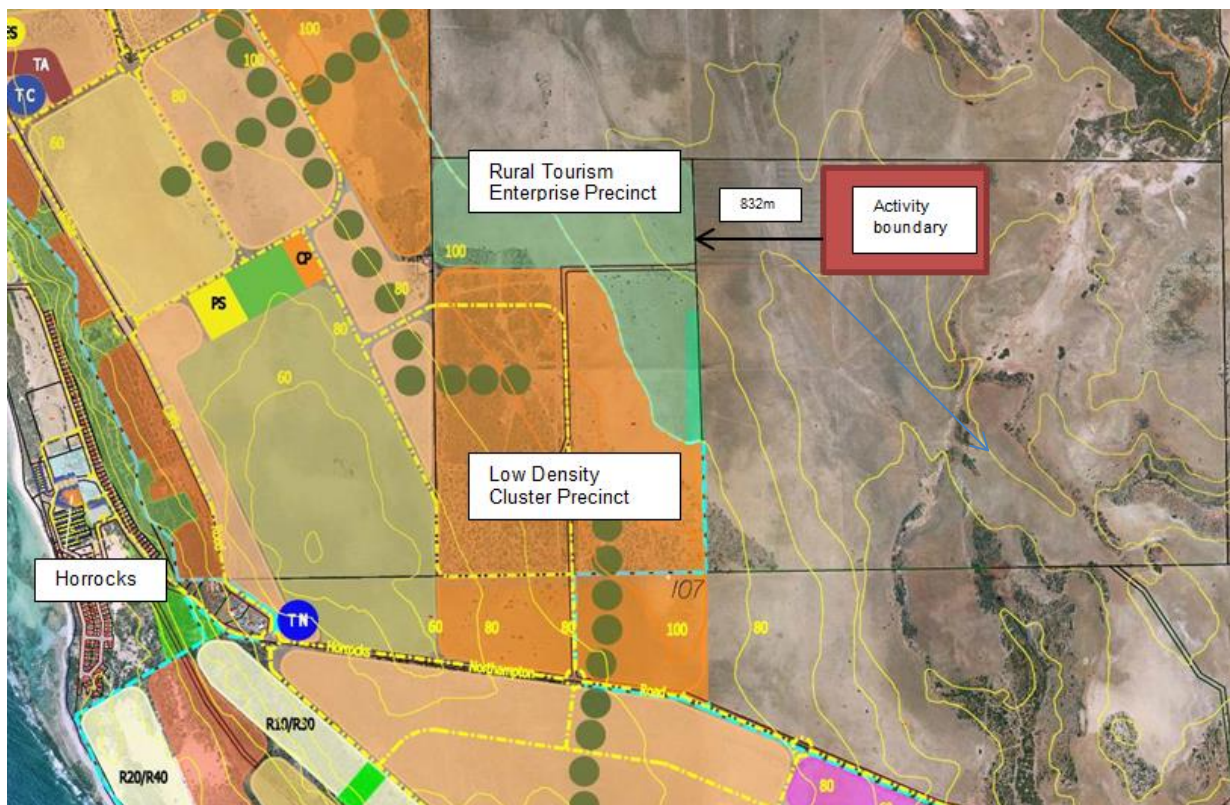


Figure 10: Proposed Lot 27 and the HB-LPS for Horrocks and the surrounding area

7.1.1 Topography

The surrounding area is hilly and undulating with sparse vegetation. The topographic contours, refer to Figure 11, show there is a ridge between the piggery and the coast then, the land falls to near sea level at Horrocks. Contour lines on the proposed site show a gradient of approximately 1m in every 100m. The proposed location for the piggery is low in a relatively large valley that runs north/south. The impact of odours upon nearby sensitive receptors will be reduced as the piggery is to be located low on the landscape.

The closest residential dwelling west of the activity boundary is located up gradient of the proposed piggery, as is the proposed residential dwelling to the north.

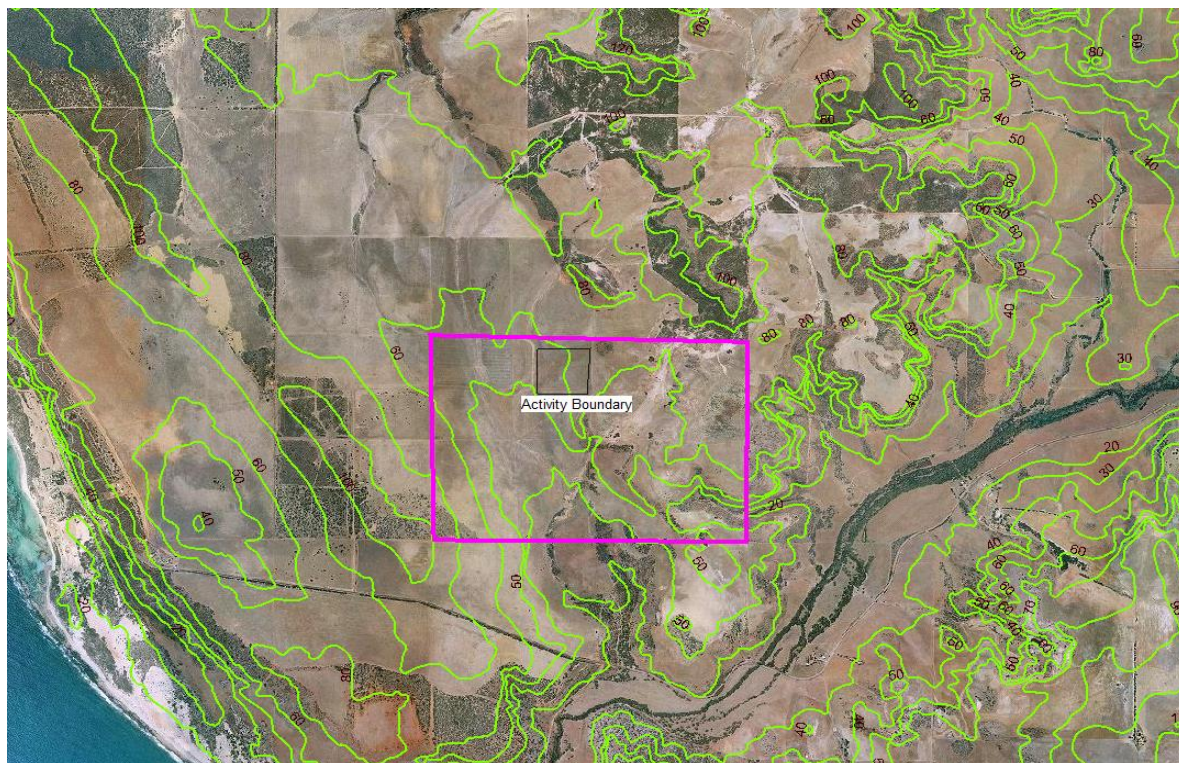


Figure 11: Topographic contours in the vicinity of the proposed piggery

Source: Topographic Contours, Statewide Properties (DWER generated)

7.2 Residential and sensitive Premises

The NEGP provides advice in respect of three types of dwellings: rural dwelling, rural residential dwellings and dwellings in towns, as per the classification identified by the relevant Local Government. Dwellings near to the proposed piggery include rural dwellings (RD), the Town of Horrocks and dwellings that may be constructed on Lot 27 (RR). The distances between the activity boundary of the proposed piggery and nearby odour sensitive receptors are detailed in Table 10. Refer to Figure 14 for the location of the Town of Horrocks and nearby residential dwellings, both existing and proposed.

Table 10: Receptors and distance from activity boundary

Sensitive land uses	Distance from Prescribed Activity
RD#1	1,543m south west and the closest neighbour
RD#2	2,317m
RD#3	2,982m
RD#4	4,084m
RD#5	4,249m
RD#6 (proposed)	2,623m
RD#7 (proposed)	754m
Town of Horrocks	3,100m west
Lot 27 - Rural Residential: Proposed subdivision	832m (refer Figure 10)

7.3 Groundwater and water resources

The distances to groundwater and water sources are shown in Table 11.

Table 11: Groundwater and water sources

Groundwater and water sources	Distance from Premises	Environmental value
Major watercourses/waterbodies	2,400m south	Bowes Rives which flows in a westerly direction towards the ocean
Proposed piggery is in the Gascoyne Groundwater Region, a proclaimed groundwater area. The underlying groundwater is referred to as the Tamblagooda Groundwater and there are superficial aquifers in the region	Advice from the Department's hydrogeologist is a groundwater bore on the property shows 2m of laterite over the Tamblagooda with standing water level at 20m BGL. Another production bore was drilled to a depth of 29m, possibly into the superficial aquifer.	Water is used as a potable resource and for crop growing and stock use.

7.4 Specified ecosystems

There are no specified ecosystems or threatened and priority fauna or flora in close proximity to the proposed piggery. The Bowes River is approximately 2.4km in a southerly direction and the site is located in the Gascoyne Groundwater area. The proposed piggery is situated on the eastern edge of a southerly flowing drainage line. The bedrock is shallow with a thin veneer of residual and Aeolian sand located not more than 5 to 10m BGL where the Tamblagooda Sandstone Expression is approximately 2m BGL.

7.5 Soil type

The Statewide Soils Database shows that the proposed piggery is located on a gently undulating plateau underlain by sedimentary rocks. The chief soils are yellow earthy sands at margins with some areas of block laterite.

7.6 Climate and prevailing winds

The site is in an area that experiences a Mediterranean type climate. The predominant wind direction tends to be mainly from the south. The area experiences hot and dry summers with the majority of rainfall occurring during the winter months from June to August. Median annual rainfall is 440mm and day time temperatures vary from 18°C in winter to over 40°C in summer.

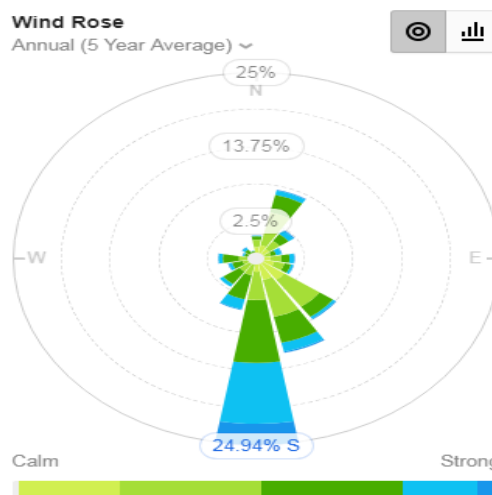


Figure 12: Five-year Annual wind rose for Horrocks.

Source: <http://wind.willyweather.com.au/wa/midwest/horrocks.html> August 2017

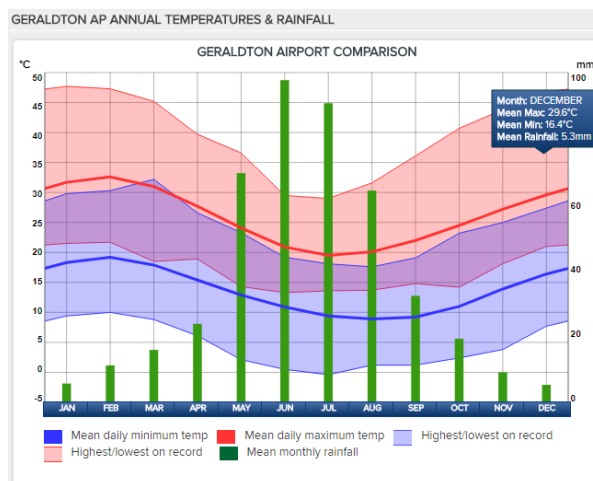


Figure 13: Geraldton Annual temperatures and rainfall

Source: <http://www.weatherzone.com.au/climate/station> August 2017

7.7 Odour and separation distance

Odour emissions are a key issue for piggery developments. The usual approach to managing odour impacts is to ensure that there is sufficient separation between a proposed piggery development and places where people reside.

The NEGP provides methods for determining whether the proposed location of a piggery is sufficiently separated from places where people reside.

In the first instance, NEGP details a Level 1 S-Factor method to examine separation distances based on the number of animals in the development, the type of pens, effluent treatment and other factors which may include the prevailing winds.

In order to calculate recommended Level 1 separation distances, the NEGP provides the following formula:

$$\begin{aligned} \text{Separation distance (D)} &= N^{0.55} \times S1 \times S2 \times S3 \text{ which is in its longer form as below:} \\ &= N^{0.55} \times (S1_R \times S1_T) \times (S2_R \times S2_T) \times S3 \end{aligned}$$

The Delegated Officer has used a composite calculation to account for the different shed types, according to the descriptors provided in the NEGP, as detailed in Table 12 and as follows:

- The number of pigs to be housed in the farrow shed = 140 SPU
- The number of pigs to be housed in the deep litter sheds = 5,562 SPU
- Total number of pigs on site = 5,702 SPU

To calculate the effluent removal factors $S1_R$ and $S1_T$, a composite calculation has been used, using the descriptor from the NEGP of *pigs on a single batch of litter ≥ 7 weeks*, to provide a conservative estimate of the separation distances:

$$\begin{aligned} S1_R &= (140 \times 1.0) + (5,562 \times 1.0) / 5,702 \\ &= 1.0 \end{aligned}$$

$$\begin{aligned} S1_T &= (140 \times 1.0) + (5,562 \times 0.63) / 5,702 \\ &= 0.64 \end{aligned}$$

Table 12 details the inputs used by the Delegated Officer to calculate separation distances.

Table 12: S-Factor descriptors for Level 1 assessment

S1 Factor	S-Factor definition	Description ¹	Receptor Type	S-Factor Value
SPU	Standard Pig Units	Maximum number of animals to be held on the piggery in SPU.	RD#1-7	5,702
			RR	
			Horrocks	
			RR	
			Horrocks	

S1 _R	Effluent removal factor	Composite of Conventional shed (1.0) and Deep litter sheds where pigs are on a single batch of litter ≥ 7 weeks (1.0)	RD#1-7	1.0
			RR	
			Horrocks	
S1 _T	Effluent removal factor	Composite of Conventional shed having ponds with ≥25% separation of volatile solids before pond (1.0) and Deep litter sheds where spent bedding is stockpiled / composted on-site (0.63)	RD#1-7	0.64
			RR	
			Horrocks	
S2 _R	Receptor type	Rural Dwelling	RD#1-7	11.5
		Rural Residential (proposed)	RR	15
		Town	Horrocks	25
S2 _S	Surface roughness	Undulating hills	RD#1-7	1.0
		Significant hills and valleys	RR	
				Horrocks
S3	Terrain weighting factor	Narrow valley (1-2%) upslope of site	RD#1-7	0.5
			RR	
			Horrocks	

Note 1: S-Factor descriptors are according to Appendix A5 of the NEGP

Table 13 shows the Level 1 assessment for the piggery at full operation for both the deep litter sheds and the farrowing shed for the premises identified in Figure 14.

Table 13: Level 1 assessment to measure required separation distance

Dwellings	Level 1 recommended distance (m) with pigs on single batch of litter ≥ 7 weeks	Actual distance (m)**	Distance within Level 1 recommended separation distance
RD#1	414	1,543	Acceptable separation distance
RD#2	414	2,317	Acceptable separation distance
RD#3	414	2,982	Acceptable separation distance
RD#4	414	4,084	Acceptable separation distance
RD#5	414	4,249	Acceptable separation distance
RD#6 [^]	414	2,623	Acceptable separation distance
RD#7 [^]	414	754	Acceptable separation distance
RR [^]	540	832	Acceptable separation distance
Horrocks	612	3,100	Acceptable separation distance

Rural dwellings identified in Figure 14

[^] Proposed dwellings including the Rural Residential subdivision proposed for Lot 27 and RD#6 and RD#7

** Delegated Officer Calculations

Key Finding: *The Delegated Officer, using the methods outlined in the NEGP has determined:*

1. *Based on the Level 1 S-Factor calculations, there is sufficient separation distance between the proposed piggery and nearby odour sensitive premises.*

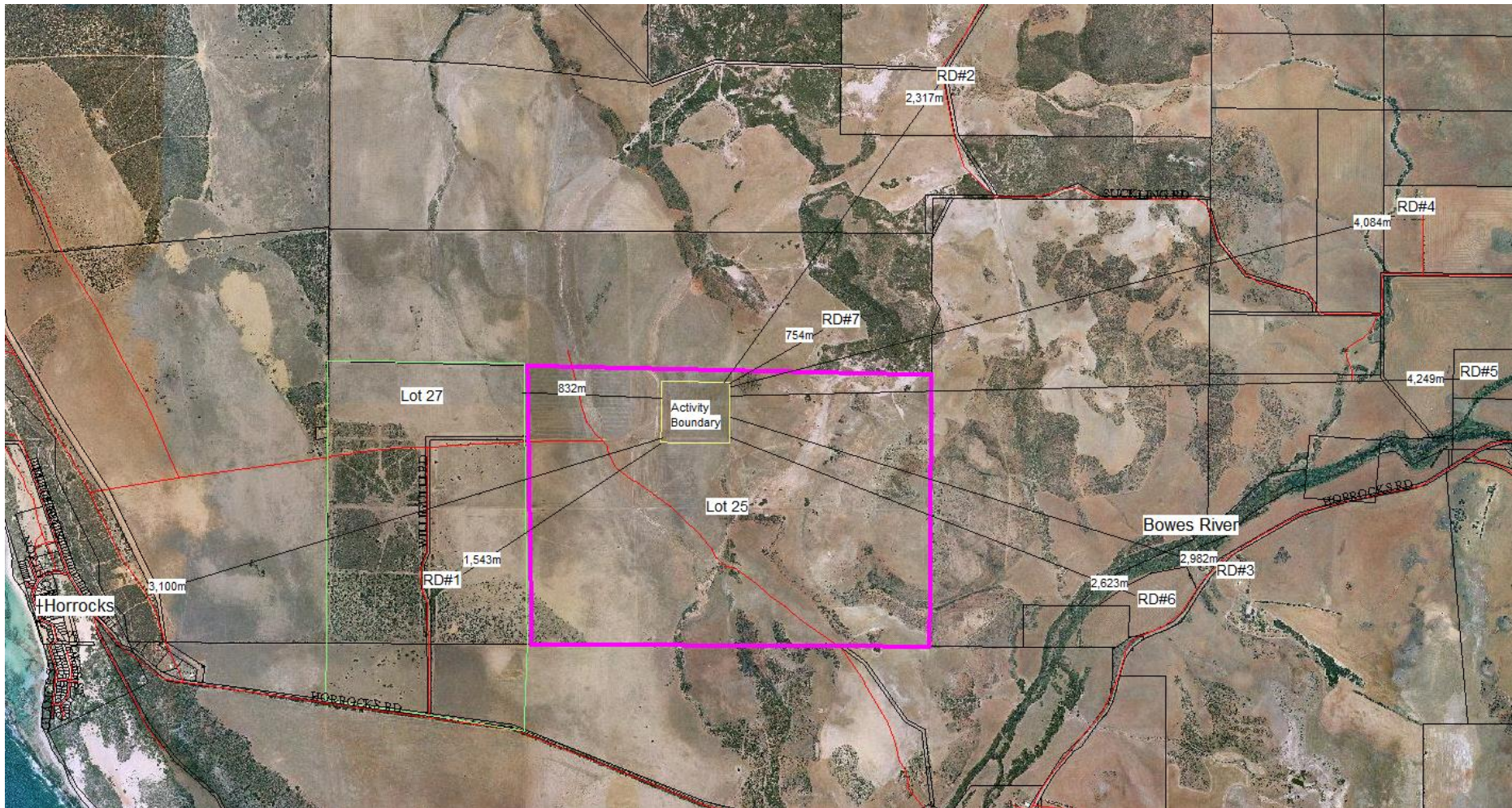


Figure 14: Map showing the proposed piggery in relation to nearby sensitive receptors (DWER generated).

Note: Lot 27, RD#6 and RD#7 are proposed dwellings

8. Risk assessment

8.1 Determination of emission, pathway and receptor

In undertaking its risk assessment, DWER will identify all potential emissions pathways and potential receptors to establish whether there is a Risk Event which requires detailed risk assessment.

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. Where there is no actual or likely pathway and/or no receptor, the emission will be screened out and will not be considered as a Risk Event. In addition, where an emission has an actual or likely pathway and a receptor which may be adversely impacted, but that emission is regulated through other mechanisms such as Part IV of the EP Act, that emission will not be risk assessed further and will be screened out through Table 14 and Table 15 below.

Table 14: Identification of emissions, pathway and receptors during construction

Risk Events					Continue to detailed risk assessment	Reasoning	
Sources/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts			
Construction, mobilisation and positioning of infrastructure	<i>Vehicle movements on unsealed access roads</i>	Noise	The closest rural dwelling is 1,543m south west of the proposed piggery	Air / wind dispersion	Amenity impacts	No	The Delegate Officer considers that the separation distance between the proposed piggery and nearby rural dwellings is sufficiently large for there to be minimal to no impacts on receptors. <i>The Environmental Protection (Noise) Regulations 1997</i> apply.
		Dust					
	<i>Construction of new buildings, plant and infrastructure</i>	Noise					
		Dust					

Table 15: Identification of emissions, pathway and receptors during operation

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts			
Pig sheds including the storage and processing of waste materials	Conventional (farrowing) shed including the underfloor pits and drainage lines	Odour	Nearby rural dwellings, proposed developments and the Town of Horrocks	Air / wind dispersion	Amenity impacts	Yes	See Section 8.4. The Delegated Officer considers the sheds and wastewater ponds to be a potential source of odour.
		Noise				No	Sufficient separation distance where noise emissions on site need to comply with the <i>Environmental Protection (Noise) Regulations 1997</i> .
	Deep litter sheds	Containment failure of underfloor pits and drainage lines leading to a discharge over land	Bowes River and the surrounding environment	Overflow of containment areas leading to a discharge over land	Potential to impact on nearby surface water	No	The pond system is small by comparison to other piggeries. The majority of the piggery is based on deep-litter sheds. The Delegated Officer considers the separation distance of 2.4km between the proposed piggery and the Bowes River is a sufficient buffer where any discharge overland is considered improbable.
Collection, treatment and storage of waste materials	Wastewater ponds	Odour	Nearby rural dwellings, proposed developments and the Town of Horrocks	Air / wind dispersion	Amenity impacts	Yes	See Section 8.4
		Containment failure and overflow from the ponds	The surrounding environment	Direct discharge over land	Potential to impact on the surrounding environment	No	Ponds have been designed to contain wet winters and extreme rainfall events.
		Infiltration/seepage of contaminants to groundwater	Groundwater	Infiltration	Potential groundwater contamination	No	There is significant separation to local groundwater for there to be minimal to no impact on groundwater. Ponds have impermeable liners.
	Solid waste storage hardstand	Odour	Nearby rural dwellings, proposed developments and the Town of Horrocks	Air / wind dispersion	Amenity impacts	Yes	See Section 8.4

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts			
	Solid waste storage hardstand (continued)	Contaminated stormwater runoff from hardstand	The surrounding environment	Direct discharge over land	Impact within the existing farm land only.	No	The Delegated Officer considers the separation distance of 2.4km between the proposed piggery and the Bowes River is a sufficient buffer where any discharge overland is considered improbable.
		Seepage from the solid waste hardstand can infiltrate to groundwater	Underlying groundwater	Infiltration	Potential groundwater contamination	No	There is significant separation to local groundwater for there to be minimal to no impact on groundwater. Hardstand is designed to be impermeable.
Waste management	Carcass burial pit	Infiltration of contaminants to groundwater	Groundwater	Infiltration	Potential Groundwater contamination.	No	The groundwater is located approximately 70m BGL and the Delegated Officer considers it very unlikely that any seepage would infiltrate through the subsoil to that depth.
	Mechanical spreading of spent bedding to land	Odour	Nearby rural dwellings, proposed developments and the Town of Horrocks	Air / wind dispersion	Amenity	No	The Delegated Officer considers that the spreading of solids to land is a secondary odour source at the premises. It is not a significant odour source and there is sufficient separation distance between the reuse area and nearby rural dwellings.
		Dust	Impact on surrounding vegetation adjacent to reuse area	Air / wind dispersion	Amenity	No	The Delegated Officer does not consider dust emissions to be a risk event as the majority of land in the reuse area has already been cleared for cropping
		Nutrients in spent bedding material	Land	Direct application	Excessive amounts of nutrients applied to land leading to unacceptable groundwater and surface water impacts.	Yes	See Section 8.5

8.2 Consequence and likelihood of risk events

A risk rating will be determined for risk events in accordance with the risk rating matrix set out in Table 16 below.

Table 16: Risk rating matrix

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

DWER will undertake an assessment of the consequence and likelihood of the Risk Event in accordance with Table 17 below.

Table 17: Risk criteria table

Likelihood		Consequence		
The following criteria has been used to determine the likelihood of the Risk Event occurring.		The following criteria has been used to determine the consequences of a Risk Event occurring:		
			Environment	Public health* and amenity (such as air and water quality, noise, and odour)
Almost Certain	The risk event is expected to occur in most circumstances	Severe	<ul style="list-style-type: none"> onsite impacts: catastrophic offsite impacts local scale: high level or above offsite impacts wider scale: mid-level or above Mid to long-term or permanent impact to an area of high conservation value or special significance[^] Specific Consequence Criteria (for environment) are significantly exceeded 	<ul style="list-style-type: none"> Loss of life Adverse health effects: high level or ongoing medical treatment Specific Consequence Criteria (for public health) are significantly exceeded Local scale impacts: permanent loss of amenity
Likely	The risk event will probably occur in most circumstances	Major	<ul style="list-style-type: none"> onsite impacts: high level offsite impacts local scale: mid-level offsite impacts wider scale: low level Short-term impact to an area of high conservation value or special significance[^] Specific Consequence Criteria (for environment) are exceeded 	<ul style="list-style-type: none"> Adverse health effects: mid-level or frequent medical treatment Specific Consequence Criteria (for public health) are exceeded Local scale impacts: high level impact to amenity
Possible	The risk event could occur at some time	Moderate	<ul style="list-style-type: none"> onsite impacts: mid-level offsite impacts local scale: low level offsite impacts wider scale: minimal Specific Consequence Criteria (for environment) are at risk of not being met 	<ul style="list-style-type: none"> Adverse health effects: low level or occasional medical treatment Specific Consequence Criteria (for public health) are at risk of not being met Local scale impacts: mid-level impact to amenity
Unlikely	The risk event will probably not occur in most circumstances	Minor	<ul style="list-style-type: none"> onsite impacts: low level offsite impacts local scale: minimal offsite impacts wider scale: not detectable Specific Consequence Criteria (for environment) likely to be met 	<ul style="list-style-type: none"> Specific Consequence Criteria (for public health) are likely to be met Local scale impacts: low level impact to amenity
Rare	The risk event may only occur in exceptional circumstances	Slight	<ul style="list-style-type: none"> onsite impact: minimal Specific Consequence Criteria (for environment) met 	<ul style="list-style-type: none"> Local scale: minimal to amenity Specific Consequence Criteria (for public health) met

[^] Determination of areas of high conservation value or special significance should be informed by the *Guidance Statement: Environmental Siting*.

* In applying public health criteria, DWER may have regard to the Department of Health's *Health Risk Assessment (Scoping) Guidelines*.

“onsite” means within the Prescribed Premises boundary.

8.3 Acceptability and treatment of risk event

DWER will determine the acceptability and treatment of Risk Events in accordance with the Risk treatment outlined in Table 18 below:

Table 18: Risk treatment table

Rating of Risk Event	Acceptability	Treatment
Extreme	Unacceptable.	Risk Event will not be tolerated. DWER may refuse application.
High	May be acceptable. Subject to multiple regulatory controls.	Risk Event may be tolerated and may be subject to multiple regulatory controls. This may include both outcome-based and management conditions.
Medium	Acceptable, generally subject to regulatory controls.	Risk Event is tolerable and is likely to be subject to some regulatory controls. A preference for outcome-based conditions where practical and appropriate will be applied.
Low	Acceptable, generally not controlled.	Risk Event is acceptable and will generally not be subject to regulatory controls.

8.4 Risk Assessment – Odour Impact

8.4.1 Description of risk event

Odour emissions can cause a nuisance and impact on the amenity and lifestyle of nearby receptors.

8.4.2 Identification and general characterisation of emission

The principal and continuous source of odour emissions are from the piggery sheds, in particular the farrowing shed and associated infrastructure including the underfloor pits in the farrowing shed and the drainage lines feeding wastewater to the wastewater treatment ponds. A portion of the odour is likely to be generated from the wastewater treatment ponds. Typically, approximately 60% to 75% of odour emissions can emanate from wastewater treatment ponds at a piggery. Periodic activities such as applying spent bedding to land and annual desludging of the ponds have the potential to generate odour but they occur infrequently and over relatively short periods of time.

8.4.3 Description of potential adverse impact from the emission

The odour at the source will have a characteristic pig manure odour. Emissions can cause annoyance to nearby odour sensitive receptors and repeated odour events can potentially cause an unreasonable loss of amenity.

8.4.4 Criteria for assessment

The general requirement in the EP Act, as it relates to odour emissions, is that a person shall not cause an unreasonable odour emission being an emission that unreasonably interferes with the health, welfare, convenience, comfort or amenity of any person. The Delegated Officer considers that the assessment of odours should be in accordance with the criteria and methods detailed in the NEGP.

8.4.5 Applicant's proposed odour controls

Table 19: Applicant's proposed odour controls

Site infrastructure	Description	Operation details
Deep litter sheds	Spent bedding which includes a mixture of manure, urine and spilt feed and drinking water. Spent bedding is removed and the sheds hosed between batches where the washdown water is directed to the operating wastewater pond.	<ul style="list-style-type: none"> Spent bedding will be replaced between each batch of pigs; Frequent checking of spent straw to ensure it is removed when it becomes soiled; Self-feeders will minimise spilt feed at feeding time; Dust will be minimised by frequent cleaning of the sheds, including hosing of the sheds in between batches; Washdown water will contain a minimum of organic matter which will have been absorbed by the straw; and Frequent checking of the sheds to ensure mortalities removed promptly.
Conventional shed	Effluent from the birthing pens will fall into underfloor pits where it will be flushed and directed to the wastewater pond.	<ul style="list-style-type: none"> Frequent flushing (twice a week) of the underfloor pits in the farrowing shed ensures that effluent is not allowed to accumulate; Only 40 sows kept in the farrowing shed at any one time; Sows kept in the farrowing crates no longer than 3 weeks per cycle; and Frequent checking of the pens to ensure mortalities and after birth removed for burial in the carcass burial pits.
Effluent drainage system	Open concrete drains will discharge washdown water from the deep litter sheds and the farrowing shed.	<ul style="list-style-type: none"> Open concrete drains will be gravity fed to ensure wastewater does not accumulate in the drains; Drains will have smooth sides and base to facilitate good drainage; Drains will be 200mm deep and 300mm wide; Where the drains intercept trafficable areas, underground unplasticised PVC pipes will replace the open drains; and Drains will be monitored by Operator(s).
Wastewater ponds	Two anaerobic ponds will be used - one operational and one pond off-line for desludging and maintenance. One Facultative pond to polish treated wastewater.	<ul style="list-style-type: none"> Only 40 sows and 400 piglets (total of 140 SPU) kept in farrowing shed so the effluent is expected to be low in volatile solids; Washdown water from the deep litter sheds low in volatile solids which will have been absorbed and removed with the bedding material; One anaerobic pond operating at any one time; Ponds taken off-line annually for desludging so volatile solids not allowed to accumulate; and One facultative pond to polish treated wastewater.
Solid waste storage hardstand and stockpiles	Spent bedding is removed from the deep litter sheds and stockpiled prior to moving into windrows.	<ul style="list-style-type: none"> Applicant to apply no more than 2.0 tonnes per hectare per year (dry) of spent bedding; and Applicant to spread stockpiles into reuse area when wind conditions are favourable to reduce potential for emissions to impact on nearby neighbours.

8.4.6 Key findings

The Delegated Officer has reviewed the information regarding odour emissions and has found:

1. *The proposed piggery has sufficient separation distance (NEGP Level 1) from nearby rural dwellings, the proposed rural residential subdivisions and the Town of Horrocks.*

8.4.7 Consequence

Considering the location, separation distance and siting of the proposed piggery and the general characterization of odours, they could have a local level impact to amenity with any impact expected to be for a short period of time to a single rural residence. Therefore, the Delegated Officer considers the consequence of odour emissions impacting on the amenity of nearby residents to be **Slight**.

8.4.8 Likelihood of risk event

The Level 1 S-Factor calculations show that during the operation of the piggery, there is sufficient buffer distance between all sensitive receptors (refer to Table 10).

The Delegated Officer has determined that the likelihood of odour emissions occurring and causing an impact may occur but only in exceptional circumstances. Therefore, the Delegated Officer considers the likelihood of odour emissions to be **Rare**.

8.4.9 Overall rating of odour emissions

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 16) and determined that the overall rating for the risk of odour emissions is **Low**.

8.5 Risk of discharges from the application of spent bedding to land

8.5.1 Description of risk event

The application of spent bedding and sludge could generate contaminated stormwater run-off and impact on the surrounding environment. Contaminates can also seep through the soil, moving beyond the root zone, causing an accumulation of salts in the soil leading to soil degradation and groundwater contamination if applied in excessive amounts. Cereal crops are likely to be grown in the reuse area.

8.5.2 Identification and general characterisation of spent bedding

Spent bedding, containing manure, urine, spilt feed and water, is to be removed from the deep litter sheds on a regular basis. Sludge from annual desludging events is to be added to stockpiled spent bedding.

8.5.3 Description of adverse impact from the application of solid wastes to land

Leaching of nutrients and contaminants into the soil can cause a build-up of salts in the soil if applied in excessive amounts. This salt accumulation can interfere with nitrogen uptake of the plants and general plant health. This can also lead to soil degradation in the area and if waste is applied to land at excessive amounts, it may cause an unacceptable impact upon water resources.

8.5.4 Criteria for assessment

As a general rule, the Delegated Officer considers that waste should be applied to land at a rate which it can be utilized as a resource by agricultural activities. WQPN 22 also provides guidance on nutrient loading rates to land based on soil types and nearby water resources.

Table 20: Applicant's controls for the spreading of solid waste to land

Control	Description
Application rate of spent bedding	<ul style="list-style-type: none">Not to exceed 2.0 tonnes per hectare per year (dry basis)
Application area	<ul style="list-style-type: none">304ha

8.5.5 Key findings

The Delegated Officer has reviewed the information regarding the risk of discharges to land from the spreading of solid wastes and has found:

- The proposed application rate of spent bedding to land is acceptable.*

8.5.6 Consequence

The proposed application rate of spent bedding to land has been calculated at a conservative level (refer 4.2.2) and is to be applied at a rate which is matched to the phosphorus uptake rate of agricultural crops. As the application rate is sustainable, it is likely to have a **slight** (if any) adverse impact on water resources. There is sufficient depth between the reuse area and the underlying groundwater which also reduces the risk of adverse impacts to groundwater. Based on the hazard characterization of spent bedding and the proposed rate of its application to land, the Delegated Officer has determined that the consequence is **slight**.

8.5.7 Likelihood of Risk Event

There is a 1,455m buffer between the reuse area and the Bowes River and a significant separation to groundwater. Therefore, the Delegated Officer considers that the risk event of discharges to land from the spreading of solid waste will probably not occur in most circumstances and considers the likelihood to be **Unlikely**.

8.5.8 Overall rating of the potential for discharges to land from the spreading of solid waste

The Delegated Officer has compared the consequence and likelihood ratings described above for the Risk Criteria and determined that the overall rating for the risk posed by the application of spent bedding to land is **low**.

8.6 Summary of acceptability and treatment of Risk Events

A summary of the risk assessment and the acceptability or unacceptability of the risk events set out above, with the appropriate treatment and control, are set out in Table 21 below. Controls are described further in Section 9.

Table 21: Risk assessment summary

	Description of Risk Event			Applicant controls	Risk rating	Acceptability with controls (conditions on instrument)
	Emission	Source	Pathway/ Receptor (Impact)			
1.	Fugitive odour emissions (Operation)	<i>Underfloor pits in conventional shed, effluent drains, deep litter sheds, wastewater ponds, sludge hardstand, burial pit</i>	<p>Transmission of emissions through the air, where the strength will depend on wind strength and direction</p> <p>Sensitive receptors located west, north and south-east of the proposed activity boundary</p>	<ul style="list-style-type: none"> • Sufficient separation distance between activity boundary and nearby sensitive receptors; • Frequent replacement of the spent straw, • All effluent discharged to the wastewater ponds; • Frequent washdown of sheds; • Management controls such as self-feeding systems; and • Sludge removed from the anaerobic ponds on an annual basis. 	<p>Slight consequence</p> <p>Rare likelihood</p> <p>Low risk</p>	<p>Acceptable. subject to proponent controls conditioned / outcomes based controls</p>
2.	Application of solids to land (Operation)	Stockpile of spent bedding material.	Direct application to land via a mechanical spreader.	<ul style="list-style-type: none"> • The application of spent bedding is to be controlled to no more than 2.0 tonnes per hectare per year (dry basis) in the reuse area. 	<p>Slight consequence</p> <p>Unlikely likelihood</p> <p>Low Risk</p>	<p>Acceptable. subject to proponent controls conditioned / outcomes based controls</p>

9. Regulatory controls

A summary of regulatory controls determined to be appropriate for the Risk Event is set out in Table 22. The risks are set out in the assessment and the controls are detailed in this section. DWER will determine controls having regard to the adequacy of controls proposed by the Applicant. The conditions of the Works Approval will be set to give effect to the determined regulatory controls.

Table 22: Summary of regulatory controls to be applied

		Controls (references are to sections below, setting out details of controls)		
		9.1 Works Approval controls – Infrastructure and equipment	9.2 Requirements for on-going Operation of infrastructure	9.3 Reports
Risk Items (see risk analysis in section 8)	1. Odour emissions	●	●	
	2. Application of spent bedding to land		●	●

9.1 Works Approval controls – Siting, infrastructure design and construction requirements

9.1.1 Siting

Note: The Applicant must locate the Works generally in accordance with the Site Plans included with the Works Approval Application (refer Figures 1 to 7).

Grounds: The application has been assessed based on the siting and location of the infrastructure shown in the Works Approval Application. The proposed piggery is located in an area where the surrounding countryside includes hills and valleys which will help to disperse odour emissions from the piggery. Similarly, the proximity to the coast and the onset of afternoon sea breezes will assist in the dispersion of odour. Effluent from the conventional shed and the deep litter sheds will be conveyed via gravity to the wastewater treatment system, where the location of the sheds and ponds are sited to take advantage of the topography and gradient of the land.

9.1.2 Construction and design of infrastructure

Infrastructure will be designed and constructed in accordance with the specifications, as detailed in Table 23:

Table 23: Infrastructure associated with the operation of the piggery

Infrastructure	Requirements (design and construction)
All pig sheds	<ul style="list-style-type: none"> (a) The floor and drainage system of all sheds to be designed to prevent the discharge of effluent to the environment; (b) Stormwater runoff is to be directed away from the sheds and floors of the sheds designed

Infrastructure	Requirements (design and construction)
	<p>to prevent the egress of stormwater;</p> <p>(c) Drains from the sheds are to be designed to ensure all washdown water is conveyed via gravity to the wastewater pond system;</p> <p>(d) All sheds to include concrete floors;</p> <p>(e) All sheds must be separated by a distance of at least five times their height to maximize ventilation;</p> <p>(f) All sheds to be fitted with mechanical fans to assist with cooling during the hot summer months; and</p> <p>(g) All sheds to be fitted with a self-feeding system.</p>
Conventional pig shed	<p>(a) The underfloor pits and drainage system to be constructed from concrete;</p> <p>(b) The floor to be designed with a minimum slope of 5 degrees to allow effective flushing of the underfloor pits into the effluent drainage system;</p> <p>(c) The shed is to be designed and constructed to include a mist spray system to assist with cooling the sows during hot summer months and heating pads to keep suckers warm during the cold winter months;.</p>
Deep litter pig sheds	<p>(a) The sheds must have a concrete floor with a slope of 3 degrees to allow effective drainage of all flushing water to the effluent drainage system.</p>
Effluent drainage system	<p>(a) The drainage system is to be constructed from concrete with smooth sides and base; and</p> <p>(b) The drainage system is to be constructed with a minimum slope of 2 degrees to ensure all effluent is channeled to the wastewater pond.</p>
Wastewater ponds	<p>(a) The ponds must be designed and constructed to be fit for purpose for receiving all effluent from the maximum number of pigs on site and of suitable capacity allowing for:</p> <p>(i) Subject to (ii), a minimum top of embankment freeboard of 500mm at all times; and</p> <p>(ii) Overtopping to not occur on average more than once every 10 years, consistent with section 12.1.1 of the NEGP;</p> <p>(b) The ponds are to be designed to allow for a 1 in 10 ARI rainfall event of 72-hour duration without overtopping;</p> <p>(c) The anaerobic ponds to be 25m in length, 12m in width with a depth of 2m, excluding freeboard;</p> <p>(d) The facultative pond is to be 25m in length, 25m in width with a depth of 1m, excluding freeboard;</p> <p>(e) Embankments designed and constructed to prevent erosion as a result of stormwater runoff including:</p> <p>(i) Appropriate embankment construction material as well as sufficient compaction of soil; and</p> <p>(ii) Batter slopes of approximately 18 degrees to maintain embankment stability.</p> <p>(f) Access to the inlet pipe to be maintained to allow access for inspection and clearing of debris;</p> <p>(g) Ponds to include an overflow pipe between the ponds to be positioned one metre above the maximum surface water level to act as an emergency overflow between ponds during an extreme rainfall event;</p> <p>(h) Pipes to be unplasticised polyvinyl chloride (uPVC) with a minimum 300mm diameter.</p> <p>(i) The pond liners to include a 300mm compacted clay liner material, as specified in the Application which will achieve a permeability of 1×10^{-9}m/second,</p> <p>(j) The compacted liner of each pond must uniformly cover both the base and perimeter to achieve an integrated holding pond;</p> <p>(k) A minimum 300mm thickness layer of inert granular or gravel material is to cover the liner at the base of each pond. The cover must be applied in a manner that does not damage the clay lining and allows access for machines to desludge the ponds without damage to the liners;</p> <p>(l) The floor of the ponds are to be located a minimum of 2m above the highest level of groundwater;</p> <p>(m) Soils used for the liner must be free from plant roots and reactive, soluble and organic matter;</p>

Infrastructure	Requirements (design and construction)
	(n) Liners constructed on gradients of less than 1 in 3; (o) Liners to be durable to maintain permeability for the working life of the ponds; (p) The preparation and construction of the pond subgrade and liner must be supervised by a competent and experienced geotechnical professional; and (q) The liner must be certified in accordance with section 17 (Liner certification) of Water Quality Protection Note 27 – <i>Liners for containing pollutants, using engineered soils</i> , Western Australian Department of Water (August 2013).
Solid waste hardstand	(a) The solid waste hardstand area is to achieve a permeability of 1×10^{-9} m/second; and (b) The hardstand is to be bunded at the sides to contain leachate and prevent egress of stormwater and include a sump to collect rainfall and leachate.
Carcass burial pit	The burial pit is to be located a minimum of 7 metres above the highest level of groundwater.

Note: Requirements detailed in Table 23 are derived from the Application, consistent with NEGP recommendations and the guidance provided in WQPN 27.

Grounds: Design and construction of the ponds, hardstand and burial pit are required to address operational risks, including potential containment failure and seepage.

The Works Approval will include the requirement that, on completion of the Works, the Applicant is to provide to the CEO the engineering or building certification from a suitably qualified professional confirming that the works have been completed to achieve the specifications detailed in Table 23.

Testing and validation of the pond liners are to be in accordance with AS1289.6.7.1-2001. Requirements specified above for liner construction and testing are consistent with WQPN 27 which is an appropriate reference document for engineered soil liners given the hazard characteristics of effluent.

9.2 Requirements for the on-going operation of infrastructure

9.2.1 Operational requirements for the management and minimisation of odour emissions

The environmental controls, infrastructure and equipment detailed in Table 24 should be maintained and operated onsite for odour management. As noted in Section 5.1.1, the Shire has provided Development Approval for 5,000 animals at full stocking capacity. Therefore, the Licence will limit the number of pigs that can be kept on site at any one time to 5,000 animals.

Table 24: Operational controls for odour emissions

Infrastructure and equipment	Description	Operational details
Number of pigs held on premises	The application has been assessed at a maximum number of 5,530 pigs (equivalent to 5,702 SPU)	The number of pigs should not exceed 5,000 animals to be held in the conventional shed and deep litter sheds at any one time, consistent with the Shire's approval.
Conventional Shed	Effluent in the conventional shed will be stored in under floor pits and released to the wastewater treatment system via flushing. The effluent will be directed to the drainage system where it will be gravity fed into the operating anaerobic wastewater pond, as the first pond in the wastewater treatment system	All effluent from the conventional shed is to be directed to the operational anaerobic wastewater pond; Effluent stored in the under floor pits of the conventional shed to be flushed on a minimum of once per week; Under floor pits to be partially filled to dislodge any manure stuck to the floor and walls; and Mortalities and afterbirth are to be collected on a daily basis and disposed to the carcass burial pit.

Infrastructure and equipment	Description	Operational details
Deep litter sheds	The floor of the deep litter sheds are covered with straw bedding to absorb all urine, manure and spilt feed and water	Sheds are swept and hosed to keep lanes, pens and handling areas clean and dust free as much as possible; Spent hay is replaced between each batch of pigs at a minimum frequency of once every 7 weeks; and Mortalities are to be collected on a daily basis and disposed to the carcass burial pit.
Wastewater ponds	All wastewater from the pig sheds is directed to the wastewater treatment system.	All pond inner and outer embankments are maintained free of emergent vegetation; Desludging of the ponds is to be carried out in a manner that does not damage the integrity of the compacted clay pond liner; and An inspection of the pond system is to occur at a minimum of every third day to ascertain pond freeboard, integrity of embankments and to detect and clear any pipe blockages.
Carcass Burial pits	Pig mortalities, afterbirth and any foreign material are transferred on a daily basis to the burial pits	Pig mortalities, afterbirth and any foreign matter are disposed to the pits and immediately covered with a minimum of 500mm of sand/clay. Large carcasses to be split prior burial to encourage microbial breakdown of the carcass; Sufficient stockpiles of sand/clay are maintained close to the burial pit to allow daily cover of carcasses. Visual inspections of the burial pit are to be carried out every second day; and Stormwater is directed away from the burial pit.
Effluent drainage system	Concrete drains carry the effluent from the pig sheds to the operational anaerobic wastewater pond	Daily visual monitoring of the drainage system is required to ensure drains are working efficiently and blockages don't occur; and Drains to be constructed from concrete with a minimum slope of 2% to ensure efficient drainage.
Solid waste hardstand	Spent hay is removed from the deep litter sheds and allowed to compost on the solid waste hardstand, along with sludge from the annual desludging events of the wastewater ponds	Spent hay and sludge are stored in stockpiles and allowed to mature for 3 to 6 months to allow the heat and microbial process within the stockpiles to assist in breaking down the organic content of the stockpiles.
Spreading of solid wastes	Spent straw combined with sludge are stored in stockpiles and allowed to mature for 3 to 6 months prior spreading in the designated reuse area	The application rate of spent bedding is not to exceed 2.0 tonnes per hectare per year (dry basis); Spreading of solid waste in the reuse area is to occur when the wind direction is away from nearby odour sensitive premises; and A separation distance of 25m is to be maintained between the premises boundary and the solid waste reuse area.

Note: Requirements are derived from the Application and CEO requirements.

Grounds: The Works Approval application has been assessed at a maximum of 5,330 pigs or 5,702 SPU at any one time. Based on the Delegated Officer's calculation of the Level 1 S-Factor, there is a sufficient separation distance between the piggery's activity boundary and nearby rural dwellings, as calculated in Table 13.

It is important that the pig sheds are maintained in clean and hygienic conditions to minimise the potential for odour. A self-feeding system will assist in minimising food wastage. Afterbirth and deceased animals are to be removed and buried on a daily basis.

The majority of pigs will be penned in deep litter sheds where good ventilation and regular replacement of bedding will help minimise the potential for odour emissions along with

frequent flushing of the conventional shed. According to “*Minimising Odour from Piggeries*: (APL 2015), potential impacts to nearby neighbours can be reduced if the handling of solid waste stockpiles, desludging of ponds and spreading of spent bedding are carried out during favourable wind conditions, in particular when the wind direction is away from nearby odour sensitive premises.

Scavenging animals can expose carcass and there is a requirement to ensure carcasses are buried promptly and sufficient cover material is available. This will also minimise the risk of odour and stormwater coming into contact with deceased animals.

9.2.2 Operational controls for the application of spent bedding to land

The following environmental controls, infrastructure and equipment detailed in should be maintained and operated onsite to manage the potential for seepage to groundwater:

Infrastructure and equipment	Description	Operational details ¹
Spent bedding application to land	Mechanical spreading of spent bedding to land	<p>Application rate is not to exceed 2.0 tonnes per hectare of spent bedding per annum;</p> <p>A separation buffer of 25m is to be maintained between the reuse area and the boundary line;</p> <p>A separation buffer of 5m is to be maintained between the reuse area and the internal roads, sheds, ponds and other infrastructure;</p> <p>A separation buffer of 50m is to be maintained between the reuse area and public roads carrying more than 50 vehicles per day; and</p> <p>A separation buffer of 25m is to be maintained between the reuse area and public roads carrying less than 50 vehicles per day.</p>

9.3 Reporting

The Licence is to include the requirement for the Applicant to provide an Annual Monitoring Report which shall contain:

- The number of animals held in the deep litter sheds and the conventional shed at any one time; and
- The amount of solid waste spread in the reuse area on an annual basis.

10. The determination of works approval and licence conditions

10.1 Works approval conditions

The works approval conditions in the Issued Works Approval and Licence have been determined in accordance with the Department’s Guidance Statements:

The Applicant has indicated that the proposed piggery is likely to be constructed in 3 phases over a two to three year period or a longer period of time. To allow the Applicant flexibility in constructing the piggery, the Delegated Officer considered that a longer term of 5 years for the works approval would be appropriate. Table 25 provides a summary of the conditions to be applied to this works approval.

Table 25: Summary of Works Approval conditions to be applied

Works Approval Condition Reference	Grounds
Infrastructure, wastewater ponds and solid waste storage area	Environmental compliance is a valid, risk-based condition to ensure appropriate linkage between the licence and the EP Act.

DWER notes that it may review the appropriateness and adequacy of controls at any time and that, following a review, DWER may initiate amendments to the works approval under the EP Act.

10.2 Licence conditions

The Applicant has provided an Application for a licence. The Delegated Officer has determined that a licence is to be granted for the maximum term of 20 years because the proposed piggery is of a low risk design and well separated from nearby sensitive receptors.

Table 26 provides a summary of the conditions that should be applied to a licence in respect of the Application.

Table 26: Summary of Licence conditions that should to be applied

Licence Condition Reference	Grounds
Operational controls for odour	These conditions are valid, risk-based and contain appropriate controls (see section 9 of this document).
Solid Waste Application to Land	This condition is valid, risk-based and consistent with the EP Act (see section 9 of this document).
Maximum stocking density	This condition is valid, risk-based and consistent with the EP Act (see section 9 of this document).
Reports	These conditions are valid, risk-based and contain appropriate controls (see section 9 of this document).

11. Applicant's comments

The Applicant was provided with the draft Decision Report on 2 October 2017.

The Applicant provided comments on 6 October 2017 which have been summarised and considered as set out in Appendix 2.

12. Conclusion

The Delegated Officer considers that the Application should be granted, subject to the conditions recommend in this report.

Paul Byrnes
Manager – Licensing (Process Industries)

Delegated Officer
under section 20 of the *Environmental Protection Act 1986*

Appendix 1: Key documents

	Document title	Date	In text ref	Availability
1.	Works Approval Application and supporting information–Scotts Fishing Co Pty Ltd	12/06/2017		DWER records (A1449403)
2.	Additional Works Approval Supporting Information–Facultative pond location and dimensions	13/09/2017		DWER records (A1522463)
3.	Additional information provided in response to the draft works approval and decision report	6/10/2017		
4.	National Environmental Guidelines for Piggeries (Australian pork Limited)	2010	NEGP	Accessed at http://australianpork.com.au/industry-focus/environmental/national-environmental-guidelines-for-piggeries
5.	<i>Minimising Odour from Piggeries</i> Australian Pork Limited	2015		Accessed at http://australianpork.com.au/wp-content/uploads/2013/10/BM_P02_MOFP_2015_06_lr.pdf/
6.	DER, <i>Guidance Statement: Regulatory Principles</i> . Department of Environment Regulation, Perth.	July 2015		accessed at www.dwer.wa.gov.au
7.	DER, <i>Guidance Statement: Setting conditions</i> . Department of Environment Regulation, Perth.	October 2015		
8.	DER. <i>Guidance Statement: Licence duration</i> . Department of Environment Regulation, Perth.	August 2016		
9.	DER, <i>Guidance Statement: Risk Assessments</i> . Department of Environment Regulation, Perth.	November 2016		
10.	DER,. <i>Guidance Statement: land use Planning</i> . Department of Environment Regulation, Perth.	February 2017		
11.	DER, <i>Guidance Statement: Decision Making</i> . Department of Environment Regulation, Perth.	November 2016		

Appendix 2: Summary of applicant's comments on risk assessment and draft conditions

Summary of Licence Holder comment	DWER response
<p>The Applicant provided comments on the draft works approval conditions which included confirmation of the following:</p> <ul style="list-style-type: none"> • The conventional shed has capacity for 40 sows at any one time; • The design of the conventional shed and the deep litter sheds will be the same, where the sheds will be a dome-like structure; and • The hardstand for the storage of solid waste will be located adjacent to the wastewater treatment ponds. 	<p>The Decision Report and the Works Approval Conditions have been updated accordingly.</p>

Appendix 3: Summary of comments on the application

Stakeholder Comments	Delegated Officer's consideration of comments
Submission 1 (Shire of Northampton)	
The Shire advised that the Applicant lodged an application for planning approval, which was subsequently advertised for comments. Respondents to the Shire raised the following issues:	
(i) The potential for impact on surface and groundwater resources.	(i) The impacts on surface and groundwater resources has been considered in the risk assessment – see Table 15 of this assessment
(ii) Odour impacts on adjoining landholdings, the Townsite of Horrocks and future expansion of Horrocks as outlined by the Horrocks Local Planning Strategy.	(ii) The odour impacts upon adjoining landholdings, the Townsite of Horrocks and future expansion, as outlined in the Horrocks Local Planning Strategy, have been considered in the risk assessment – see Section 8.4
(iii) Adequate separation distances from the proposed development to adjoining rural properties and existing rural dwellings.	(iii) As above, see Section 8.4.
(iv) Visual impact on Horrocks' road and from adjacent Lot 26 (North).	(iv) Visual impacts are not relevant considerations for the assessment of emissions and discharges under this application. Visual impacts may be relevant considerations for the Shire of Northampton.
(v) The need for an environmental management plan addressing above issues along with ongoing management of waste on the site.	(v) The Delegated Officer considers regulatory controls that are to be attached to the Environmental Licence (if granted), scheduled compliance inspections and annual reporting requirements are sufficient to address the issues raised by the respondent.
Submission 2	
(i) A general concern about the impact of the piggery on future land uses	(i) The separation distance between the proposed piggery and the proposed dwelling on Lot 26 has been assessed – see Table 13..
(ii) Odour impacts in a sea breeze	(ii) Odour emissions and prevailing winds have been considered in the risk assessment – see Section 7 <i>Location and siting</i> and Section 8.4.
(iii) The spreading of waste over paddocks is an odour source.	(iii) The risk of odour from the application of solid wastes in the reuse area has been detailed in Table 19 and assessed in Section 8.4.

Stakeholder Comments	Delegated Officer's consideration of comments
(iv) The plan provides a design detail for Stage 1 but describes a 3-stage development at 4 times the size. What would this look like from an impact on visual, environment, land resources, odour impact and waste disposal.	(iv) The application has been assessed at the proposed full capacity of the piggery being 5,330 animals, equivalent to 5,702 SPU. Visual impacts are not relevant considerations for the assessment of emissions and discharges under this application. Visual impacts may be relevant considerations for the Shire of Northampton.
(v) There is no screening proposed to protect the view from our block. The respondent would like to see a substantial tree barrier planted around the perimeter of the proposed site.	(v) Visual impacts are not relevant considerations for the assessment of emissions and discharges under this application. Visual impacts may be relevant considerations for the Shire of Northampton.
(vi) Would approval of the piggery create a precedent for other additional similar developments in the area? Is this area with the adjoining lifestyle land and residential land appropriate for intensive agriculture?	(vi) The matters that the respondent has raised are relevant to the Shire of Northampton and the legislation that it manages. They are not relevant considerations in the process of assessing an application for a works approval or a licence.
(vii) Odour impacts in sea breeze conditions.	(vii) Odour emissions and prevailing winds have been considered in the risk assessment – see Section 7 <i>Location and siting</i> and Section 8.4.
(viii) The respondent has also raised several planning related matters.	(viii) The planning related matters that the respondent has mentioned are relevant to the Shire of Northampton and the legislation that it manages. They are not relevant considerations in the process of assessing an application for a works approval or a licence.

Attachment 1: Works Approval W6062/2017/1
