

**TOPIGS SA (PTY) LTD
TOPIGS SA MERINO PIGGERY –
DRAFT ENVIRONMENTAL
MANAGEMENT PROGRAMME**

Locality: The Farm Merino, Mpumalanga

Departmental Ref No: 17/2/3/GS-281

Date: 3 June 2015

SHANGONI
Management Services (Pty) Ltd



DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMP)

TOPIGS SA (PTY) LTD

Topigs SA Merino Piggery – Draft Environmental Management Programme

Locality: The Farm Merino, Mpumalanga

Departmental Ref No: 17/2/3/GS-281

Date: 3 June 2015

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PROJECT DETAILS

Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs

Reference No.: 17/2/3/GS-281

Project Title: Topigs SA Merino Piggery

Project Number: TOP-VIL-14-04-09

Compiled by: Karien Venter

Date: 3 June 2015

Location: The Farm Merino, Mpumalanga

Technical Reviewer: Lizette Crous



Signature



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LIST OF ABBREVIATIONS

DARDLEA	-	Department of Agriculture, Rural Development, Land and Environmental Affairs, Mpumalanga
DWS	-	Department of Water and Sanitation
EAP	-	Environmental Assessment Practitioner
ECA	-	Environmental Conservation Act of 1989
EIA	-	Environmental Impact Assessment
EMF	-	Environmental Management Framework
EMP	-	Environmental Management Programme
GN	-	Government Notice
NEMA	-	National Environmental Management Act, Act No. 107 of 1998, as amended
NEM:WA	-	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NHRA	-	National Heritage Resources Act, Act No. 25 of 1999
R	-	Regulation
SAHRA	-	South African Heritage Resources Agency



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1. INTRODUCTION

Topigs SA was established in 1995 by pig farmers, for pig farmers. The company is based in Gauteng and services customers throughout South Africa. Topigs SA also has clients in Malawi, Nigeria, Namibia, Swaziland, Zimbabwe and Zambia.

The TOPIGS 40 sow and TEMPO boar are ideally suited for African conditions and many top commercial farmers in Africa have invested in the breed with great success.

1.1 BACKGROUND DESCRIPTION

The project property, Portion 0 (remaining extent) of the farm Merino 641, IR, Mpumalanga, has historically been used for agricultural activities, namely crop production and livestock grazing. Topigs SA has identified a need to expand their operations and have identified the project property as an ideal location for the construction of their new piggery.

1.2 PROJECT/ACTIVITY DESCRIPTION

The proposed project will entail the following:

- The development of a piggery-grower unit where weaner piglets are grown until they are ready for slaughter. These pigs are called baconers.
- The construction of two (2) Weaner platforms. Each platform will have two (2) houses and each house will have four (4) rooms (therefore a total of 16 rooms). Each room houses 450 piglets. The total capacity within the weaner rooms is therefore 7 200 piglets. The dimensions of one platform is: 75m x 15m (1 125m²) x 2 platforms = 2 250m².
- The construction of seven (7) grower platforms. Each platform will have two (2) houses and each house will have two (2) rooms (therefore a total of 28 rooms). Each room houses 450 baconer/grower pigs. The total capacity within the grower rooms is therefore 12 600 baconers/growers. The dimensions of one platform: 145m x 15m (2 175m²) x 7 platforms = 15 225m².
- The total footprint size of all the weaner and grower platforms is therefore 17 475m² (1.7475ha).
- The total development footprint, including the platforms and open spaces between and surrounding the platforms is: 285m x 175m = 49 875m² (4.9875ha).
- The construction of an office block that will include a store room and ablution facilities. The office block will have the following dimensions: 6m x 20m (120m²).

The following describes the basic process that will be followed to raise the baconer pigs:

- Each week, 900 weaner piglets (three weeks old) will be delivered to the piggery.
- One weaner room will accommodate 450 piglets.
- Weaner piglets will be transferred to grower rooms at ten and a half weeks of age.



- Once the pigs are 23 weeks old, they will be collected and taken to an abattoir for slaughter.

The following listed activities in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) are being applied for:

Table 1: Listed activities in terms of GN. No R 544, 545 and 546, dated 2010 under NEMA, 1998

Number and date of the relevant notice	Activity No	Description
GN. No. R 544 Listing Notice 1 of 18 June 2010	4	<p>The construction of facilities or infrastructure for the concentration of animals for the purpose of commercial production in densities that exceed—</p> <p>(i) 20 square metres per large stock unit and more than 500 units, per facility;</p> <p>(ii) 8 square meters per small stock unit and;</p> <p>a. more than 1 000 units per facility excluding pigs where (b) will apply;</p> <p>b. more than 250 pigs per facility excluding piglets that are not yet weaned;</p> <p>(iii) 30 square metres per crocodile at any level of production, excluding crocodiles younger than 6 months;</p> <p>(iv) 3 square metre per rabbit and more than 500 rabbits per facility; or</p> <p>(v) 250 square metres per ostrich or emu and more than 50 ostriches or emus per facility; or 2500 square metres per breeding pair.</p> <p>The construction of infrastructure for a piggery for the growing of weaner piglets until they are ready for slaughter. The piggery will have a capacity to house 7 200 piglets and 12 600 baconer/grower pigs at any point in time.</p>
GN. No. R 544 Listing Notice 1 of 18 June 2010	23	<p>The transformation of undeveloped, vacant or derelict land to –</p> <p>(i) residential, retail, commercial, recreational, industrial or institutional use, inside an urban area, and where the total area to be transformed is 5 hectares or more, but less than 20 hectares, or</p> <p>(ii) residential, retail, commercial, recreational, industrial or institutional use, outside an urban area and where the total area to be transformed is bigger than 1 hectare but less than 20 hectares; -</p> <p>except where such transformation takes place –</p> <p>(i) for linear activities; or</p> <p>(ii) for purposes of agriculture or afforestation, in which case Activity 16 of Notice No. R. 545 applies.</p> <p>The total development footprint of the piggery, including the platforms for the pig houses and open spaces between and surrounding the platforms, will be 4.9875ha. Therefore, more than 1ha of undeveloped land outside of an urban area will be transformed to construct the piggery.</p>



Number and date of the relevant notice	Activity No	Description
GN. No. R 544 Listing Notice 1 of 18 June 2010	37	<p>The expansion of facilities or infrastructure for the bulk transportation of water, sewage or storm water where:</p> <p>(a) the facility or infrastructure is expanded by more than 1000 metres in length; or</p> <p>(b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more—</p> <p>excluding where such expansion:</p> <p>(i) relates to transportation of water, sewage or storm water within a road reserve;</p> <p>or</p> <p>(ii) where such expansion will occur within urban areas but further than 32 metres from a watercourse, measured from the edge of the watercourse.</p> <p>Existing bulk infrastructure to the property will be expanded to the proposed piggery. This includes water, sewage and storm water infrastructure. The infrastructure will be expanded by more than 1km.</p>
GN. No. R 544 Listing Notice 1 of 18 June 2010	47	<p>The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre -</p> <p>(i) where the existing reserve is wider than 13,5 meters; or</p> <p>(ii) where no reserve exists, where the existing road is wider than 8 metres –</p> <p>excluding widening or lengthening occurring inside urban areas.</p> <p>An existing access road on the property will be lengthened and expanded by approximately 2km. The road will be approximately 4m in width and wider than 4m in places, such as at turns.</p>
GN. No. R 546 Listing Notice 3 of 18 June 2010	4	<p>The construction of a road wider than 4 metres with a reserve less than 13,5 metres.</p> <p>(a) In Eastern Cape, Free State, KwaZulu-Natal, Limpopo, Mpumalanga and Northern Cape provinces:</p> <p>ii. Outside urban areas, in:</p> <p>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p> <p>An access road to the piggery will be built from an existing access road on the property. The road will be wider than 4m in places, such as at turns, but will be approximately 4m wide in straight sections.</p> <p>The site lies within a “Highly Significant” Critical Biodiversity Area in terms of the Mpumalanga Biodiversity Conservation Plan, as indicated on SANBI’s Biodiversity GIS database.</p>



Number and date of the relevant notice	Activity No	Description
GN. No. R 546 Listing Notice 3 of 18 June 2010	12	<p>The clearance of an area of 300 square metres or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation.</p> <p>(a) Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;</p> <p>(b) Within critical biodiversity areas identified in bioregional plans.</p> <p>The total development footprint of the piggery, including the platforms for the pig houses and open spaces between and surrounding the platforms, will be 4.9875ha. Therefore, more than 300m² of vegetation will be cleared to construct the piggery.</p> <p>The vegetation on site is classified as Soweto Highveld Grassland which is an “Endangered” vegetation type in terms of section 52 of the NEM:BA, 2004. The site also lies within a “Highly Significant” Critical Biodiversity Area in terms of the Mpumalanga Biodiversity Conservation Plan, as indicated on SANBI’s Biodiversity GIS database.</p>
GN. No. R 546 Listing Notice 3 of 18 June 2010	13	<p>The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for:</p> <p>(1) the undertaking of a process or activity included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), in which case the activity is regarded to be excluded from this list.</p> <p>(2) the undertaking of a linear activity falling below the thresholds mentioned in Listing Notice 1 in terms of GN No. 544 of 2010.</p> <p>(a) Critical biodiversity areas and ecological support areas as identified in systematic biodiversity plans adopted by the competent authority.</p> <p>The total development footprint of the piggery, including the platforms for the pig houses and open spaces between and surrounding the platforms, will be 4.9875ha. Therefore, more than 1ha of vegetation will be cleared to construct the piggery.</p> <p>The site lies within a “Highly Significant” Critical Biodiversity Area in terms of the Mpumalanga Biodiversity Conservation Plan, as indicated on SANBI’s Biodiversity GIS database.</p>
GN. No. R 546 Listing Notice 3 of	19	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.

Number and date of the relevant notice	Activity No	Description
18 June 2010		<p>(a) In Eastern Cape, Free State, KwaZulu-Natal, Limpopo, Mpumalanga and Northern Cape provinces:</p> <p>ii. Outside urban areas, in:</p> <p>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.</p> <p>An existing access road on the property will be lengthened and expanded by approximately 2km. The road will be approximately 4m in width.</p> <p>The site lies within a “Highly Significant” Critical Biodiversity Area in terms of the Mpumalanga Biodiversity Conservation Plan, as indicated on SANBI’s Biodiversity GIS database.</p>



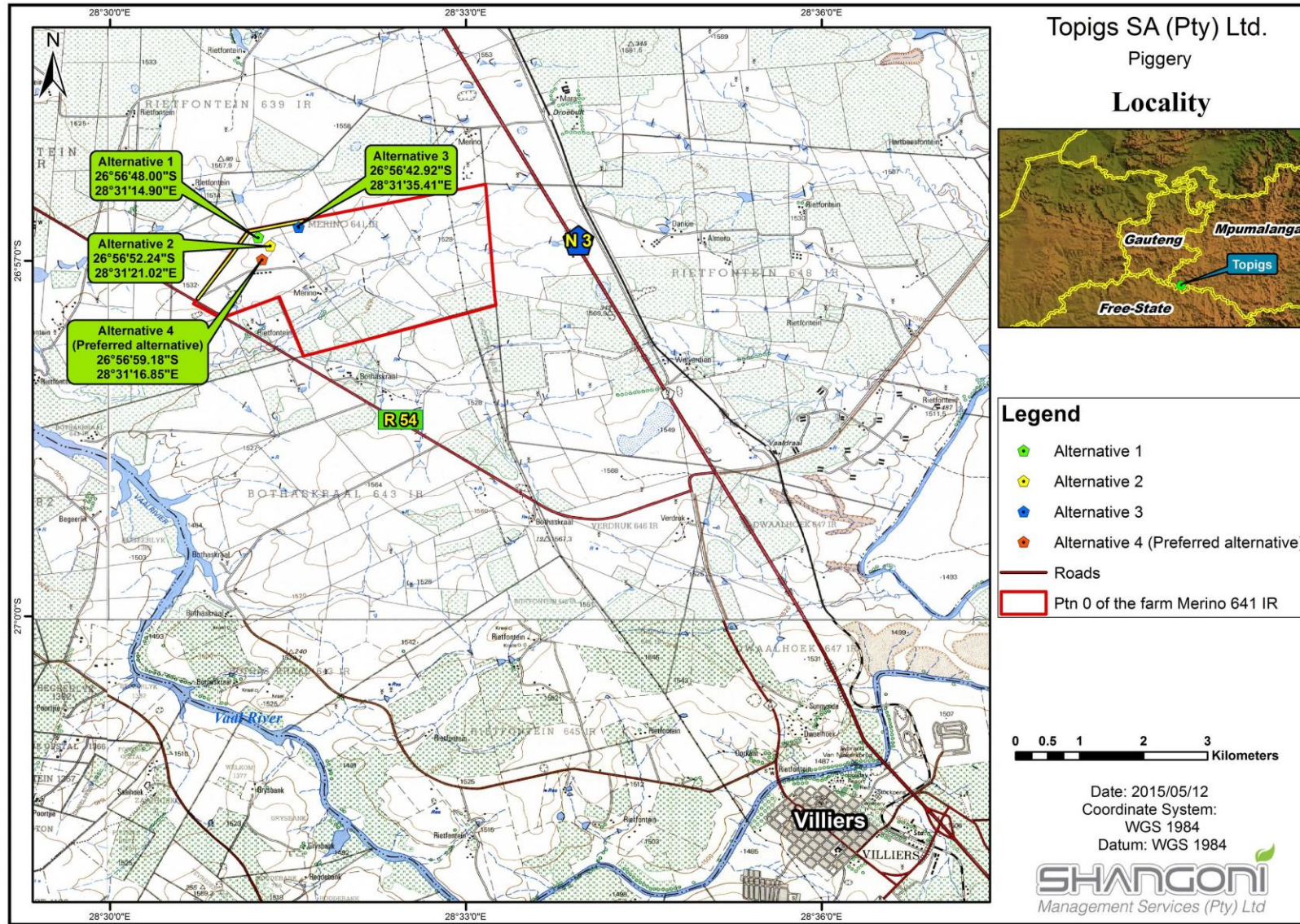


Figure 1: Locality of the Site

2. ENVIRONMENTAL ASSESSMENT PRACTITIONER

Name of firm	Shangoni Management Services	
Postal address	P.O. Box 74726 Lynnwood Ridge Pretoria 0400	
Telephone No.	012 807 7036	
Fax	012 807 1014/086 643 5360	
E-mail	lizette@shangoni.co.za	
Team of Environmental Assessment Practitioners on project		
Name	Qualifications & experience to conduct the EIA	Responsibility
Mr Lourens de Villiers	<ul style="list-style-type: none"> • MSc. Water Resource Management (UP) • BSc. (Hons) (PU for CHE) • More than 12 years' experience conducting Environmental Impact Assessments and Waste Management License Applications 	Project Director
Ms Lizette Crous	<ul style="list-style-type: none"> • MSc Environmental Management (University of London) • More than 3 years' experience conducting Environmental Impact Assessments and Waste Management License Applications 	EAP
Ms Karien Venter	<ul style="list-style-type: none"> • B.Sc. (Hons) Environmental Management • Less than 1 years' experience conducting Environmental Impact Assessments and Waste Management License Applications. 	EAP

3. SITE DOCUMENTATION

The following documentation must be available at the site office at all times:

- A copy of the Basic Environmental Impact Assessment (BA) Report;
- A copy of this Environmental Management Programme (EMP); and
- A copy of the Environmental Authorisation.



4. LEGISLATION

Table 2: Applicable legislation, policies and/or guidelines

Title of legislation, policy or guideline	Administering authority	Aim of legislation, policy or guideline
Laws of General Application		
The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)	-	To establish a Constitution with a Bill of Rights for the RSA.
Environment Conservation Act, 1989 (Act No. 73 of 1989 as amended)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To control environmental conservation.
National Environmental Management Act, 1998 (Act No. 107 of 1998)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To provide for the integrated management of the environment, and to regulate the 'Duty of Care' Principle.
Promotion of Access to Information Act, 2000 (Act No. 2 of 2000 as amended)	-	To give effect to the constitutional right of access to any information held by the State and any information that is held by another person and that is required for the exercise or protection of any rights.
Air Quality and Noise		
National Environmental Management: Air Quality Act (Act No. 39 of 2004)	Gert Sibande Municipality	To reform the law regulating air quality to protect the environment by providing reasonable measures for the prevention of pollution. To provide for national norms and standards regulating air quality monitoring, management and control.
Government Notice 1123, dated 2007 under the NEM:AQA, 2004	Gert Sibande Municipality	To declare the Highveld as a priority area in terms of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004).
Water Management		
National Water Act (NWA), 1998 (Act No. 36 of 1998)	Department of Water and Sanitation	To provide for fundamental reform of the law relating to water resources.
Waste Management		
National Environmental Management: Waste Act (Act No. 59 of 2008)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation.
Biodiversity		



Title of legislation, policy or guideline	Administering authority	Aim of legislation, policy or guideline
National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To provide for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998.
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To provide for control over the utilisation of the natural agricultural resources of South Africa in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants.
National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To reform the law on veldt and forest fires.
Agricultural Pest Act, 1983 (Act No. 36 of 1983 as amended) – GN R276 of 5 March 2004	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To regulate plants, plant products and other regulated articles when imported into South Africa.
Mpumalanga Nature Conservation Act, 1998 (Act No. 10 of 1998)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To consolidate and amend the laws relating to nature conservation within the Province and to provide for matters connected therewith.
Soil and Land Management		
National Environmental Management Act, 1998 (Act No. 107 of 1998). National Environmental Management Amendment Act, 2008 (Act No. 62 of 2008).	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To provide for the integrated management of the environment and to regulate the 'Duty of Care' Principle.
Environment Conservation Act, 1989 (Act No. 73 of 1989 as amended)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To control environmental conservation.
Heritage and Archaeological Resources		
National Heritage Resources Act, 1999 (Act No. 25 of 1999 as amended)	South African Heritage Resources Agency	To introduce an integrated and interactive system for the management of the national heritage resources; to promote good government at all levels, and empower civil society to nurture and conserve their heritage resources so that they may be bequeathed to future generations
Protected Areas		



Title of legislation, policy or guideline	Administering authority	Aim of legislation, policy or guideline
National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003 as amended)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes.
Mpumalanga Biodiversity Sector Plan	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	
Planning of New Activities		
National Environmental Management Act, 1998 (Act No. 107 of 1998)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To provide for the integrated management of the environment and to regulate the 'Duty of Care' Principle.
EIA Regulations R 543, R 544, R 545 and R 546, dated June 2010, under the NEMA, 1998	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To regulate and control the authorisation of certain listed activities.
Dipaleseng Local Municipality – Environmental Management Framework	Dipaleseng Local Municipality	To facilitate appropriate and sustainable development in the



5. ENVIRONMENTAL MANAGEMENT PROGRAMME

Refer to the tables below for the EMP. Responsibility is assigned to the relevant parties, keeping in mind Topigs SA (Pty) Ltd are ultimately still responsible for ensuring implementation of the EMP. The EMP must be updated should any significant changes occur to the operations with regards to the Topigs SA Merino Piggery.

Note: Mitigation measures, as contained in the tables below, have taken the various alternatives into consideration.

5.1 SPECIFIC TRIGGERED LISTED ACTIVITY

5.1.1 Planning and Design Phase

Table 3: EMP – Planning and Design Phase)

Activity:					
<ul style="list-style-type: none"> Design and planning of the proposed piggery. Design and planning of the wastewater management system. 					
Aspect:					
<ul style="list-style-type: none"> Inadequate planning and design of the piggery. Inadequate design and planning of the wastewater management system. 					
Nature and significance of environmental impact					
Project Phase Applicability: Design and Planning					
Impact Description	Environmental Objective	Management / Mitigation / Monitoring Measures	Monitoring compliance and reporting	Timeframes	Responsible Party
Harm to moist grassland and watercourses due to inadequate planning and design.	To prevent harm to moist grassland and watercourses through effective and thorough planning and design, taking the environment into consideration.	<ul style="list-style-type: none"> Development planning, including stormwater and wastewater management, must ensure that the construction and operation of the piggery will not impact on the moist grassland or watercourses. Project engineers should compile a method statement, outlining the construction methodologies. Mitigation measures should be included in this method statement that must be approved by the ECO and be available on site. 	Topigs SA must verify implementation of the mitigation measures proposed in this EMP.	During the Planning of the Merino piggery.	<ul style="list-style-type: none"> Facility manager. Designing engineer.
Soil, surface water and groundwater pollution from the ineffective containment of the piggery wastewater and the irresponsible application of wastewater sludge to land.	To ensure effective design of the wastewater management system, so that no environmental harm results when the system becomes operational.	<ul style="list-style-type: none"> The wastewater management system should be properly designed and installed to that the piggery waste is effectively removed from the houses. Plastic lined holding dams/lagoon for wastewater (liquid fraction) should be designed to contain the maximum amount of wastewater that could be stored at any given time. Any eventualities resulting in land application not being possible should be taken into account when designing the storage facilities. The holding dam/lagoon must be lined with a 1.5mm HDPE liner or impermeable concrete floor. The wastewater management system must be positioned so that it is not subject to flooding and must be situated above the 1:100 year floodline. Overflow of the wastewater management system must be prevented. Ensure sufficient freeboard to guarantee facility integrity during heavy rainfall events. The solid fraction of the wastewater must be stored on an impermeable surface that is properly drained, with drains leading back to the separator. 	Topigs SA must verify implementation of the mitigation measures proposed in this EMP.	During the design and planning of the wastewater management system.	<ul style="list-style-type: none"> Facility manager. Designing engineer.



		<ul style="list-style-type: none"> • Determining the amount of land required for the effective and responsible application of the wastewater sludge must take the following into consideration: <ul style="list-style-type: none"> ▪ Susceptibility to waterlogging, erosion and surface water runoff; ▪ Climatic conditions (evapotranspiration, wind speed and rainfall); ▪ The potential effect on surface and groundwater resources; ▪ The nature of the crop or pasture to be irrigated; ▪ Agricultural practices on the farm; ▪ Soil properties, such as infiltration rate; ▪ The quantity and quality of the wastewater; ▪ Trace element loading (Cu, Zn and Cd); and ▪ The maximum operational life of the application sites in terms of phosphorous sorption capacity and predicted salt accumulation (ARMCANZ/ANZECC, 1999). • It must be ensured that the soils where the wastewater will be irrigated have the following characteristics, or as many of them as possible: <ul style="list-style-type: none"> ▪ A structure that permits water penetration and air movement; ▪ Adequate drainage; ▪ Sufficient depth for crop root development; ▪ Sufficient capacity to hold water for plant use between irrigations; ▪ A moderate pH; ▪ Nutrients in sufficient quantities to promote plant growth; and ▪ Ease of cultivation. ▪ Suitable soils are generally deep, well drained, well-structured soils with loam to clay loam textures (ARMCANZ/ANZECC, 1999). • Land application rates must take into consideration the following: <ul style="list-style-type: none"> ▪ Wastewater salinity; ▪ Wastewater nutrient content; ▪ Wastewater pH; ▪ Wastewater BOD; ▪ Hydraulic loading; ▪ Salt loading; and ▪ Nutrient loading (P, N and K) (ARMCANZ/ANZECC, 1999). • Land application of wastewater should not occur on land which is: <ul style="list-style-type: none"> ▪ Waterlogged or saline; ▪ Subject to flooding; ▪ Sloping with inadequate groundcover; ▪ A highly impermeable soil type; and ▪ Rocky or highly erodible (ARMCANZ/ANZECC, 1999). • The following groundwater factors must be considered when designing the wastewater irrigation system: <ul style="list-style-type: none"> ▪ Groundwater quality; ▪ Depth to the groundwater; and ▪ The current and potential future uses of the groundwater (ARMCANZ/ANZECC, 1999). • The following surface water factors must be considered when designing the wastewater irrigation system: <ul style="list-style-type: none"> ▪ The distance to watercourses; and ▪ Hydrological features such as drainage patterns and catchment areas (ARMCANZ/ANZECC, 1999). 			
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5.1.2 Environment in General

Table 4: EMP- Environment in General

Activity:					
<ul style="list-style-type: none"> Construction activities for the establishment of a new piggery. Operational activities at the piggery. 					
Aspect:					
<ul style="list-style-type: none"> Lack of knowledge amongst workers and contractors in terms of the impact their actions may have on the environment. 					
Nature and significance of environmental impact					
Project Phase Applicability	Construction	X			
	Operation	X			
	Decommissioning				
Impact Description	Environmental Objective	Management / Mitigation / Monitoring Measures	Monitoring compliance and reporting	Timeframes	Responsible Party
Harm to the environment in general (including pollution of soil and water resources, as well as harm to employees).	To prevent harm to the environment due to lack of knowledge.	<ul style="list-style-type: none"> Compliance to the Environmental Authorisation and Environmental Management Programme must form part of agreements with all construction or operational phase contractors. The contractor is to ensure that all employees, including sub-contractors and their employees, attend onsite Environmental Awareness Training prior to commencing work onsite. Follow-up Environmental Awareness Training may be required from time to time as new subcontractors, crews or employees commence work or for specific activities that may potentially impact upon the environment. The contractor and facility manager is to maintain accurate records of any training undertaken. The ECO shall monitor the contractor's compliance with the requirement to provide sufficient environmental awareness training to all site staff. All construction workers shall be issued with ID badges and clearly identifiable uniforms. Training is to cover all aspects of the EMP and procedures to be followed. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	During the construction and operational phases.	<ul style="list-style-type: none"> Construction contractor Facility Manager ECO

5.1.3 Geology and Soil

Table 5: EMP- Geology and Soil

Activity:					
<ul style="list-style-type: none"> Construction and operation of the new piggery. Stockpiling of topsoil and cleared vegetation. Site clearance. Replacement of topsoil and re-vegetation. Vegetation establishment as part of the rehabilitation. 					
Aspect:					
<ul style="list-style-type: none"> Soil erosion. Topsoil being exposed to the elements. 					



- Prolonged exposure of cleared areas.
- Poor topsoil replacement and establishment of vegetation.
- Unsatisfactory establishment of vegetation.

Nature and significance of environmental impact

Project Phase Applicability	Construction	X
	Operation	X
	Decommissioning	

Impact Description	Environmental Objective	Management / Mitigation / Monitoring Measures	Monitoring compliance and reporting	Timeframes	Responsible Party
Exposure of soil to erosion. Erosion can lead to destruction of natural habitats and sedimentation of the proximate watercourses.	To prevent soil erosion and subsequent sedimentation of proximate watercourses.	<ul style="list-style-type: none"> • The contractor is to ensure that all reasonable measures are taken to limit erosion during the construction phase. • All areas susceptible to erosion should be protected. Erosion protection measures include sand bags, cut-off drains and/or berms. • Do not allow erosion to develop to a large scale before taking action. • Existing roads and tracks should be used as far as possible. • Retain vegetation and soil in position as long as possible. It should only be removed immediately ahead of construction (DWAF, 2005). • Remove only the vegetation essential for construction. No disturbance of adjoining vegetation should be allowed. • Colonisation of the disturbed areas should be monitored to ensure that vegetation cover is sufficient within one growing season. If not, the area has to be rehabilitated. • Stormwater Management Measures should be implemented. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> • ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> • Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	During the construction phase.	<ul style="list-style-type: none"> • Construction contractor • Facility Manager • ECO
Degradation and loss of valuable resource (topsoil) due to exposure of topsoil to the elements.	To reduce the duration and extent of exposure of topsoil in order to preserve and protect it as a resource.	<ul style="list-style-type: none"> • Topsoil is to be stockpiled in discrete areas and retained for future landscaping. • Any sub-soil or rocks removed should also be stockpiled separately and be used during rehabilitation. • The length and steepness of the slopes should be minimised. • If sterilisation of the topsoil has occurred during stockpiling, inorganic fertilisers can be used to supplement the soils before seeding of the areas takes place. • Replace topsoil concurrent with construction, whenever possible. • Cordon off areas under rehabilitation using danger tape or similar demarcation to prevent vehicular, pedestrian and livestock access. • Aim to replace topsoil to its original depth. • If there is not enough topsoil available from a particular soil zone, topsoil of a similar quality may be used to replace it. The suitability of substitute topsoil should be determined by a soil analysis and approved by the ECO. • Compacted soil should be ripped to ensure effective re-vegetation. • Work necessary additives, as indicated by the soil analysis, into the soil. • Re-vegetation by indigenous grass species. • If areas show no specific vegetation growth within three months, the areas shall receive additional topsoil, ripped to a depth of 100mm and re-planted. • Soil stabilising measures could include rotovating in straw bales (at a rate of 1 bale/20m²), applying mulching or brush packing, or creating windbreaks using brush or bales. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> • ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> • Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	During the construction and operational phases.	<ul style="list-style-type: none"> • Construction contractor • Facility Manager • ECO



		<ul style="list-style-type: none"> The site must have an adequate and effective stormwater management system in place. Stormwater measures should be inspected on a regular basis in order to ensure that the structures are functional and not causing soil erosion. Where necessary, place culverts underneath road foundations. 			
Vegetation establishment, as part of the rehabilitation of cleared areas and the construction site, may not be effective and this may lead to erosion of bare areas.	To prevent erosion of bare areas by ensuring vegetation establishment.	<ul style="list-style-type: none"> Re-vegetated areas should be continuously monitored to verify whether the vegetation is growing and covering bare areas. If areas show no specific vegetation growth within three months, areas must receive additional topsoil, ripped to a depth of 100mm and re-planted. Fertilisers can also be used to promote growth of vegetation. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	During the operational phase.	<ul style="list-style-type: none"> Facility Manager ECO

5.1.4 Atmosphere and Noise

Table 6: EMP- Atmosphere and Noise

Activity:						
<ul style="list-style-type: none"> Construction activities of the piggery Excavation activities, loading and offloading activities and vehicles travelling to and from the site. Increased traffic to and from the site. Operational activities on the piggery Waste management on site 						
Aspect:						
<ul style="list-style-type: none"> Release of emissions and odours from the piggery, mortalities and wastewater management system, and subsequent nuisance. Dust generation Generation of noise and nuisance 						
Nature and significance of environmental impact						
Project Phase Applicability	Construction	X				
	Operation	X				
	Decommissioning					
Impact Description	Environmental Objective	Management / Mitigation / Monitoring Measures		Monitoring compliance and reporting	Timeframes	Responsible Party
Degradation of ambient air quality and nuisance due to odour generation from the piggery, ammonia emissions, its wastewater management practices and mortality management. The generation of odours depends on the design of the piggery, the wastewater collection and disposal system as well as how the piggery is managed. The impact of any odours that are generated depends upon the topography and climate of the site	To minimise atmospheric emissions, odour generation and the subsequent nuisance it causes.	<ul style="list-style-type: none"> Ventilation points on the piggery houses must be as high as possible so that the exiting gases enter the air column as high as possible. Covering the wastewater collection pond/lagoon can reduce odorous emissions. The released gas can also be captured as part of a bio-gas plant. Spillages must be prevented. Effective housekeeping and best management practices must be implemented. Houses should be cleaned and maintained on a regular basis. Drains and treatment systems should be well maintained. 		<p>Construction Phase:</p> <ul style="list-style-type: none"> ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> Regular site inspections. 	During the construction and operational phases.	<ul style="list-style-type: none"> Construction contractor Facility Manager ECO



<p>(www.daf.qld.gov.au/environment/intensive-livestock/piggeries/managing-environmental-impacts/odour).</p> <p>The main sources of odours at intensive piggery operations include the following:</p> <ul style="list-style-type: none"> • Poorly maintained pig houses; • Inadequate housekeeping; and • Inadequate or poorly maintained wastewater treatment systems, storage of wastewater and land application of wastewater and solids (ARMCANZ/ANZECC, 1999). <p>Odours are also generated from the decomposition of manure and waste food at the piggery (www.daf.qld.gov.au/environment/intensive-livestock/piggeries/managing-environmental-impacts/odour).</p> <p>The main constituents of piggery wastewater that need to be considered from an environmental protection perspective include potassium, dissolved solids, sodium, ammoniacal compounds, organic matter, phosphorous and nitrogen from urine and faeces. The wastewater generally has elevated levels of volatile organic solids, nutrients and possibly salts and can also contain disinfectants used to wash the houses, veterinary chemicals and metals such as copper and zinc. The organic components are readily biodegradable (ARMCANZ/ANZECC, 1999). Toxic compounds in the wastewater sludge, such as heavy metals and pathogens, can, however, also be detrimental to the environment.</p> <p>The proposed management of the piggery wastewater will include a deep pit flush system as described under Section 1.5 of this report. Should any pipes within the system burst, the wastewater will enter into the main channel and from there into the collection sump. The entire system is a closed system and no wastewater can be released into the environment.</p> <p>The introduction of a separator stage will have the following benefits:</p> <ul style="list-style-type: none"> • The N utilisation (% of total N) by crops of the liquid fraction is higher compared to application of raw, unseparated pig slurry (Birkmose, 2009). More of the liquid fraction is therefore considered to enter the soil, resulting in the generation of less odours following land application. • The storage of the separated liquid fraction in dams/lagoons should also have a lower potential to produce persistent odours as the solid fraction has been removed. Also, as the liquid fraction should contain no solids/fibres, less crust should form in the dams/lagoons. Crust formation 		<ul style="list-style-type: none"> • Disposal of wastewater should be done in accordance with DWS and WRC guidelines. • Disposal of the liquid fraction on agricultural land should be avoided in adverse weather conditions (windy days). • Low trajectory slurry application techniques, where the slurry is directed towards the soil, should be used. • Wind rows for drying the solid fraction should be located as far as possible from sensitive receptors. • Disposal of wastewater on agricultural land should be avoided on weekends and public holidays, as far as possible. • The following buffer zone is required to protect the public from possible vectors and odours: <ul style="list-style-type: none"> ▪ Application to land: >500m away from dwellings. • The production of biogas from the wastewater slurry and its use in generating heat and/or electricity can reduce the greenhouse gas emissions per kg pig raised at the piggery (www.thepigsite.com/swinenews/18012/environmental-impact-assessment-in-pig-production/). • Ensure adequate ventilation of houses. • Keep wastewater drains clean. • Avoid ponding and irrigation with wastewater slurry during wet conditions. • Avoid excessive build-up of manure within the houses and below the floor area. • Regularly flush wastewater from the houses. • Plant trees around the piggery to act as buffers (www.daf.qld.gov.au/environment/intensive-livestock/piggeries/managing-environmental-impacts/odour). • A biodigester is proposed for the disposal of mortalities on the farm. Alternatively a mortality/compost pit can also be used. • Mortalities must be stored in enclosed areas prior to being taken to the biodigester or mortality/compost pit. • The biodigester or mortality/compost pit must be adequately designed and regularly maintained. • It must be ensured that the capacity of the biodigester or mortality/compost pit is not exceeded. • The biodigester or mortality/compost pit must be well managed and monitored. • The biodigester or mortality/compost pit must be located away from sensitive environmental receptors, including wetlands, rivers, streams and drainage lines. • The design of the mortality/compost pit must ensure that water does not enter upstream of the pit. This can be achieved by locating the pit at or near the crest of a hill. • The addition of Carbon to the mortality/compost pit is necessary to ensure that the required Carbon-Nitrogen ratio is present, allowing for optimal composting. Sawdust is the preferable source of Carbon. Straw can also be used. • The composting process will be more efficient if the correct ingredients are placed in composting “bins” in the correct proportions, allowed to compost for a period of time (a minimum of three months from when the last mortality is placed in the bin) and then moved to a second bin for a secondary composting phase of at least three months. The composting bins can be constructed using large round or square bales of hay. The bales are placed end-to-end to create three-sided enclosures (bins). Two 	<p>Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.</p>		
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<p>contributes to anaerobic conditions and further putrefaction of the liquid and greater odour problems. Soil infiltration following land application is also facilitated, thereby reducing ammonia losses due to volatilisation.</p> <p>The application of the sludge to land is a recognised practice for piggeries across the world. Its application must, however, be controlled and managed effectively to prevent negative effects on environmental resources.</p>		<p>adjacent bins are required as a minimum. The bins must be constructed on top of a layer of at least 300mm of sawdust.</p> <ul style="list-style-type: none"> • Each mortality must be placed in the pit and covered with at least 300mm of sawdust or straw. • Mortalities must be inspected daily and re-covered where necessary. • Any runoff from the pits should be contained and taken to the wastewater management system (www.daf.qld.gov.au/environment/intensive-livestock/piggeries/managing-environmental-impacts/pig-carcass-composting). • Inform neighbours in advance of any maintenance activities that may lead to odour nuisance. • The biodigester or mortality/compost pit must be monitored for abnormal fly populations and odours. • A complaints register should be kept onsite. The register must record the following: Date when complaint was received, name of person who reported the complaint, details of the complaint and when and how the concern was addressed. 			
<p>Degradation of ambient air quality due to dust and exhaust emissions generation.</p>	<p>To minimise the impact of construction activities, excavation activities, loading and offloading activities and increased traffic to and from the site on the ambient air quality.</p>	<ul style="list-style-type: none"> • A dust cart should be onsite to water down dusty roads. • Speed bumps and traffic signs should be erected to reduce speeding onsite. • A complaints register should be kept onsite. The register must record the following: Date when complaint was received, name of person who reported the complaint, details of the complaint and when and how the concern was addressed. • Open areas should be re-vegetated. If the soil is compacted, it should be ripped, and fertilised. • Regular maintenance of vehicles and equipment should be undertaken. Optimal engine combustion will allow for 'cleaner' exhaust emissions. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> • ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> • Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	<p>During the construction and operational phases.</p>	<ul style="list-style-type: none"> • Construction contractor • Facility Manager • ECO
<p>Noise According to Jorgensen & Johnson (1981), the noise levels created by general construction activities on a building site can reach levels of approximately 70 dB, caused by for instance heavy machinery. It can therefore be assumed that the proposed development will have a negative impact on the environmental noise of the area once construction starts.</p> <p>Sound is inversely proportional to the distance from the source and can get absorbed by buildings and vegetation barriers. Noise intensities (dB) will be at their highest on site and will decrease as one moves away from their sources.</p> <p>The noise decline curve gives an indication of how noise generated at the site will decrease with distance. It gives an indication of the distance that the sound would have travelled upon reaching a level of 60 dB, prescribed by the SABS as being the acceptable limit for environmental noise. According to noise decline curve, at a distance of 27 metres from the construction site, the generated noise would have decreased to a level of 60 dB and at a distance of 45 metres it would have decreased to approximately 55dB. It can therefore be said that</p>	<p>To minimise noise generation on the site.</p>	<ul style="list-style-type: none"> • Activities that will generate the most noise should be scheduled during times of the day that will result in least disturbance to neighbours. • Site workers and contractors will adhere to the requirements of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) regarding hearing protection and noise control measures. • Regular maintenance of vehicles, equipment and fans should be done. • Conveyors/augers should not be run when empty. • Working hours should be restricted to daylight hours. • No sound amplification equipment such as sirens, loud halers or hooters are to be used on site except in emergencies. • No amplified music is permitted on site. • If work is to be undertaken outside normal work hours, permission must be obtained from the ECO and the facility manager. • No noisy work is to be conducted over the weekends or on public holidays. • Unnecessary disturbance of the pigs should be avoided. This will ensure that the pigs are not excessively noisy. • Vehicles travelling to and from the site during night time hours must be kept to a minimum. • A complaints register should be kept onsite. The register must record the following: Date when complaint was received, name of person who reported the complaint, details of the complaint and when and how the concern was addressed. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> • ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> • Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	<p>During the construction and operational phases.</p>	<ul style="list-style-type: none"> • Construction contractor • Facility Manager • ECO



<p>noise travelling further than 45 metres will have a low impact on neighbouring farms and residential areas.</p> <p>The distance to sensitive noise receptors (residences) is more than 45 metres in all cases.</p> <p>During the operational phase, noise will be generated by the ventilation equipment, transport vehicles and the pigs themselves. Noise levels at the piggery should not exceed 55dB during daytime hours and 45dB during night time hours. Increased noise levels during the operational phase can be caused by the animals, when they are unsettled, disturbed or excited. For example, pigs that are fed at designated times during the day become excited when the feed cart approaches. At the proposed piggery, the pigs will have permanent access to feed and will therefore not routinely become excited during the day. The piggery houses will be solidly constructed and will largely contain noise generated by the pigs.</p>					
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5.1.5 Soil, surface water, stormwater and groundwater

Table 7: EMP - Soil, surface water, stormwater and groundwater

<p>Activity:</p> <ul style="list-style-type: none"> • The handling, storage, mixing and disposal of cement and concrete. • The cleaning of equipment and construction areas. • Handling, storage and disposal of general, domestic and hazardous waste. • Installation and use of ablution facilities. • Storage and handling of hazardous chemical substances including fuel, greases and oils. • Vehicle and equipment maintenance and fuelling. • Construction and operation of the piggery, its wastewater management system and mortality management system. • Stormwater runoff on site. • Management of the solid wastewater fraction. 			
<p>Aspect:</p> <ul style="list-style-type: none"> • Concrete and cement spillage. • Generation and runoff of contaminated wash water. • Poor waste management. • Unsanitary conditions on site. • Poor management and spills of hazardous chemical substances including fuel, greases and oils. • Leaking and/or spilling of fuels, greases and oils. • Inadequate construction and management of the piggery, its wastewater management system and mortality management system. • Contamination of clean runoff water. • Poor containment and management of the solid wastewater fraction. 			
<p>Nature and significance of environmental impact</p>			
<p>Project Phase Applicability</p>	<p>Construction</p>	<p>X</p>	
	<p>Operation</p>	<p>X</p>	
	<p>Decommissioning</p>		



Impact Description	Environmental Objective	Management / Mitigation / Monitoring Measures	Monitoring compliance and reporting	Timeframes	Responsible Party
Soil and surface water pollution as a result of spillage, improper handling, storage, mixing or disposal of cement and concrete.	To prevent pollution of soil and surface water.	<ul style="list-style-type: none"> • Cement may only be mixed on an impermeable surface (not bare soil). • Dry cement must be removed from the soil surface to prevent an impermeable layer forming on top of the soil. The cement must be disposed of with building rubble. • Ready-mix trucks are not permitted to clean chutes onsite. Cleaning into foundations or a dedicated cleaning pit is permitted. • Bricklayers and plasterers are to minimise any cement spill or runoff in their work area. They also have to ensure that the work area is cleaned of all cement spillage at the end of each workday. • Both used and unused cement bags are to be stored in weatherproof containers so as not to be affected by rain or runoff. • Soil contaminated by cement or concrete, including residue produced by the washing of cavities, are to be removed immediately after the spillage has occurred and disposed of appropriately. • Measures must be taken to prevent dirty water (wash water) from contaminating a watercourse. Water has to be contained by excavations or berms. • Should a concrete batching plant be required, the following measures should be implemented: <ul style="list-style-type: none"> ▪ Concrete may only be mixed in designated and demarcated areas. ▪ The batching plant must be erected on a compacted earth platform. ▪ The batching plant must be sited within a bund wall. ▪ Stormwater must be diverted around the batching plant. ▪ Any concrete spillages must be removed by the contractor and disposed of at a licensed disposal site. ▪ After use, all waste remaining at the batching plant must be removed and disposed of at a licensed disposal site. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> • ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> • Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	During the construction phase.	<ul style="list-style-type: none"> • Construction contractor • Facility Manager • ECO
Soil and surface water pollution through contaminated wash water.	To prevent soil and surface water pollution.	<ul style="list-style-type: none"> • No vehicles are permitted to be washed on site. • A dedicated, temporary cleaning area (such as a plastic lined pit, plastic or metal drums located close to a water point) is to be identified to facilitate washing of cement and painting equipment. • No wastewater/wash water may be disposed of on site, onto the soil or into any water body. • Runoff from the washing activities is to be contained against the building by excavations or berms around the foundations. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> • ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> • Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	During the construction and operational phases.	<ul style="list-style-type: none"> • Construction contractor • Facility Manager • ECO
Soil, surface water and groundwater pollution due to poor waste management (including biological waste generated on site).	To prevent soil, surface water and groundwater pollution.	<ul style="list-style-type: none"> • Building waste must be disposed of at a landfill site. • Sufficient waste bins, skips or bulk containers should be installed. Containers must be available on site at all times. • All containers (bins, skips and bulk containers) must be kept clean and hygienic. • Containers (bins, skips and bulk containers) utilised for the disposal of general and hazardous waste must be demarcated accordingly. • Waste material may only be temporarily stored in areas demarcated for such storage. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> • ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> • Regular site inspections. 	During the construction and operational phases.	<ul style="list-style-type: none"> • Construction contractor • Facility Manager • ECO



		<ul style="list-style-type: none"> • General waste must be stored in a manner that prevents the harbouring of pests. • General waste should always be stored or disposed of separately from hazardous waste. • Skips or bulk containers should be removed to a licensed landfill site on a weekly basis or more often if required. No build-up of waste is permitted onsite. • A waste management plan should be implemented. The waste management plan should consider the type of waste, description, source, storage, disposal method, disposal facility and responsible person. • No incineration of any kind of waste will be permitted onsite. • The facility should be fenced off in order to ensure high health herd status. • Strict biosecurity measure should be employed. Such measures include: <ul style="list-style-type: none"> ▪ Limit nonessential access and traffic to the farm. ▪ Clean and disinfect livestock and feed haulers. ▪ Keep a record of all visitors and deliveries. ▪ Have one combined entrance and exit. ▪ Provide disinfectant and appropriate footwear. ▪ Implement policies with regards to visiting livestock facilities. ▪ Take precaution when buying livestock, feed and equipment. ▪ Prevent contact between healthy and sick animals. ▪ Implement pest control measures. ▪ Prevent contact between livestock and waste generated on the site. • The piggery should consist of platforms in which specific categories of pigs are housed. • Animal housing should have slatted floors that capture waste in a sealed slurry store facility of 50 – 60cm deep with a storage capacity of at least 28 days. • All slurry receiving and conducting canals should be concrete canals with flow regulators. • The concrete slurry collection pit to which slurry is fed should have an additional 10 days collection capacity. • The liquid fraction that will be applied to agricultural land should be handled in accordance with DWS and WRC recommended guidelines. 	<p>Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.</p>		
<p>Soil, surface water and groundwater pollution due to unsanitary conditions onsite.</p>	<p>To prevent soil, surface water and groundwater pollution.</p>	<ul style="list-style-type: none"> • Sufficient ablution facilities shall be provided – minimum of 1 toilet per 15 workers. • Ablution facilities must be on impermeable surfaces and at least 50m from wetlands, drainage lines or places where stormwater may accumulate. • The location of the ablution facilities is to be approved by the ECO prior to site establishment, but shall be located within 100m of any work point. • Ablating anywhere other than in the toilets shall not be allowed. • Ablution facilities are to be secured. • The contractor shall ensure that no chemicals and/or waste from the ablution facilities are spilled on the ground at any time. • Ablution facilities are to be serviced weekly or more frequently if required. • Contents are to be removed from site on a regular basis. • Ablution facilities should be inspected and maintained to prevent and minimise blockage and leakages. • Toilets should have properly closing doors and be supplied with toilet paper. • Awareness of the importance of proper hygiene should be created among employees. • The septic tank should be cleaned and de-sludged at least once a year. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> • ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> • Regular site inspections. <p>Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.</p>	<p>During the construction and operational phases.</p>	<ul style="list-style-type: none"> • Construction contractor • Facility Manager • ECO



<p>Soil, surface water and groundwater pollution due to poor management and accidental spills of hazardous chemical substances including fuel, greases and oils used onsite.</p> <p>A diesel tank will be installed on site to provide diesel to the backup generator and the heaters within the houses.</p>	<p>To prevent soil, surface water and groundwater pollution by hazardous chemical substances.</p>	<ul style="list-style-type: none"> • Identify all hazardous chemical substances used onsite including fuel, greases and oils. • Obtain the material safety data sheet of each of the hazardous chemical substances. • Ensure that the material safety data sheets have sufficient information to enable the user to take the necessary measures to protect his/her health and safety and that of the environment. • Material Safety Data Sheets for all hazardous chemical substances must be readily available on site. • Keep a stock inventory register of all chemicals in the store. • Powders must be stored above liquids. • Proper storage of chemicals in a lockable, well ventilated building. • Use chemicals with low toxicity and low water contamination potential, as far as possible. • Ensure adequate access control for the storage area. • Storage areas for hazardous chemicals are to comply with standard fire safety regulations. • Safety signage including “No Smoking”, “No Naked Lights” and “Danger”, and product identification signs, are to be clearly displayed in areas housing chemicals. • Appropriate equipment to deal with emergency spill incidents is to be readily available on site. This includes fire extinguishers, spill kits for hydrocarbon spills, drip trays for equipment and/or machinery leaks, drums or containers for contaminated water. • Chemicals are to be properly labelled and handled in a safety conscious manner. • All personnel handling hazardous chemicals and hazardous materials are to be issued with the appropriate Personal Protective Equipment (PPE). • Ensure that diesel/fuel tanks are in a bunded area with capacity of holding 110% of the total storage volume. • The removal of only the daily-required amount of chemicals to be used from the shed. • If refuelling on site or from drums, the ground must be protected and proper dispensing equipment is to be used i.e. hand pumps and funnels. Drums may not be tipped to dispense fuel. • Use of drip trays during filling of machinery or equipment. Drip trays should be emptied into secondary containers on a regular basis. • Ensure that any spilled chemical cannot exit the designated storage area by constructing a berm or bump at the exit, or store chemicals in a spill tray. • Immediately clean all spillage of fuels, lubricants and other petroleum based products. • The contaminated material must be disposed of in accordance with the waste management procedure. • No hazardous chemical must be discarded in the sewage or stormwater system. • Train staff on the use of chemicals in accordance with the risks as described in the material data sheets. • Soil contaminated with hazardous chemical substances shall be treated as hazardous waste and removed from site. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> • ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> • Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	<p>During the construction and operational phases.</p>	<ul style="list-style-type: none"> • Construction contractor • Facility Manager • ECO
<p>Hydrocarbon pollution of soil, surface water and groundwater due to spilling of fuel, grease or oil or leaking equipment and vehicles.</p>	<p>To prevent hydrocarbon pollution of soil, surface water and groundwater.</p>	<ul style="list-style-type: none"> • All equipment, generators, diesel tanks and vehicles are to be inspected and maintained on a regular basis. • Equipment and vehicles are to be repaired immediately upon developing leaks. • Drip trays shall be supplied for all repair work undertaken on machinery on site. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> • ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. 	<p>During the construction and operational phases.</p>	<ul style="list-style-type: none"> • Construction contractor • Facility Manager • ECO



		<ul style="list-style-type: none"> • Drip trays are to be utilised during greasing and re-fuelling of machinery and to contain incidental spills and pollutants. • Drip trays are to be inspected daily for leaks and effectiveness and emptied when necessary. This is to be closely monitored during rain events to prevent overflow. • Appropriate equipment to deal with emergency spill incidents is to be readily available on site. This includes fire extinguishers, spill kits for hydrocarbon spills, drip trays for equipment and/or machinery leaks and drums or containers for contaminated water. • Soil contaminated with hazardous substances, fuel or oil shall be treated as hazardous waste and removed from site. • If refuelling on site or from drums, the ground must be protected and proper dispensing equipment is to be used i.e. hand pumps and funnels. Drums may not be tipped to dispense fuel. • All liquid fuels (petrol and diesel) are to be stored in tanks or containers with lids. • Inspect vehicles on entering the facility to ensure vehicles are in sound condition to reduce the risk of oil or diesel spillages. • Diesel storage tanks and bund walls must undergo yearly integrity assessments. • Generators must be stored on concrete floors in bunded areas. 	<p>Operational Phase:</p> <ul style="list-style-type: none"> • Regular site inspections. <p>Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.</p>		
<p>Soil, surface water and groundwater pollution from the piggery, its wastewater management practices and mortality management.</p> <p>The main constituents of piggery wastewater that need to be considered from an environmental protection perspective include potassium, dissolved solids, sodium, ammoniacal compounds, organic matter, phosphorous and nitrogen from urine and faeces. The wastewater generally has elevated levels of volatile organic solids, nutrients and possibly salts and can also contain disinfectants used to wash the houses, veterinary chemicals and metals such as copper and zinc. The organic components are readily biodegradable (ARMCANZ/ANZECC, 1999). Toxic compounds in the wastewater sludge, such as heavy metals and pathogens, can, however, also be detrimental to the environment.</p> <p>The proposed management of the piggery wastewater will include a deep pit, flush system as described under Section 1.5 of this report. Should any pipes within the system burst, the wastewater will enter into the main channel and from there into the collection sump. The entire system is a closed system and no wastewater can be released into the environment.</p> <p>The introduction of a separator stage will have the following benefits:</p> <ul style="list-style-type: none"> • The N utilisation (% of total N) by crops of the liquid fraction is higher compared to application of raw pig slurry (Birkmose, 2009). More of the liquid fraction is therefore considered to enter the soil, resulting in the generation of less odours following land application. 	<p>To ensure responsible management of the piggery wastewater and to prevent the pollution of soil, surface water and groundwater.</p>	<ul style="list-style-type: none"> • The wastewater sludge must be classified in terms of the South African Wastewater Sludge Classification System. • The Pollutant, Microbial and Stability Classes of the wastewater sludge must be established. • The wastewater management system must regularly be maintained and inspected to ensure that it is in working condition. This will prevent the development of leaks. • All land application of wastewater must be in accordance with the DWA and WRC Guidelines for the Utilisation and Disposal of Wastewater Sludge (WRC TT 262/06). • Application of wastewater may only be during conditions that will minimise surface run-off, surface ponding and groundwater contamination (ARMCANZ/ANZECC, 1999). • The restrictions (wetland buffer zones) and soil quality monitoring requirements regarding land application of wastewater, as stipulated in the DWA and WRC Guidelines for the Utilisation and Disposal of Wastewater Sludge (WRC TT 262/06) must be adhered to. • Sludge may only be stored in suitable facilities that are designed to ensure minimal impact on the environment. • The sludge should be applied as soon as possible. • Action must be taken to reduce odours and vector attraction. • Storage ponds must be desludged once the sludge takes up one third of the total volume (or half of the depth) of the pond (ARMCANZ/ANZECC, 1999). • The application rate must not exceed plant nutrient requirements (agronomic rates) and should be less than 10 tons dry mass/ha/year (WRC TT 262/06). • The nutrient content of the wastewater sludge must be confirmed before each major planting season by determining the phosphorous, nitrogen and potassium concentration on at least four composite samples. • Slope and land preparation must not result in soil erosion or potential surface runoff. • The following buffer zones are required to protect groundwater and surface water from pollution: <ul style="list-style-type: none"> ▪ Depth to aquifer: >5m. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> • ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> • Regular site inspections. <p>Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.</p>	<p>During the operational phase.</p>	<ul style="list-style-type: none"> • Construction contractor • Facility Manager • ECO



<ul style="list-style-type: none"> The storage of the separated liquid fraction in dams/lagoons should also have a lower potential to produce persistent odours as the solid fraction has been removed. Also, as the liquid fraction should contain no solids/fibres, less crust should form in the dams/lagoons. Crust formation contributes to anaerobic conditions and further putrefaction of the liquid and greater odour problems. Soil infiltration following land application is also facilitated, thereby reducing ammonia losses due to volatilisation. <p>According to the Water Resources Commission (WRC) Guidelines for the utilisation and disposal of wastewater sludge, Volume 2, Requirements for the agricultural use of wastewater sludge, wastewater sludge, such as that from the proposed piggery, has beneficial fertilising and soil conditioning properties. A variety of elements in the sludge are essential for plant growth and it has been suggested that sludge is a more complete fertiliser than organic fertilisers. The major benefits of sludge application to land are:</p> <ul style="list-style-type: none"> A supply of plant nutrients, namely magnesium, calcium, potassium, nitrogen and phosphorous; A supply of micronutrients, namely copper, zinc, manganese and molybdenum; and An improvement in the soil's physical properties, including improved soil water transmission, increased water holding capacity and improved soil structure. <p>Sludge can be beneficially recycled to agricultural land provided that the processing and application of the sludge is effectively managed and controlled and that the application rate doesn't exceed the nitrogen needs of the crops (this would result in nutrient leaching). The agricultural use of sludge is viewed as a cost effective management option. The sludge increases the organic content of the soils, which is especially beneficial in South Africa where cultivated soils are low in organic matter due to its rapid decomposition in the SA climate. The use of wastewater sludge for fertiliser also results in savings on commercial, inorganic fertilisers (WRC, 2006).</p> <p>The application of the sludge to land is a recognised practice for piggeries across the world. Its application must, however, be controlled and managed effectively to prevent negative effects on environmental resources.</p>		<ul style="list-style-type: none"> Distance from surface water/borehole: >200m. Relaxation of buffer zones may only be applied for on condition that proof is provided that the water resource or odour control or vector attraction are adequately protected or implemented. Monitoring of the sludge and soil must be performed according to the WRC Guidelines for the Utilisation and Disposal of Wastewater Sludge (WRC TT 262/06). Record keeping must be in place for the aspects listed above, as well as application volumes and areas, as specified in the WRC Guidelines for the Utilisation and Disposal of Wastewater Sludge (WRC TT 262/06). Re-use of the liquid and solid fractions of the wastewater must take cognisance of the Precautionary Practices applicable. Spillages must be prevented. Low trajectory slurry application techniques, where the slurry is directed towards the soil, should be used. Avoid ponding and irrigation with wastewater slurry during wet conditions. Avoid excessive build-up of manure within the houses and below the floor area. Mortalities must be stored in enclosed areas prior to being taken to the biodigester or mortality/compost pit. The biodigester must be adequately designed and regularly maintained. It must be ensured that the capacity of the biodigester is not exceeded. The biodigester or mortality/compost pit must be well managed and monitored. The biodigester or mortality/compost pit must be located away from sensitive environmental receptors, including wetlands, rivers, streams and drainage lines. The design of the mortality/compost pit must ensure that water does not enter upstream of the pit. This can be achieved by locating the pit at or near the crest of a hill. The addition of Carbon to the mortality/compost pit is necessary to ensure that the required Carbon-Nitrogen ratio is present, allowing for optimal composting. Sawdust is the preferable source of Carbon. Straw can also be used. The composting process will be more efficient if the correct ingredients are placed in composting "bins" in the correct proportions, allowed to compost for a period of time (a minimum of three months from when the last mortality is placed in the bin) and then moved to a second bin for a secondary composting phase of at least three months. The composting bins can be constructed using large round or square bales of hay. The bales are placed end-to-end to create three-sided enclosures (bins). Two adjacent bins are required as a minimum. The bins must be constructed on top of a layer of at least 300mm of sawdust. Each mortality must be placed in the pit and covered with at least 300mm of sawdust or straw. Mortalities must be inspected daily and re-covered where necessary. Any runoff from the mortality/compost pit should be contained and taken to the wastewater management system (www.daf.qld.gov.au/environment/intensive-livestock/piggeries/managing-environmental-impacts/pig-carcass-composting). 			
<p>Soil, surface water and groundwater pollution due to the contamination of clean stormwater runoff.</p>	<p>To ensure effective management of stormwater and the prevention of contamination of stormwater runoff.</p>	<ul style="list-style-type: none"> It is the responsibility of the applicant to ensure that storm water control measures are designed and constructed to be capable of withstanding the maximum design flood. It should be taken into consideration that the potential for erosion increases where the 	<p>Construction Phase:</p> <ul style="list-style-type: none"> ECO to verify implementation of the mitigation measures proposed in this EMP. 	<p>During the operational phase.</p>	<ul style="list-style-type: none"> Site Manager



		<p>surface runoff is concentrated and must be addressed within the designs. Designs should incorporate gradual drainage to avoid siltation of storm water infrastructure.</p> <ul style="list-style-type: none"> The composting area must be bunded and a collection pit/sump must be installed to contain any runoff from the composting area. 	<p>ECO to submit monthly compliance reports to the competent authority.</p> <p>Operational Phase:</p> <ul style="list-style-type: none"> Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 		
<p>Soil, surface water and groundwater pollution due to the incorrect management of the solid fraction of wastewater on site. Nuisance due to management of the solid fraction.</p>	<p>To prevent soil, surface and groundwater pollution and nuisance as a result of poor management of the solid wastewater fraction.</p>	<ul style="list-style-type: none"> The solid fraction of the piggery wastewater may only be temporarily stored in designated areas, on impermeable surfaces. The temporary storage must occur in such a manner as to prevent the harbouring of pests. The composting process must occur on a bunded area of land that is impermeable. No wastewater from the composting area may be discharged or allowed to run into the environment or into any drainage lines or other water systems. A collection pit/sump must be installed to contain any runoff from the composting area. The captured water can be re-used to moisten the compost piles. Manage every active compost pile such that the initial carbon to nitrogen ratio is at least 25:1. The ideal C:N ratio is between 25:1 and 30:1. Any solid or liquid waste generated at the facility, including contaminated products and process residuals that cannot be processed at the facility must be stored in such a manner as to prevent water pollution and amenity impacts. The quantities of incoming and processed organics must not exceed the design requirements of the storage and processing areas. All organic compost intended for use as fertilisers must be registered with the DAFF and meet all the necessary requirements as per the Regulations Regarding Fertilisers (GNR 732 of 10 September 2012) issued in terms of the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947), including any other amended version(s) thereof. No incineration of any kind of waste will be permitted onsite. Implement a surface- and groundwater monitoring programme. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	<p>During the operational phase.</p>	<ul style="list-style-type: none"> Site Manager

5.1.6 Vegetation

Table 8: EMP - Vegetation

<p>Activity:</p> <ul style="list-style-type: none"> Construction of the proposed piggery. Operational activities of the piggery. 		
<p>Aspect:</p> <ul style="list-style-type: none"> Site clearance Establishment of the construction camp Storage of construction equipment and building material. Movement of construction, maintenance and delivery vehicles and machinery. 		
<p>Nature and significance of environmental impact</p>		
<p>Project Phase Applicability</p>	<p>Construction</p>	<p>X</p>
	<p>Operation</p>	<p>X</p>
	<p>Decommissioning</p>	



Impact Description	Environmental Objective	Management / Mitigation / Monitoring Measures	Monitoring compliance and reporting	Timeframes	Responsible Party
<p>Destruction of natural vegetation due to construction, access to the site and operational activities.</p>	<p>To minimise the destruction of natural vegetation.</p>	<ul style="list-style-type: none"> • Development should, as far as possible, occur on already transformed areas. • Development should occur as far as possible from moist grassland. • Before construction takes place the proposed development area will be pegged out and demarcated. Construction activities will be limited to these areas. • The construction camp should be restricted to already disturbed areas, such as where the existing worker’s housing will be demolished next to the access road into the farm. • All construction equipment and building material must be stored within the already disturbed area of the construction camp when not in use. • Vegetation should only be removed where absolutely necessary. • The development footprint should be kept to a minimum. • Existing access roads should be used as far as possible. New road should be planned within vegetation of low-medium sensitivity. • Access roads should not be wider than 3m in sensitive areas. Roads should include stormwater management to prevent water runoff from the roads impacting on the surrounding vegetation. • The construction site should be demarcated to prevent access to sensitive areas. The demarcation should be maintained for the duration of the construction phase. • An area/corridor of disturbance should be marked out by the ECO and construction contractor. No disturbance is permitted outside of this disturbance area/corridor. • Vehicle and pedestrian access to natural areas beyond the development footprint should be prohibited. • Trenching required for the installation of engineering services, such as water, sewerage and underground electricity lines, should be done by hand as far as possible to limit the impact of excavation equipment on site. • Excavated material may not be placed in the veld, outside of the disturbance area/corridor. The material must be placed within the development footprint, on road surfaces or within the future road surface area. • Trenches must only be as deep as necessary. • Trenches must be backfilled as soon as possible. • Open trenches must be demarcated with danger tape. • No open fires or harvesting of trees for firewood are permitted. • Enough fire extinguishers and hydrants must be placed on site. The hydrants must also have a high enough water pressure for use as fire extinguishers. • Site workers and contractors may not remove vegetation or collect seed form plants without permission from the local authority. • Overburden material must be stored in designated areas, within the disturbance zone, and re-used later for filling and/or sloping and landscaping. • Clay removed from foundations may not be discarded into the adjacent vegetation. • No edge effects from construction may be allowed into the adjacent <i>Themeda</i>-grassland and proximate moist grassland. • After construction, the land must be cleared of waste, surplus materials and equipment. Conditions should be left as close as possible to the conditions prior to construction. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> • ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> • Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	<p>During the construction and operational phases.</p>	<ul style="list-style-type: none"> • Construction contractor • Facility Manager • ECO



		<ul style="list-style-type: none"> • Soil stockpiles must be cleared of alien vegetation before being re-used/reintroduced. • Maintenance should take place according to a fixed plan. • Rehabilitating areas should be demarcated as no-go areas. • Maintenance work should be restricted to previously disturbed areas. • Natural fires should be allowed to burn across the vegetation, except if infrastructure and lives are threatened. • Firebreaks must be managed as stipulated in the National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998). • Re-introduction of livestock to all rehabilitation areas should be delayed until an acceptable level of re-vegetation has been reached. <p>Specific mitigation measures applicable to Site Alternative 4</p> <ul style="list-style-type: none"> • The construction on site alternative 4 must be discussed with the Mpumalanga Tourism and Parks Agency (MTPA). An offset can be considered to allow construction on site alternative 4. The offset will entail setting aside part of the property to be managed for conservation through the Mpumalanga Biodiversity Stewardship Programme. Through this programme, landowners become the stewards of biodiversity conservation, through formal declaration of the land as protected areas and by applying specific management measures that ensure that the land is well managed and that biodiversity persists. • The disturbance footprint must be kept as small as possible. As much use must be made of the trampled and grazed grassland to the east of site alternative 4. • The footprint of the development and related infrastructure must be walked by a vegetation specialist after good summer rains to ascertain whether any threatened plants may be present. 			
<p>Exposure of the soil to erosion and subsequent sedimentation of wetlands.</p> <p>Indigenous vegetation is not likely to colonise eroded soils successfully. This may cause spread of alien invasive species.</p>	<p>To prevent soil erosion, subsequent sedimentation of wetlands and the spread of alien invasive species.</p>	<ul style="list-style-type: none"> • Areas susceptible to erosion, such as stockpiles, should be protected. • Erosion should not be allowed to develop to a large scale before taking action. • The extent of wetland and riparian conditions should be verified by a wetland specialist. No activities should take place within the wetland zones onsite without a Water Use License. • Existing roads should be used. • Runoff from roads should be managed to avoid erosion. • Vegetation and soil should be retained in position for as long as possible (DWAF, 2005). • Remove only vegetation where essential for construction, taking precaution not to disturb adjoining natural vegetation. • Areas that were used for the stockpiling of soil must be ripped and re-vegetated as soon as the stockpiles have been removed. • Colonisation of disturbed areas by species from surrounding natural vegetation should be monitored to ensure that vegetation cover is sufficient within one growing season. If not, areas should be rehabilitated with species naturally occurring in the area. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> • ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> • Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	<p>During the construction and operational phases.</p>	<ul style="list-style-type: none"> • Construction contractor • Facility Manager • ECO



<p>Modification of habitats and destruction of vegetation due to soil compaction by the movement of heavy machinery. Soil compaction will also inhibit re-vegetation and increase runoff. This could result in erosion of proximate watercourses and moist grassland.</p>	<p>To minimise soil compaction and the subsequent modification and destruction of vegetation.</p>	<ul style="list-style-type: none"> • Vehicles should only make use of dedicated roads. • Once construction is complete, obsolete roads should be obliterated by breaking the surface crust and erecting earth embankments to prevent erosion. Natural species composition should also be re-established. • Independent Environmental Auditing should be conducted during the construction phase. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> • ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> • Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	<p>During the construction and operational phases.</p>	<ul style="list-style-type: none"> • Construction contractor • Facility Manager • ECO
<p>Possible destruction of plants of conservation concern</p>	<p>Protection of plants of conservation concern.</p>	<ul style="list-style-type: none"> • Construction activities should be restricted to already disturbed or transformed areas as far as possible. • Project engineers should compile a method statement, outlining the construction methodologies. Mitigation measures should be included in this method statement that must be approved by the ECO and be available on site. • Final development footprints must be investigated during the growing/flowering period of plant species of conservation concern to assess the presence of any such species. • If any plants of conservation concern are present within the development footprint, a Plant Rescue and Rehabilitation Plan should be implemented. Any such species that are under threat from construction activities should be removed by a suitably qualified specialist and relocated as part of vegetation rehabilitation. Any plants of conservation concern may only be removed with the permission of the provincial authority. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> • ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> • Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	<p>During the construction and operational phases.</p>	<ul style="list-style-type: none"> • Construction contractor • Facility Manager • ECO
<p>Spread of alien invasive species from current infestation to disturbed soils or by means of contaminated vehicles and tools</p>	<p>To prevent the spreading and increase of alien invasive vegetation.</p>	<ul style="list-style-type: none"> • Ensure that all alien invasive species are identified on site. • Alien invasive species identified on the site should be removed prior to construction. • All alien seedlings and saplings should be removed as they are identified during the construction and operation of the piggery. • Manual/mechanical removal should be used rather than chemical control. • All vehicles, equipment and material should be thoroughly cleaned prior to access on to the site in order to assure that all vehicles, equipment and material are free of soil and plant material. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> • ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> • Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	<p>During the construction and operational phases.</p>	<ul style="list-style-type: none"> • Construction contractor • Facility Manager • ECO



<p>Negative impacts on moist grassland and watercourse as well as loss of stabilising vegetation.</p> <p>Destruction of vegetation will impact on the hydrological function of the moist grassland and can cause edge effects in the moist grassland and vegetation.</p> <p>Polluted water and sediment reaching the moist grassland or watercourse will have detrimental effects on the vegetation and hydrology of the wetland system.</p>	<p>To minimise negative impacts on moist grassland and watercourses.</p>	<ul style="list-style-type: none"> • A wetland assessment should be undertaken to delineate the wetlands and watercourses in the area and recommend an appropriate, protective buffer zone. • Project engineers should compile a method statement, outlining the construction methodologies. Mitigation measures should be included in this method statement which must be approved by the ECO and be available on site. • Permeable paving should be used for the development in order to maintain catchment areas to the moist grassland. • Existing roads and tracks must be used. • Runoff from roads should be managed to avoid erosion and pollutions problems. • Vegetation should only be removed if it is essential for construction. No disturbance should be allowed to the adjoining vegetation. • Areas susceptible to erosion should be protected. Erosion control barriers should be placed and maintained to prevent sedimentation of watercourses and moist grasslands. • Polluted water should be prevented from reaching the watercourse and surrounding moist grassland. • An ecologically sound stormwater management plan must be implemented during construction. Stormwater management of the completed development must be adequate to prevent negative impacts on the moist grasslands and watercourses. • Stormwater should not be allowed to be canalised. • Contamination of rainwater should be prevented on the site. • Vehicles and equipment should only be washed in dedicated areas. Dirty water should not be discharged into the watercourse or surrounding vegetation. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> • ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> • Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	<p>During the construction and operational phases.</p>	<ul style="list-style-type: none"> • Construction contractor • Facility Manager • ECO
<p>Loss of ecological function of moist grassland and deterioration of watercourses.</p> <p>Loss of natural vegetation in and around the wetland (due to polluted water and sedimentation) could drastically reduce the wetland's water holding capacity and could subsequently lead to loss of ecological function of the vegetation as catchment to the watercourse.</p>	<p>To prevent loss of ecological function of moist grassland and watercourses.</p>	<ul style="list-style-type: none"> • A method to contain, divert and treat accidental release of effluent should be implemented. • Routes through drainage lines, moist grassland and watercourses should be avoided. Stormwater management should be implemented for the construction of the access roads. • Leaks should be repaired and issues of water wastage should be addressed as soon as identified. • Erosion control barriers should be placed and maintained to prevent sedimentation. • Vegetation disturbed during construction should be rehabilitated. Rehabilitation should be monitored for at least three years after construction has been completed. If rehabilitation failed, corrective action should be taken immediately. • Maintenance should be done according to a fixed plan. After maintenance, the area must be cleared of waste, surplus material and equipment. The area should be left in a condition as natural as possible. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> • ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> • Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	<p>During the construction and operational phases.</p>	<ul style="list-style-type: none"> • Construction contractor • Facility Manager • ECO

5.1.7 Fauna

Table 9: EMP - Fauna

<p>Activity:</p> <ul style="list-style-type: none"> • Construction and operation of the new piggery.
<p>Aspect:</p> <ul style="list-style-type: none"> • Movement of construction, maintenance and delivery vehicles. • Increased human activity on the site.
<p style="text-align: center;">Nature and significance of environmental impact</p>



Project Phase Applicability	Construction	X				
	Operation	X				
	Decommissioning					
Impact Description	Environmental Objective	Management / Mitigation / Monitoring Measures	Monitoring compliance and reporting	Timeframes	Responsible Party	
Destruction of natural habitat due to construction activities and consequential displacement of vertebrates.	To minimise the effect of construction activities on the natural habitat.	<ul style="list-style-type: none"> Construction activities should be restricted to the development footprint. The site should be cordoned off in order to restrict the movement of construction vehicles and personnel. Safety and warning signs should be erected along the construction site. No development should occur within any sensitive natural open spaces. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	During the construction phase.	<ul style="list-style-type: none"> Construction contractor Facility Manager ECO 	
Destruction of sensitive vertebrate habitat which can lead to the relocation of certain species.	To prevent the destruction of sensitive habitat.	<ul style="list-style-type: none"> No construction should be allowed within sensitive vegetation (wetlands). Sensitive vegetation should be cordoned off to prevent access. A monitoring programme should be implemented to assess the presence of faunal species within sensitive vegetation. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	During the construction and operational phases.	<ul style="list-style-type: none"> Construction contractor Facility Manager ECO 	
Loss of ecosystem function such as reduction in water quality, soil pollution and underground water contamination and the consequent negative impacts on vertebrate species richness and population numbers.	To prevent the loss of ecosystem function on the site.	<ul style="list-style-type: none"> Restrict construction activities to the development site. The site should be cordoned off in order to restrict the movement of construction vehicles and site workers and contractors. No development should occur within any sensitive natural open spaces. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	During the construction phase.	<ul style="list-style-type: none"> Construction contractor Facility Manager ECO 	



<p>Loss of ecological function of the wetland due to alteration of the landscape by the development. This may place faunal species under pressure.</p>	<p>To prevent loss of ecological function of the wetland.</p>	<ul style="list-style-type: none"> No development should take place near any wetland zones or drainage lines. Any spillages should be contained. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	<p>During the construction and operational phases.</p>	<ul style="list-style-type: none"> Construction contractor Facility Manager ECO
<p>Exposure of soil to erosion may lead to damage to the basal cover which may influence species richness and population numbers.</p>	<p>To minimise erosion and the subsequent impacts on faunal species in the area.</p>	<ul style="list-style-type: none"> A construction strategy should be implemented to ensure rehabilitation of the construction area immediately after construction has been completed. Bare soil should be protected from erosion. Stormwater Management Measures should be implemented. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	<p>During the construction phase.</p>	<ul style="list-style-type: none"> Construction contractor Facility Manager ECO
<p>Poaching of wildlife in the area of the development. Increased human activity in the area may lead to more animals being killed.</p>	<p>To prevent harm to animals.</p>	<ul style="list-style-type: none"> Education of site workers and contractors about the value of wildlife and environmental sensitivity. Access to suitable and sensitive habitats of faunal species should be restricted. Site workers and contractors should ensure that no animals are disturbed, trapped, hunted or killed during the construction phase. Conservation-orientated clauses should be included into contracts for construction personnel, complete with penalty clauses for non-compliance. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	<p>During the construction and operational phases.</p>	<ul style="list-style-type: none"> Construction contractor Facility Manager ECO
<p>Disturbance of faunal species due to light pollution.</p>	<p>To minimise the effect of light pollution on fauna.</p>	<ul style="list-style-type: none"> Outside lighting should be designed to minimise impacts on fauna. All outside lighting should be directed away from sensitive areas. Fluorescent and mercury vapour lighting should be avoided. Sodium vapour lights should rather be used as far as possible. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	<p>During the construction and operational phases.</p>	<ul style="list-style-type: none"> Construction contractor Facility Manager ECO
<p>Displacement of indigenous fauna species</p>	<p>To minimise the displacement of indigenous fauna species.</p>	<ul style="list-style-type: none"> The site is so small and treeless that no mitigation measures are required. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> ECO to verify implementation of the mitigation measures proposed in this EMP. 	<p>During the construction and operational phases.</p>	<ul style="list-style-type: none"> Construction contractor Facility Manager ECO



			<p>ECO to submit monthly compliance reports to the competent authority.</p> <p>Operational Phase:</p> <ul style="list-style-type: none"> Regular site inspections. <p>Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.</p>		
<p>Increased amounts of surface water runoff from hard surfaces can increase the chance of flash floods. This may cause fatalities of terrestrial vertebrates as refuges such as burrows are inundated.</p>	<p>To minimise the extent of hard surfaces and subsequently the probability of flash floods.</p>	<ul style="list-style-type: none"> Create open, natural space within the development and reduce the amount of hard paved surfaces. Implement an ecologically sound storm water management plan such as retention ponds and artificial water sponges (wetlands). 	<p>Construction Phase:</p> <ul style="list-style-type: none"> ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> Regular site inspections. <p>Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.</p>	<p>During the construction and operational phases.</p>	<ul style="list-style-type: none"> Construction contractor Facility Manager ECO
<p>Human activities could disturb fauna species that depend on the natural, sensitive vegetation present on site.</p>	<p>To minimise the disturbance of fauna species on site.</p>	<ul style="list-style-type: none"> A management plan should be implemented to prevent the workers from disturbing or harassing any animals. Implement a monitoring programme to regularly assess the presence of faunal species within the sensitive vegetation on site. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> Regular site inspections. <p>Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.</p>	<p>During the construction and operational phases.</p>	<ul style="list-style-type: none"> Construction contractor Facility Manager ECO
<p>Construction activities may impact upon the drainage and status of wetland areas and connectivity along the watercourses. This will in turn have a negative impact upon the vertebrate species richness.</p>	<p>To prevent negative impacts upon the vertebrate species richness on site.</p>	<ul style="list-style-type: none"> No development may occur within or close to any wetland zones or drainage lines. Any spillages during the construction phase must be contained so that it cannot impact on the wetlands on site. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> Regular site inspections. <p>Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.</p>	<p>During the construction phase.</p>	<ul style="list-style-type: none"> Construction contractor Facility Manager ECO



5.1.8 Heritage

Table 10: EMP - Heritage

Activity:					
<ul style="list-style-type: none"> Construction and operational activities of the new piggery. 					
Aspect:					
<ul style="list-style-type: none"> Disturbance of artefacts or sites of cultural heritage (archaeological and historical) significance. 					
Nature and significance of environmental impact					
Project Phase Applicability	Construction	X			
	Operation	X			
	Decommissioning				
Impact Description	Environmental Objective	Management / Mitigation / Monitoring Measures	Monitoring compliance and reporting	Timeframes	Responsible Party
<p>Construction activities may disturb or destroy sites, features or artefacts of archaeological and/or historical importance.</p> <p>The graves (not within the development footprint of any of the Site alternative) carry a high significance rating and are worthy of conservation.</p> <p>Archaeological Zone 1 will not be impacted by the proposed development. Archaeological Zone 2 will be impacted, by all of the Site alternatives (1, 2 and 4). Archaeological mitigation measures need to be implemented as construction on either of these sites will have an impact on a section of the Iron Age settlement features.</p> <p>From a heritage point of view, the development should be allowed to continue, taking the necessary mitigation measures into account.</p>	To protect artefacts or sites of cultural heritage (archaeological and historical) significance.	<ul style="list-style-type: none"> The grave site should be included in the heritage register and not be disturbed. The grave site should be fenced in to protect it. Access to the site for potential visitors (descendants/living relatives) should be provided. Workers should be informed of the importance of cultural and/or archaeological features. A Cultural Heritage Resources Management Plan should be compiled and implemented. Mitigation measures need to be implemented to allow construction of the piggery on either of Site alternatives 1, 2 or 4. This should include detailed mapping of all sites and features, as well as archaeological excavations in Archaeological Zone 2. A Destruction Permit must be obtained before the piggery can be constructed. Archaeological Zone 1 must be protected. If during any construction or operational activities, any site, features and objects of a cultural heritage (archaeological or historical) nature are exposed, an expert should be called in to investigate and suitable mitigation measures must be implemented. All activities in the area should be halted until the situation has been resolved. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	During the construction and operational phases.	<ul style="list-style-type: none"> Construction contractor Facility Manager ECO

5.1.9 Sensitive Landscapes – Wetlands

Table 11: EMP - Sensitive Landscapes - Wetlands

Activity:					
<ul style="list-style-type: none"> Construction activities for the establishment of new piggery. Operational activities of the piggery. Wastewater management at the piggery. 					
Aspect:					
<ul style="list-style-type: none"> Site clearance influencing wetland zones. Increased human activity in the vicinity of the wetland zones. Alteration of the landscape in the vicinity of the wetland zones. Inefficient management of piggery wastewater. 					
Nature and significance of environmental impact					



Project Phase Applicability	Construction	X				
	Operation	X				
	Decommissioning					
Impact Description	Environmental Objective	Management / Mitigation / Monitoring Measures	Monitoring compliance and reporting	Timeframes	Responsible Party	
Disturbance or degradation of the wetland due to site clearance, consequential sedimentation of the wetland, increased human activity, alternation of the landscape and the loss of natural vegetation.	To minimise the impact of the construction and operation of the proposed piggery on the wetlands on site.	<ul style="list-style-type: none"> • Construction should take place as far from the wetland as possible. • Before any construction takes place, the proposed area for construction will be pegged out. All construction activities will be limited within these areas in order to avoid impact on the wetland zones. • Site clearance is to be limited to only the area necessary for construction of the piggery. • The contractor is to draw up a plan for submission to the ECO and the facility manager indicating the locations of construction infrastructure including the site-camp, paint or cement cleaning pits, toilets, stores, stockpiles (topsoil and building rubble), site office and wetland zones. • No entry, stockpiling, dumping or storage of equipment is allowed within any of the wetland zones. • All construction activities are to be restricted within the site boundary and may not extend into any wetland zones. • Operational activities must occur outside of the wetland zones. No entry, stockpiling, dumping or storage of equipment or other material is allowed within any of the wetland zones. • A habitat assessment study must be conducted annually for a period of three years. • Existing roads and tracks should be used. • Maintenance should be done according to a fixed plan. After maintenance, the area must be cleared of waste, surplus material and equipment. The area should be left in a condition as natural as possible. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> • ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> • Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	During the construction and operational phases.	<ul style="list-style-type: none"> • Construction contractor • Facility Manager • ECO 	
Eutrophication of wetlands due to the potential release of piggery wastewater into the environment and the subsequent accumulation of nutrient rich material within the wetland zones.	To prevent the accumulation of nutrients within the wetland zones.	<ul style="list-style-type: none"> • The piggery wastewater management system must contain all wastewater (solid and liquid fractions) and must ensure that no wastewater is released or overflows into the environment, where it can end up in watercourses or wetland zones. • The wastewater management system must regularly be maintained and inspected to ensure that it is in working condition. This will prevent the development of leaks. • All land application of wastewater must be in accordance with the DWA and WRC Guidelines for the Utilisation and Disposal of Wastewater Sludge (WRC TT 262/06). • The restrictions (wetland buffer zones) and soil quality monitoring requirements regarding land application of wastewater, as stipulated in the DWA and WRC Guidelines for the Utilisation and Disposal of Wastewater Sludge (WRC TT 262/06) must be adhered to. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> • ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> • Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	During the construction and operational phases.	<ul style="list-style-type: none"> • Construction contractor • Facility Manager • ECO 	



5.1.10 Biosecurity

Table 12: EMP - Biosecurity

Nature and significance of environmental impact					
Project Phase Applicability	Construction				
	Operational	X			
	Decommissioning				
Impact Description	Environmental Objective	Management / Mitigation / Monitoring Measures	Monitoring compliance and reporting	Timeframes	Responsible Party
<p>Flies, mice and rats can carry infectious vectors that are detrimental to the health of pigs.</p> <p>Flies are attracted to moist and decaying organic matter. A risk exists of fly populations increasing in the vicinity of the piggery.</p>	To prevent the attraction of flies to the piggery and the harbouring of pests such as mice and rats.	<ul style="list-style-type: none"> Mortalities must be removed from the houses on a daily basis. The feed storage and distribution systems must be designed and maintained in a manner that deters the presence and breeding of vermin. Attention to effective sanitation at the piggery will minimise the area where flies can rest and breed. Regular flushing of the wastewater from the houses will minimise fly breeding. Regularly clean the feeding areas and collect wasted feed. This will prevent the attraction of flies to the piggery. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	During the operational phase.	<ul style="list-style-type: none"> Facility Manager
<p>Potential injury to employees working with biological waste. Biological or bio-hazard waste includes syringes for vaccines.</p>	To ensure the correct management of biological waste.	<ul style="list-style-type: none"> The collection and disposal of biological waste must be conducted in a responsible manner, in conjunction with a consulting veterinarian. Recognised safe storage equipment/containers must be used for the collection of this waste. Awareness must be created amongst employees on the safe placing of this material into the designated containers. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	During the operational phase.	<ul style="list-style-type: none"> Facility Manager
<p>Unauthorised access to the site, via foot or vehicles, as well as the entry of other animals into the biosecurity zone of the piggery can compromise its biosecurity buffer.</p>	To ensure that there is no unauthorised access to the site.	<ul style="list-style-type: none"> A security fence must be erected around the piggery. Access to the piggery must be controlled via one access point. Access to the property itself must also be controlled. Entrance gates must be manned during operational hours and locked outside of operational hours. Access to the premises should only be by prior arrangement. The condition of the fence around the piggery must be inspected every six months. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> Regular site inspections. 	During the operational phase.	<ul style="list-style-type: none"> Facility Manager



			Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed.		
Death of pigs at the piggery, including mass mortalities and the potential spread of the disease to other farms.	To ensure that any outbreak of disease is contained and does not spread to neighbouring farms or further afield.	<ul style="list-style-type: none"> Should there be an outbreak of disease at the piggery, the cause or source of the disease should be identified as soon as possible, in consultation with a veterinarian. Neighbouring landowners should be informed of the outbreak. The diseased animals should be separated/isolated and treated (when possible). Sealable containers must be used for mortalities. Inform the relevant state department of the outbreak. Bait stations should be used for rodent control and can also be used for fly control. Bait stations must be placed where they cannot be reached by the pigs. They must be placed where rodents and flies are active and should have sufficient levels of bait. Emergency plans/procedures must be developed to deal with outbreaks of diseases. Mass mortalities must be managed in a responsible manner, in consultation with a veterinarian. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	During the operational phase.	<ul style="list-style-type: none"> Facility Manager

5.1.11 Resource Usage

Table 13: EMP - Resource Usage

Activity:					
<ul style="list-style-type: none"> Usage of resources, such as electricity and water (groundwater). 					
Aspect:					
<ul style="list-style-type: none"> Inefficient and redundant use of valuable resources (electricity and groundwater). 					
Nature and significance of environmental impact					
Project Phase Applicability	Construction	X			
	Operation	X			
	Decommissioning				
Impact Description	Environmental Objective	Management / Mitigation / Monitoring Measures		Monitoring compliance and reporting	Timeframes
Wastage or depletion of valuable resources (electricity and groundwater) due to inefficient or redundant usage.	To prevent the wastage or depletion of valuable resources (electricity and groundwater).	<p>General</p> <ul style="list-style-type: none"> Ensure that all employees have been informed of the importance of natural resources (proper environmental training and awareness). Regular site inspection by supervisors should be conducted. Inspect operations regularly to determine areas of improvement with regards to resource consumption. Regular maintenance and inspection of equipment such as hose pipes to prevent leaks. Monitor resource consumption. Identify areas where resource consumption can be minimised. Set targets to minimise resource consumption. Identify and implement technologies and practices that may reduce resource consumption. 		<p>Construction Phase:</p> <ul style="list-style-type: none"> ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	During the construction and operational phases.
					<ul style="list-style-type: none"> Construction contractor Facility Manager ECO



		<p>Water</p> <ul style="list-style-type: none"> • Regular inspection and maintenance of all boreholes, tanks, reservoirs, toilets, water pipes, valves and taps should be conducted. • Leaking tanks, reservoirs, taps, toilets and pipes must be repaired immediately. • Running water taps and pipes may not be left unattended. • All pipe, hose and tap connections are to be fitted with correct and appropriate plumbing fittings. • The quantity of groundwater abstracted on a daily basis must be metered or gauged. Records must be kept of all abstractions. • The recommended groundwater abstraction rates should be adhered to, to ensure sustainable use of the resource. • It is advised that water level monitoring is conducted on the boreholes used for the piggery as well as any surrounding boreholes. • All measuring devices must be properly maintained, must be in good working order and must be easily accessible. This shall include a programme of checking, calibration and/or renewal of measuring devices. <p>Electricity</p> <ul style="list-style-type: none"> • Houses should face north for optimal temperature control within the houses. • Save electricity by turning off lights and computers when not in use. • Energy saving light bulbs should be used. • The flow of wastewater through the wastewater management system should be by gravity flow, rather than pumps, as far as possible. 			
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5.1.12 Infrastructure

Table 14: EMP - Infrastructure

Activity:						
<ul style="list-style-type: none"> • Increased traffic frequency on road infrastructure during construction activities. • Increased traffic on road infrastructure during operation of the piggery (loading and offloading of pigs and feed). 						
Aspect:						
<ul style="list-style-type: none"> • Wear of access roads and insufficient vehicle inspections. • Visibility of the piggery to adjacent land owners and passing motorists on the N4 and R54. 						
Nature and significance of environmental impact						
Project Phase Applicability	Construction	X				
	Operational	X				
	Decommissioning					
Impact Description	Environmental Objective	Management / Mitigation / Monitoring Measures		Monitoring compliance and reporting	Timeframes	Responsible Party
Wear of access roads, accidents on access roads, unpermitted transport of pigs and loss of pigs being transported on access roads.	To minimise the impact of the increase in traffic on access roads to the site.	<ul style="list-style-type: none"> • Ensure that all construction vehicles using access roads are roadworthy. • All loads are to be securely fastened when being transported. • All vehicles are to adhere to the tonnage limitation and acquire a permit as required. • All speed limits and other traffic regulations on the roadways must be adhered to. • Safety signage should be erected along the construction site. 		<p>Construction Phase:</p> <ul style="list-style-type: none"> • ECO to verify implementation of the mitigation measures proposed in this EMP. • ECO to submit monthly compliance reports to the competent authority. 	During the construction and operational phase.	<ul style="list-style-type: none"> • Construction contractor • Facility Manager • ECO



			<p>Operational Phase:</p> <ul style="list-style-type: none"> Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 		
<p>Visual impact upon receptors surrounding the piggery, including adjacent land owners and passing motorists on the N4 and R54.</p> <p>The preferred site (Alternative 4) is the closest to the R54 (approximately 950m from the R54), but is also the furthest from the N4. Site Alternative 3 is the closest to the N4 at approximately 3km. The residential dwellings of all adjacent properties are further than 1km from the four alternative sites.</p>	<p>To minimise the visual impact of the piggery on receptors in the vicinity of the site.</p>	<ul style="list-style-type: none"> Trees should be planted around the periphery of the piggery, outside of the piggery fence, to reduce the visibility of the piggery to receptors in the vicinity of the piggery. Directional lighting can be used at the piggery, but must be directed inwards (towards the piggery) and not outwards towards the neighbouring properties and the nearby N4 and R54. No high floodlights may be erected at the piggery. 	<p>Construction Phase:</p> <ul style="list-style-type: none"> ECO to verify implementation of the mitigation measures proposed in this EMP. ECO to submit monthly compliance reports to the competent authority. <p>Operational Phase:</p> <ul style="list-style-type: none"> Regular site inspections. Internal audits against this EMP must be conducted every 6 months and records kept onsite. Shortcomings must immediately be addressed. 	<p>During the construction and operational phase.</p>	<ul style="list-style-type: none"> Construction contractor Facility Manager ECO



5.3 CLOSURE PHASE

Decommissioning of the piggery is not anticipated for the foreseeable future. Should the piggery be decommissioned, a detailed closure and rehabilitation plan will be submitted to the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs prior to decommissioning.



6. ENVIRONMENTAL AWARENESS PLAN

The following Environmental Awareness Plan must be implemented by Topigs SA (Pty) Ltd in order to inform their employees and contractors of the environmental risk that may result from their work. The plan must be conducted as part of the induction process for all new employees (including contractors) that will perform work in terms of the proposed activities. Proof of all training provided must be kept on-site.

The Environmental Awareness Plan is referred to as the “SHE match” training programme. The training programme focuses on the following aspects:

1. Explaining clearly what the environment is and what the environment consist of namely: air, water, soil, fauna, flora and people.
2. Once participants have grasped the description of what the environment entails, the training focuses on the potential impacts that the construction and operational activities may have on each one of these environmental components. This is done by making use of the aspect register, where each one of the environmental aspects and associated impacts has been identified.
3. To ensure that the training is effective, visual aids are used. Photos are taken of actual and potential impacts occurring on site and in some cases role-play is used to illustrate a potential impact.
4. The participants are then exposed to a poster that reflects the various environmental components. The various photos taken are posted on the poster on a rotational basis and the participants indicate (based on the visual component) what environmental component was or could have been affected by the activities portrayed on the photo.
5. By doing this the participants visualise the action as well as the potential consequence (environmental impact) of their action.
6. This general awareness training must be done before construction commences and also when new employees start work. The training should be done every two years during the Operational Phase. The poster is posted in the communal area where the impacts are visualised and the photos rotated on a monthly basis.

