

APP-003426
OPERATIONS OF THE SMALL STOCK ABATTOIR OF
FARMERS MEAT MARKET, MARIENTAL
ENVIRONMENTAL MANAGEMENT PLAN




Prepared by:



Prepared for:


Farmers Meat Market
Mariental Abattoir (Pty)
Ltd

June 2022

Project:	OPERATIONS OF THE SMALL STOCK ABATTOIR OF FARMERS MEAT MARKET, MARIENTAL: ENVIRONMENTAL MANAGEMENT PLAN	
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Report Approval	 André Faul Environmental Assessment Practitioner	

I Günther Ling acting as a representative of Farmers Meat Market Mariental Abattoir (Pty) Ltd, hereby confirm that the project description contained in this report is a true reflection of the information which the Proponent provided to Geo Pollution Technologies. All material information in the possession of the proponent that reasonably has or may have the potential of influencing any decision or the objectivity of this assessment is fairly represented in this report and the report is hereby approved.

Signed at Windhoek on the 22 day of July 2022.


Farmers Meat Market Mariental Abattoir (Pty) Ltd

1995/0286
Business Registration/ID Number

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LIST OF ABBREVIATIONS

°C	Degrees Celsius
AIDS	Acquired Immune Deficiency Syndrome
BOD	Biodegradable Oxygen Demand
COD	Chemical Oxygen Demand
DEA	Directorate of Environmental Affairs
DWA	Department of Water Affairs
EA	Environmental Assessment
ECC	Environmental clearance certificate
EIA	Environmental Impact Assessment
EMA	Environmental Management Act No 7 of 2007
EMP	Environmental Management Plan
EMS	Environmental Management System
GDP	Gross Domestic Product
GPT	Geo Pollution Technologies
HIV	Human Immunodeficiency Virus
HSEQ	A Health, Safety, Environment and Quality Policy
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
kV	Kilovolt
kW	Kilowatt
m	Meter
m³	Cubic meter
MEFT	Ministry of Environment, Forestry and Tourism
MSDS	Material Safety Data Sheet
MWth	Megawatt Thermal
NO_x	Nitrogen Oxides
O₂	Oxygen
PM	Particulate Matter
PPE	Personal Protective Equipment
SANS	South African National Standards
SO₂	Sulfur Dioxide
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization
SS	Suspended Solids

GLOSSARY OF TERMS

Biochemical Oxygen Demand - Measurement of oxygen utilised by microorganisms during oxidation of organic material contained in wastewater.

Chemical Oxygen Demand - Measurement of the amount of chemically oxidisable organic matter, viz the amount of oxygen required to convert all organic carbon constituents to CO₂ and H₂O.

Competent Authority - means a body or person empowered under the local authorities act or Environmental Management Act to enforce the rule of law.

Construction - means the building, erection or modification of a facility, structure or infrastructure that is necessary for the undertaking of an activity, including the modification, alteration, upgrading or decommissioning of such facility, structure or infrastructure.

Cumulative Impacts - in relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

Effluent - Liquid waste originating from domestic, industrial, agricultural or mining activities that has been treated in a wastewater treatment facility and released into the environment in a dam, an evaporation pond, an aquifer, a river, the sea or onto the surface of the ground.

Effluent Ponds- System of dams that are designed to receive and treat wastewater, utilising mainly natural resources, e.g. solar energy, algae and a variety of microorganisms, to physically and biologically decompose and / or remove solids, organic matter, nutrients and reduce pathogens.

Environment - As defined in the Environmental Assessment Policy and Environmental Management Act - "land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, palaeontological or social values".

Environmental Clearance Certificate (ECC) - certificate (and its associated conditions) issued in terms of the environmental management act, authorising a listed activity to be undertaken.

Environmental Management Plan (EMP) - A working document on environmental and socio-economic mitigation measures, which must be implemented by several responsible parties of the project.

Environmental Management System (EMS) - An Environment Management System, or EMS, is a comprehensive approach to managing environmental issues, integrating environment-oriented thinking into every aspect of business management. An EMS ensures environmental considerations are a priority, along with other concerns such as costs, product quality, investments, PR productivity and strategic planning. An EMS generally makes a positive impact on a company's bottom line. It increases efficiency and focuses on customer needs and marketplace conditions, improving both the company's financial and environmental performance. By using an EMS to convert environmental problems into commercial opportunities, companies usually become more competitive.

Groundwater - Water - (a) occurring naturally below the surface of the ground; or
(b) pumped, diverted or released into a cavity for storage underground.

Hazard - Anything that has the potential to cause damage to life, property and/or the environment. The hazard of a particular material or installation is constant; that is, it would present the same hazard wherever it was present.

Landfill area – For purposes of this document the landfill refers to an area where slaughterhouse waste is buried.

Mitigate - The implementation of practical measures to reduce adverse impacts.

Proponent (Applicant) - Any person who has submitted or intends to submit an application for an authorisation, as legislated by the Environmental Management Act no. 7 of 2007, to undertake an

activity or activities identified as a listed activity or listed activities; or in any other notice published by the Minister or Ministry of Environment & Tourism.

Slaughterhouse Waste – inedible parts of animals derived from the slaughtering process inclusive of intestinal contents, trimmings, pieces of flesh or fat falling to the floor, pieces of skin, etc.

1 INTRODUCTION & BACKGROUND

Farmers Meat Market Mariental Abattoir (Pty) Ltd (the Proponent) has an existing abattoir for the slaughtering of small stock and small game, specifically sheep, goat and springbok for local and export markets. The livestock and game are sourced from Namibian farms. The facility is also equipped to partially portion or debone carcasses, for export markets. At maximum operational capacity, the abattoir has the capacity to slaughter 1,200 heads of small stock or small game per day.

The abattoir is located on Portion 6 of Farm Keikanachab Ost (Farm No. 90), about 6 km north of Mariental (Figure 2-1). The facility was established in the 1980's as an ostrich abattoir and was converted to a facility for small stock in the 1990's and became an export facility in the early 2000's. In 2005 it was bought by Hartlief and operations as Farmers Meat Market Mariental Abattoir continued. Due to a downturn in throughput, brought about by persistent droughts, the site was temporarily closed down in August 2020. In the interim, the Proponent requested Geo Pollution Technologies (Pty) Ltd (GPT), as independent environmental consultant, to apply for an environmental clearance certificate (ECC) for the abattoir. As such, and in line with the current requirements of the Ministry of Environment, Forestry and Tourism (MEFT), this environmental management plan (EMP) was prepared for the abattoir and all its typical operational activities. The EMP was prepared in line with the Environmental Management Act No. 7 of 2007 (EMA) and its regulations as published in 2012.

The EMP is a tool used to take pro-active action by addressing potential problems before they occur. This limits potential future corrective measures that may need to be implemented and allows for application of mitigation measures for unavoidable impacts. This document should be used as an on-site reference document during all phases (planning, construction (care and maintenance), operations and decommissioning) of the abattoir. All monitoring and records kept should be included in bi-annual reports to ensure compliance with the EMP and the conditions of an ECC. Parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken. The Proponent's workplace safety policy, environmental policy, quality / food safety policy and any other relevant policies should be used in conjunction with the EMP. Relevant regulations and guidelines must be adhered to and monitored regularly as outlined in the EMP.

2 SCOPE

The scope of the EMP is to:

- ◆ Provide a brief overview of all components and related operations of the abattoir.
- ◆ Summarise the legal and regulatory framework within which the abattoir operates.
- ◆ Provide a brief overview of the environment, i.e. the physical, biological, social and economic conditions, potentially impacted by the abattoir and related operations.
- ◆ Identify a range of management actions which could mitigate the potential adverse impacts to acceptable levels.
- ◆ Provide sufficient information to the relevant competent authorities and the MEFT to make informed decisions regarding the operations of the abattoir.

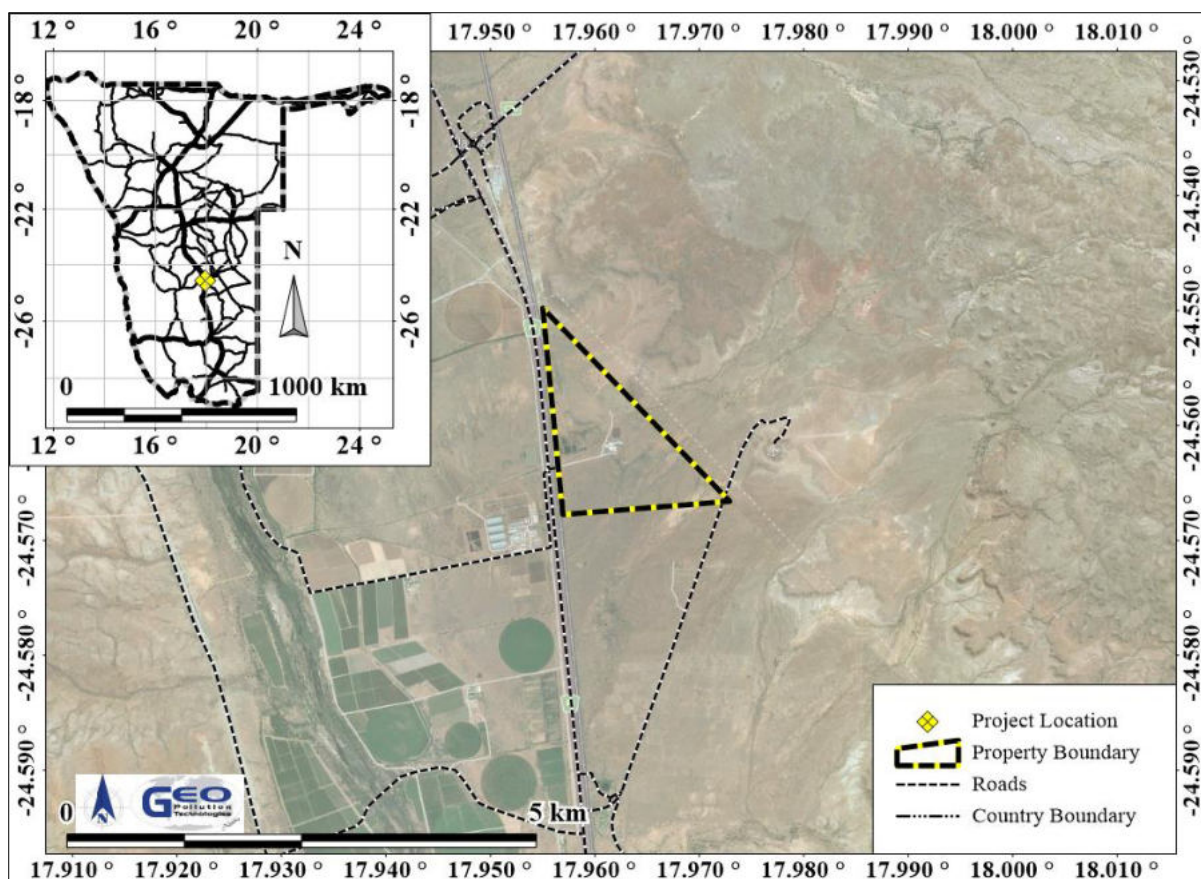


Figure 2-1 Project location

3 PROJECT DESCRIPTION

The Farmers Meat Market abattoir specialises in the slaughtering of small stock and small game, specifically sheep, goat and springbok for local and export markets. At maximum operational capacity it can slaughter up to 1,200 heads of small stock per day or 6,000 per week.

The entire facility is divided into a “green line” and “red line” area. The green line area is operational areas where cleanliness is paramount to prevent contamination of meat products, while the red line is operational areas where offal and wastes are handled in order to keep it separate from the green line. During slaughtering events, employees are not allowed to move uncontrolled between green line and red line areas and each area has its own ablution facilities for workers to use.

The following sections provide a brief overview of the main operational activities at the facility.

3.1 SMALL STOCK AND GAME DELIVERY

Trucks or smaller vehicles delivering live sheep or springbok carcasses arrive at a dedicated gate where security scrutinize their permits, before allowing them to enter. Sheep are offloaded and kept in pens with concrete floors and a roof structure for shade. They are provided with water, but are only provided with feed when delays occur that prevents slaughtering from commencing and being finalised within a 24 hour period.

Springbok are culled on the farms from which they are sourced and are transported to the abattoir in refrigerated trucks. The springbok carcasses are offloaded directly into cold rooms where they are temporarily stored prior to processing.

All empty trucks must go through a compulsory washing and sanitation process before they are allowed to depart from the premises. Washing is performed with water and soda ash and chlorine based cleaning agents at a dedicated wash bay.



Photo 3-1 Security controlled stock deliver gate



Photo 3-2 Vehicle washing area

3.2 SLAUGHTERING AND PROCESSING

When slaughtering commence, the sheep are led into a walkway leading to the slaughter room situated inside the main building. The sheep are stunned with an electrical pulse that ensures temporary unconsciousness. They are then hanged upside down on an overhead rail from where they are slaughtered according to Halaal methods. The carcass automatically proceeds along the processing line, passing by various workers, each of whom performs specific slaughtering actions until the entire sheep is skinned and gutted. The sheep carcass and offal are inspected by veterinarians. If it passes inspection, the carcasses are weighed and graded and then placed in chiller rooms. The offal and skins passes into the red line area for further processing. If any sheep are found to be unfit for human consumption by the veterinarian, they are removed from the processing line for examination, and later on disposal.

Carcasses may be prepared in four ways:

- ◆ Dispatched as whole carcasses, unpackaged (typically for local markets),
- ◆ Dispatched as whole carcasses, but in a vacuum sealed bag and packaged into a carton (typically for export markets),
- ◆ Portioned with bone in and vacuum sealed and packaged into a carton (typically for export markets).
- ◆ Portioned, deboned and vacuum sealed and packaged into a carton (typically for export markets).

Sheep earmarked for whole carcass dispatch are hanged in chillers and when a refrigerated truck arrive for collection, they are weighed and loaded into the trucks at the whole carcass dispatch door. Sheep packaged as whole carcasses are cut and folded to fit in a vacuum bag. They are then vacuumed, sealed and placed into cartons. For deboning the sheep carcasses are processed with electric meat saws and with knives by workers skilled in deboning techniques. Deboned meat is placed in vacuum bags, sealed and boxed. All vacuumed and boxed meat pass through a metal detector to ensure no foreign metal objects are present. They are then placed in freezers for at least 48 hours before being collected by refrigerated trucks.

Springbok carcasses undergo the same processes from skinning to processing and packaging as the sheep.

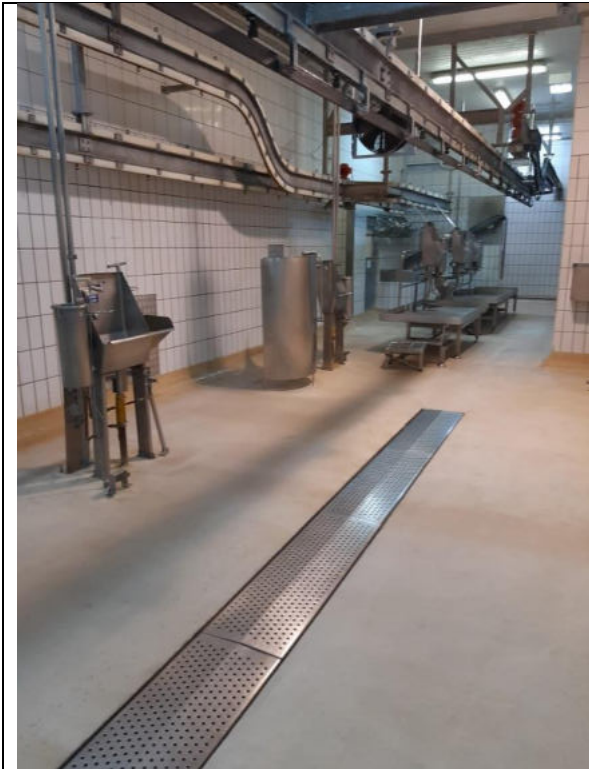


Photo 3-3 Slaughtering line



Photo 3-4 Slaughtering station

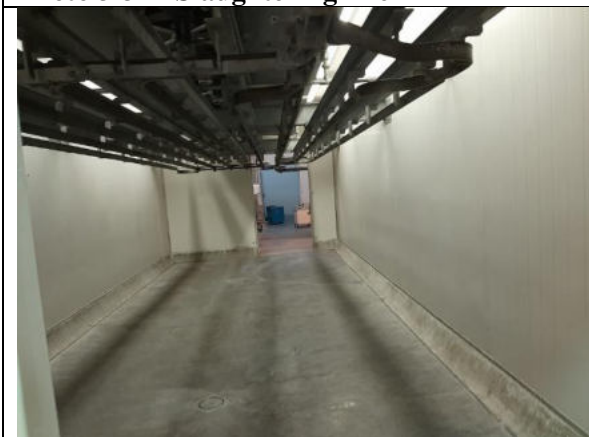


Photo 3-5 Chiller room

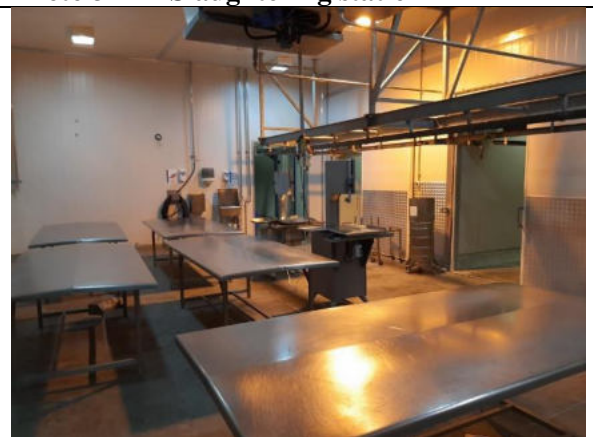


Photo 3-6 Portioning and deboning area



Photo 3-7 Vacuum packing and metal screening area



Photo 3-8 Freezer room



Photo 3-9 Offal handling area



Photo 3-10 Dispatch area

3.3 BYPRODUCT HANDLING

The main byproducts are offal, bones from the deboning process, horns and skins. All offal undergo basic cleaning in the red line area and are then boxed and placed into freezers from where they are dispatched to clients. All skins are salted and the skins, bones and horns are sold.

3.4 EXISTING INFRASTRUCTURE

All required infrastructure has previously been established on site and no additional major infrastructure will be established. The main infrastructure components are depicted in Table 3-1 and Figure 3-1.

Table 3-1 Main abattoir infrastructure components

Infrastructure	Description
Covered holding pen	Holds 1,500 – 1,600 small livestock units
Slaughter house	Capacity to slaughter 1,200 small livestock units per day. Including the slaughter floor, deboning section, offal handling area
Cold storage	Chillers can accommodate approximately 2,420 slaughtered lambs Various blast freezers with different capacities for boxed meat (green line) and offal (red line)
Refrigeration system	Compressors, ammonia tanks, evaporative cooling towers
Solar geysers	Roof mounted
Boiler and stack	Two boilers and one stack with 1.3 m stack height
Aboveground diesel storage tank	8 m ³ steel tank inside bund wall.
Photovoltaic plant	407 kW
Power line and transformer	33 kV line and related transformer to the main building
Administrative and other buildings	Including offices, ablutions, kitchens, workshops, stores, etc.
Chemical store	Mostly cleaning materials
Air washer	System to pass air through water to remove impurities and humidify the air in order to provide clean, high quality air to operational areas.
Effluent ponds	System of nine ponds (volume not known) Additional three ponds as back-up for instances of high waste water volumes
Septic tanks	Two
Landfill area	Area earmarked for the burying of slaughterhouse waste
Water supply line	NamWater supply line for potable water
Water reservoir	Back-up water supply. Water is chlorinated before used in the facility.
Wash bay	Can accommodate a single truck at a time

The **holding pen** is covered and fitted with water troughs providing shelter to all livestock received. It has cement flooring for easy cleaning of manure. Located next to the holding pen, in a secure building, are the various slaughter and processing components of the abattoir, including

the main **cold storage facility** which uses ammonia as coolant. The coolant is stored inside an ammonia tank and is pumped with compressors throughout the facility to the various evaporators in the various cold rooms, freezers and operational areas. After heat exchange take place, the warm coolant is cooled down in three **evaporative towers**.

Hot water required for cleaning the various components of the abattoir is obtained from a two-fold heating system. Water is firstly preheated in roof-mounted **solar geysers** and is then heated further by a **boiler** located in a boiler room. A second boiler is present for back-up purposes in case the main boiler fails. **Diesel** for the boiler operations is stored in an 8 m³ aboveground tank in a concrete bund area. The diesel tank is the property of a third party diesel supplier who is responsible for all legal compliances related to the tank. The Proponent ensure correct operational procedures and implementation of spill control. All water is sourced from NamWater and a backup **water reservoir** is located on the site. Water is disinfected by chlorination prior to being utilized.

Electricity is supplied by the Mariental municipality through the **33 kV power line** and a transformer. Electricity is augmented by a 407 kW grid tied **photovoltaic plant**. Wastewater generated from cleaning of the facility is channelled into a series of **nine effluent ponds** while all sewage is sent to two **septic tanks** on site. Slaughterhouse waste and condemned material are buried onsite in a **landfill area**. A small **chemical room** is present on site and is used to store mainly cleaning chemicals. A small **maintenance store/workshop** for repairing equipment is also present. Various offices, a kitchen, ablution facilities, gate security room, etc. are present. The entire property is fenced with a stock fence while the abattoir and associated buildings and infrastructure is fenced with a security fence.

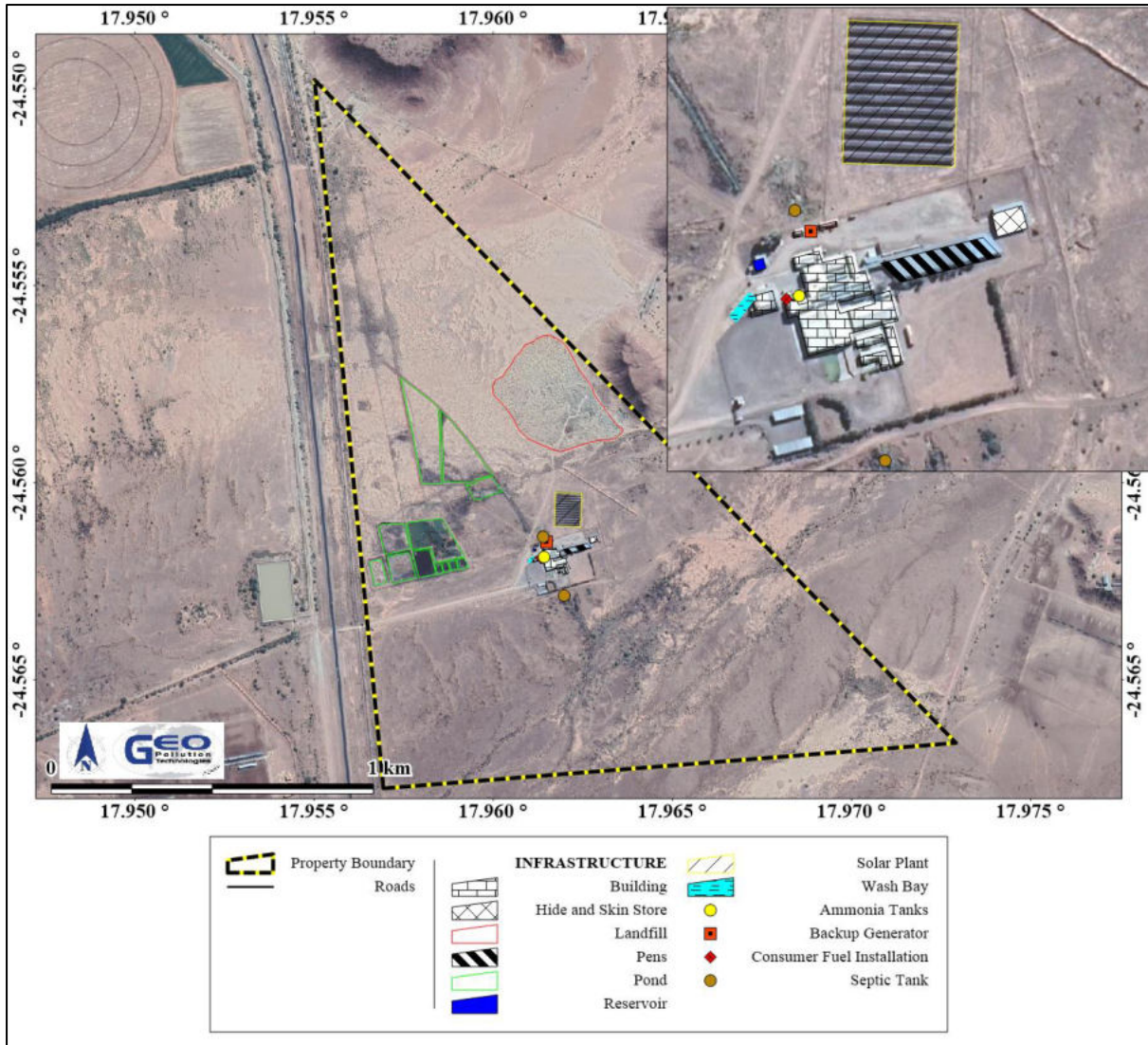


Figure 3-1 Infrastructure components



Photo 3-11 Diesel tank



Photo 3-12 Water storage



Photo 3-13 Solar plant



Photo 3-14 Ablution facilities

3.5 WASTE GENERATION

The abattoir as a whole has various waste streams. Major waste streams are indicated in Table 3-2.

Table 3-2 Main waste streams and disposal methods

Type	Category	Origin	Disposal
Livestock droppings (faeces)	Solid	Holding pens and truck washing area	Landfill
Urine	Liquid	Mixed with wash water from holding pens and truck washing area	Effluent ponds
Blood	Liquid	Mixed with wash water from slaughtering area	Effluent ponds
Slaughterhouse waste	Solid and liquid	Slaughtering area	Solids separated from liquid. Liquids disposed in effluent ponds, solids disposed at landfill area
Condemned material	Solid (biological)	Slaughtering, processing and cold storage area	Landfill
Wash water	Liquid	All washing and cleaning water from pens, slaughtering areas, truck washing area, etc.	Effluent ponds
Domestic sewage	Liquid and solid	Ablutions, kitchens	Septic tanks
Domestic and office waste	Liquid and solid	Offices, kitchens, etc.	Municipal waste disposal site
Exhaust gases	Gas	Boilers	Released in air
Hazardous waste	Solid, liquid or gas	Expired or contaminated cleaning chemicals or fuels, lubricants, pest control traps, microbiology culture plates, etc.	Returned to supplier or disposed at hazardous waste disposal facility

All industrial waste water that is disposed of in the effluent ponds, as indicated in Table 3-2, first collect in a sump through three inlets. One of the inlets first pass through a liquid-solids separator where the liquid (mainly water) from the intestinal contents and some other slaughtering wastes are pressed out. The liquid enters the sump while the solids are dumped in a skip for disposal. In the sump, solids are allowed to settle out and the waste water flows via a pipe under gravity towards the effluent ponds.

The effluent ponds consist of nine ponds connected in series. When waste water volumes exceeds the capacity of the pipeline from the collection sump to the ponds, a pump is started manually to pump the excess waste water from the sump to a separate series of three ponds. The sump is periodically cleaned to remove all collected solids for disposal.

The landfill area is an area earmarked mainly for disposal of livestock droppings (on surface) and burial of slaughterhouse waste and condemned material. In the landfill, small diameter pits of five to six meters deep are excavated using a back actor. Slaughterhouse waste is disposed of in the pit which is, when full, covered with the soil removed for the digging of the pit. The next pit is then dug for the next slaughtering event. After sufficient time, when the contents of the pits in an area have been sufficiently decomposed, that area can be re-used for digging new pits.



Photo 3-15 Effluent sump



Photo 3-16 Effluent pond



Photo 3-17 Landfill area



Photo 3-18 Septic tank area

3.6 GENERAL

Basic microbial testing is performed on site. Swabs are routinely taken from products, surfaces and workers hands, and applied to agar gel in petri dishes. The agar plates are prepared in Windhoek and sent to the abattoir in sterile conditions. Once the plates are inoculated, they are placed in an incubator to enable bacterial growth, if any, and thus determine if any bacterial contamination is present.

Site security controls access to the site at two access gates, one for stock and game delivery vehicles and one for access to the offices and for trucks collecting products.

General day to day administrative tasks continue inclusive of cleaning of the premises, waste disposal, maintenance, garden care, etc. A kitchen prepares food for workers and a small onsite laundry washes clothing of slaughtering and meat handling personnel.

No personnel stay on the site and all personnel are transported to and from the site by the Proponent.

4 ADMINISTRATIVE, LEGAL AND POLICY REQUIREMENTS

4.1 NAMIBIAN LEGISLATION

To protect the environment and achieve sustainable development, all projects, plans, programmes and policies deemed to have adverse impacts on the environment require an ECC, as per the Namibian legislation. The legislation and standards provided in Table 4-1 to Table 4-2 govern the environmental assessment process in Namibia and/or are relevant to the abattoir.

Table 4-1 Namibian law applicable to the abattoir

Law	Key Aspects
The Namibian Constitution	<ul style="list-style-type: none"> ◆ Promote the welfare of people. ◆ Incorporates a high level of environmental protection. ◆ Incorporates international agreements as part of Namibian law.
Environmental Management Act Act No. 7 of 2007, Government Notice No. 232 of 2007	<ul style="list-style-type: none"> ◆ Defines the environment. ◆ Promote sustainable management of the environment and the use of natural resources. ◆ Provide a process of assessment and control of activities with possible significant effects on the environment.
Environmental Management Act Regulations Government Notice No. 28-30 of 2012	<ul style="list-style-type: none"> ◆ Commencement of the Environmental Management Act. ◆ List activities that requires an environmental clearance certificate. ◆ Provide Environmental Impact Assessment Regulations.
Abattoir Industry Act 54 of 1976 Act No. 54 of 1976, Government Notice No. 620 of 1976	<ul style="list-style-type: none"> ◆ Makes provision for control on matters related to construction and operations of abattoirs.
Abattoirs Restriction Proclamation 8 of 1944	<ul style="list-style-type: none"> ◆ Places restrictions on the types of animals which can be slaughtered in abattoirs. ◆ Prohibits slaughtering of animals other than stock without consent. ◆ Makes no provision for regulations.
Cold Storage Works and Abattoirs Proclamation 50 of 1921	<ul style="list-style-type: none"> ◆ Places limits on the construction and operation of cold storage works used for the export of meat. ◆ No regulations known of.
Animal Health Act Act No. 1 of 2011, Government Notice 46 of 2011	<ul style="list-style-type: none"> ◆ Provide for the prevention, detection and control of animal disease and the maintenance and improvement of animal health.
Animals Protection Act Act No. 71 of 1962, Government Gazette Extraordinaire of 22 nd June 1962	<ul style="list-style-type: none"> ◆ To consolidate and amend the laws relating to the prevention of cruelty to animals

Law	Key Aspects
Agricultural Produce Export Ordinance 13 of 1928	<ul style="list-style-type: none"> ◆ Regulates the export of agricultural produce and meat. ◆ No regulations known of.
Meat Industry Act Act 12 of 1981, Government Notice No. 99 of 1981	<ul style="list-style-type: none"> ◆ Provides for control over the grading, sale, import and export of livestock, meat and meat products, and the levies on these items.
Prevention of Undesirable Residue in Meat Act Act 21 of 1991, Government Notice No. 322 of 1991	<ul style="list-style-type: none"> ◆ Regulate the slaughtering of animals and the marketing of meat and meat products
Petroleum Products and Energy Act Act No. 13 of 1990, Government Notice No. 45 of 1990	<ul style="list-style-type: none"> ◆ Regulates petroleum industry. ◆ Makes provision for impact assessment. ◆ Petroleum Products Regulations (Government Notice No. 155 of 2000).
The Water Act Act No. 54 of 1956	<ul style="list-style-type: none"> ◆ Remains in force until the new Water Resources Management Act comes into force. ◆ Defines the interests of the state in protecting water resources. ◆ Controls and permits the disposal of effluent. ◆ Numerous amendments.
Water Resources Management Act Act No. 11 of 2013	<ul style="list-style-type: none"> ◆ Provide for management, protection, development, use and conservation of water resources. ◆ Prevention of water pollution and assignment of liability. ◆ Not in force yet.
Local Authorities Act Act No. 23 of 1992, Government Notice No. 116 of 1992	<ul style="list-style-type: none"> ◆ Define the powers, duties and functions of local authority councils. ◆ Regulates discharges into sewers.
Public and Environmental Health Act Act No. 1 of 2015, Government Notice No. 86 of 2015	<ul style="list-style-type: none"> ◆ Provides a framework for a structured more uniform public and environmental health system, and for incidental matters. ◆ Deals with Integrated Waste Management including waste collection disposal and recycling; waste generation and storage; and sanitation.
Labour Act Act No 11 of 2007, Government Notice No. 236 of 2007	<ul style="list-style-type: none"> ◆ Provides for Labour Law and the protection and safety of employees. ◆ Labour Act, 1992: Regulations relating to the health and safety of employees at work (Government Notice No. 156 of 1997).
Atmospheric Pollution Prevention Ordinance Ordinance No. 11 of 1976	<ul style="list-style-type: none"> ◆ Governs the control of noxious or offensive gases ◆ Prohibits scheduled process without a registration certificate in a controlled area. ◆ Requires best practical means for preventing or reducing the escape into the atmosphere of noxious or offensive gases produced by the scheduled process.
Hazardous Substances Ordinance Ordinance No. 14 of 1974	<ul style="list-style-type: none"> ◆ Applies to the manufacture, sale, use, disposal and dumping of hazardous substances as well as their import and export. ◆ Aims to prevent hazardous substances from causing injury, ill-health or the death of human beings.

Law	Key Aspects
Pollution Control and Waste Management Bill	<ul style="list-style-type: none"> ◆ The bill aims to prevent and regulate the discharge of pollutants to air, water, and land. It further aims to promote the establishment of a system of waste management, and enable Namibia to meet its international obligations. Only unrecyclable and unusable materials will be disposed of at a designated disposal site.

Table 4-2 Relevant multilateral environmental agreements for Namibia and the abattoir

Agreement	Key Aspects
Stockholm Declaration on the Human Environment, Stockholm 1972.	<ul style="list-style-type: none"> ◆ Recognizes the need for a common outlook and common principles to inspire and guide the people of the world in the preservation and enhancement of the human environment.
1985 Vienna Convention for the Protection of the Ozone Layer	<ul style="list-style-type: none"> ◆ Aims to protect human health and the environment against adverse effects from modification of the Ozone Layer are considered ◆ Adopted to regulate levels of greenhouse gas concentration in the atmosphere.
United Nations Framework Convention on Climate Change (UNFCCC)	<ul style="list-style-type: none"> ◆ The Convention recognises that developing countries should be accorded appropriate assistance to enable them to fulfil the terms of the Convention.
Convention on Biological Diversity, Rio de Janeiro, 1992	<ul style="list-style-type: none"> ◆ Under article 14 of The Convention, EIAs must be conducted for projects that may negatively affect biological diversity.

Listed activities which require an ECC application (Government Regulation No 29 of 2012) related to this project include the following:

Section 1 of Government Notice No. 29 of 2012: Energy Generation, Transmission and Storage Activities

- ◆ 1(a). The construction of facilities for the generation of electricity: The abattoir has an existing 407 kW photovoltaic plant. The plant is small enough to warrant exemption from requiring an ECC, however included here for purpose of management measures.

Section 2 of Government Notice No. 29 of 2012: Waste Management, Treatment, Handling and Disposal Activities

- ◆ 2.1. The construction of facilities for waste sites, treatment of waste and disposal of waste:
 - Operations require that industrial effluent (mainly wash water and the organic products it contains like blood) be treated and disposed of onsite via a system of treatment ponds.
 - Two septic tanks systems accommodate all sewerage.
 - Slaughterhouse waste are collected in skips or bins and taken to an onsite landfill where it is buried.

Section 9 of Government Notice No. 29 of 2012: Hazardous Substance Treatment, Handling and Storage

- ◆ 9.1 “The manufacturing, storage, handling or processing of a hazardous substance defined in the Hazardous Substances Ordinance, 1974.” Fuel, ammonia and various chemicals are stored on site.
- ◆ 9.2 “Any process or activity which requires a permit, licence or other form of authorisation, or the modification of or changes to existing facilities for any process or activity which requires an amendment of an existing permit, licence or authorisation or which requires a new permit, licence or authorisation in terms of a law governing the generation or release of

emissions, pollution, effluent or waste.” The Proponent stores fuel on site in an above ground tank with the capacity of 8 m³.

- ◆ “Construction of filling stations or any other facility for the underground and aboveground storage of dangerous goods, including petrol, diesel, liquid petroleum gas or paraffin” Diesel is stored in an aboveground tank on site.

4.2 ADDITIONAL POLICIES AND STANDARDS

Guidelines related to septic tanks and pond systems are implemented by the Department of Water Affairs, Ministry of Agriculture, Water and Land Reform (DWA 2008). These are:

Department of Water Affairs and Forestry, Code of Practice: Volume 1, Septic tank Systems.

Department of Water Affairs and Forestry, Code of Practice volume 2 Pond Systems General Guidelines.

These should be considered in the operation of the abattoir.

Of importance related to the placement of septic tanks are:

- ◆ Not be closer than 2 m and 5 m from buildings and boundaries respectively. In areas where municipal by-laws apply, these must be taken into full consideration.
- ◆ Be located downhill from wells or springs.
- ◆ Never be closer than 500 to 800 m from any water resource or water supply - larger distances are preferred where possible. If closer, a proper environmental impact assessment (EIA) study to motivate this must be produced by a reputable consultant in this field.
- ◆ Not be considered for swampy areas, nor in areas subjected to flooding.
- ◆ Be located where there is a large area available with good soil penetration, serving as disposal field.

Of importance related to Industrial Wastewater pond systems (code of practice: volume 2 pond systems general guidelines) are:

- ◆ “For design and evaluation purposes each industrial plant must therefore be treated as unique and a full assessment of each effluent stream of its COD and especially BOD must be undertaken.”
- ◆ “Whereas pond systems mainly remove biodegradable organic material (reduce COD and BOD), they do not achieve good ammonia-nitrogen removal rates and cannot be used for biological N and P removal. Also, the soluble BOD of the final effluent will be low, but total SS and total BOD will be high, which is attributed mainly to algae. Thus, the final effluent from a pond system cannot achieve the required final water standards required for final effluent discharge”. DWA does not allow any final effluent from a pond system to be discharged into the environment or to be disposed of into a river. Instead it should be contained in evaporation ponds.
- ◆ “The pond system must be completely fenced in to prevent people and animals entering the area and ample notices must be provided to warn and keep people out of this area. As a minimum, a “jackal proof” fence at least 1.8 m high with double-gate to allow access for trucks must be provided. The gate must be kept properly locked. No animals or people are allowed to swim in any of the ponds.”

For safe disposal of sludge, the waste sludge shall not:

- ◆ “Contaminate any drinking water supply;
- ◆ Give rise indirectly to a public-health hazard by being accessible to insects, rodents or other possible animals, which later may come into contact with food or drinking water;
- ◆ Give rise directly to a public-health hazard by being accessible to children;
- ◆ Violate laws or regulations governing water pollution or sewage disposal;
- ◆ Pollute or contaminate the waters of any bathing beach, shellfish-breeding ground or stream used for public or domestic water supply purpose, or for recreational purpose.
- ◆ Give rise to nuisance due to odour or unsightly appearance.”

4.3 INTERNATIONAL GUIDELINES

The Namibian legislature lacks specific, enforceable air quality parameters¹ for operations such as boilers. In general air quality standards aim to protect human life as well as ecosystems. In light of the lack of enforceable standards, projects may revert to the World Bank and International Finance Corporation's (IFC) Environmental, Health, and Safety guidelines (known as the EHS guidelines). These guidelines are technical reference documents which may be considered by specific industries. The use of these guidelines are hinged on the condition that the guidelines be adapted to site specific variables, considering the sensitivity of the environment and project factors as indicated in the environmental assessment.

For the purposes of this project, reference is made to the "General EHS Guidelines: Environmental Air Emissions and Ambient Air Quality".

The boiler system used to heat the water may be classified as a "Small Combustion Facility". These are systems which are designed to deliver electrical or mechanical power, steam, heat, or any combination of these, regardless of the fuel type, with a total, rated heat input capacity of between three (3) Megawatt thermal (MWth) and 50 MWth. The emissions guidelines in Table 4-3 (as adapted from the guidelines) are applicable to small combustion process installations operating more than 500 hours per year, and those with an annual capacity utilization of more than 30 percent (IFC, 2007).

Table 4-3 Small combustion facilities emissions guidelines (3 MWth – 50 MWth) – (in mg/Nm³ or as indicated) as adapted from the EHS Guidelines (IFC, 2007)

Combustion Technology / Fuel	Particulate Matter (PM)	Sulfur Dioxide (SO ₂)	Nitrogen Oxides (NO _x)	Dry Gas, Excess O ₂ Content (%)
Boiler				
Gas	N/A	N/A	320	3
Liquid	50 or up to 150 if justified by environmental assessment	2,000	460	3
Solid	50 or up to 150 if justified by environmental assessment	2,000	650	6

Notes: -N/A - no emissions guideline; Higher performance levels than these in the Table should be applicable to facilities located in urban / industrial areas with degraded airsheds or close to ecologically sensitive areas where more stringent emissions controls may be needed.; MWth is heat input on high heat value basis; Solid fuels include biomass; Nm³ is at one atmosphere pressure, 0°C.; MWth category is to apply to the entire facility consisting of multiple units that are reasonably considered to be emitted from a common stack except for NO_x and PM limits for turbines and boilers.

¹ Ambient standards provide the maximum allowable level of a pollutant in the receiving environment whereas emission standards set the maximum amount of pollutant that may be released

5 ENVIRONMENTAL CHARACTERISTICS

The following section provides a brief description of the environment of the abattoir.

5.1 LOCALITY AND SURROUNDING LAND USE

The abattoir is located 6 km north of Mariental, directly east of the B1 Trunk Road in the Mariental Townlands and Mariental Urban Constituency (-24.562029°S, 17.961480°E). Operations are located on agricultural land and surrounded by agricultural related properties. The Namibia Dairies Superfarm and related infrastructure is situated west of the site, along with a canal and irrigation dam supplying water from the Hardap Dam to the Hardap Irrigation Scheme.

Implications and Impacts

The facility is located on suitably zoned land with no residential or sensitive receptors within 1,000 m of the site. Surrounding land use relate to agricultural uses and there are no industries which present a risk to the abattoir operations or *vice versa*.

5.2 CLIMATE

Table 5-1 and Figure 5-1 presents the CHIRPS-2 (Climate Hazards Group Infra-Red Precipitation with Station data version 2) dataset on rainfall for the project area (Funk et al., 2015). The dataset consists of long term rainfall data (1981 to near-present) obtained from satellite imagery and in-situ station data. The resultant dataset provides a reasonably well represented overview of the climatic conditions and historic rainfall of the general area. True values for single, site specific meteorological events may however differ to some degree.

The average annual evaporation ranges between 3,200 and 3,400 mm/a, while the average annual rainfall is in the order of 156 mm/a. Average annual temperature is 20 to 21 °C and the solar radiation index is 6 to 6.2 kWh/m² for the area.

Table 5-1 Rainfall statistics based on CHIRPS-2 data (Funk et al., 2015)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Minimum (mm/m)	6.62	5.86	5.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum (mm/m)	133.19	149.63	67.47	43.16	5.06	3.39	0.78	1.51	4.65	20.80	34.92	48.19
Average (mm/m)	36.7	44.6	26.2	12.5	0.7	0.3	0.1	0.1	1.0	4.9	8.3	15.7
Variability (%)	77.0	77.0	65.0	70.0	198.0	306.0	240.0	280.0	129.0	89.0	94.0	77.0
Daily maximum (mm)	31.6	39.2	34.6	23.8	5.1	3.4	0.8	1.1	3.3	13.0	10.7	26.5
Average rain days	5	5	3	2	0	0	0	0	1	2	2	3
Season July - June average: 156 mm						Season coefficient of variation: 39 %						
Data range	1981-Jul-01 to			2021-Jun-30			Lat: 24.562°S Long: 17.9615°E					

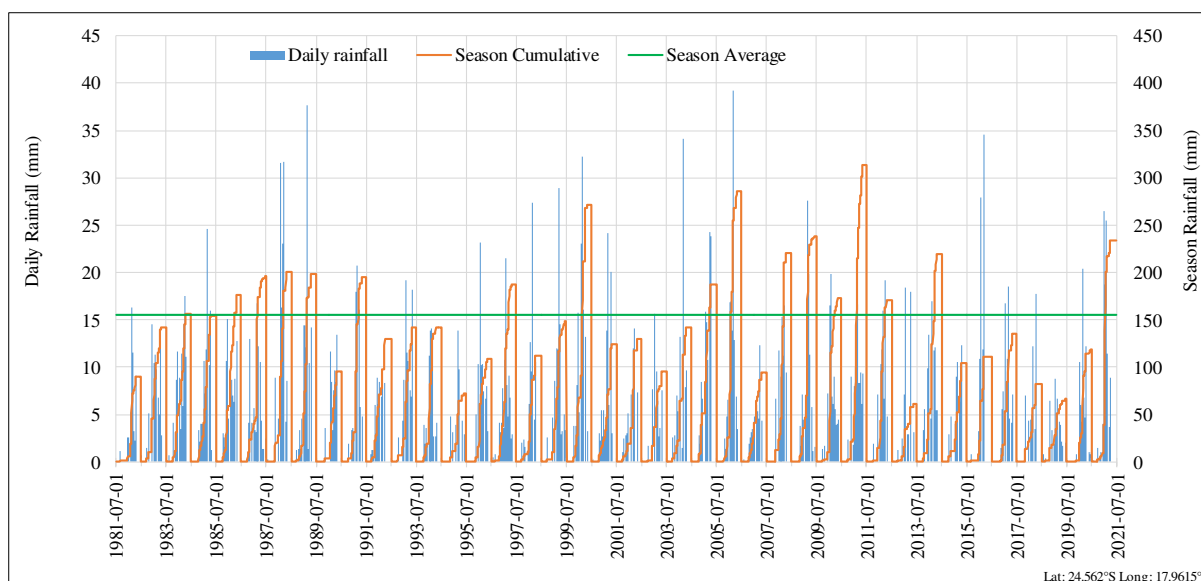


Figure 5-1 Daily and seasonal rainfall from CHIRPS-2 data (Funk et al., 2015)

Implications and Impacts

Water is a scarce and valuable resource in Namibia and the variability in seasonal rainfall makes water an extremely vulnerable resource. Excessive rainfall may result in flooding of, or damage (erosion) to, the effluent ponds. Damaged ponds may release untreated effluent into the environment and cause pollution.

Storm water may wash pollutants like uncontained, spilled hydrocarbons or chemicals, or waste into the environment and cause pollution.

The high solar radiation index ensures optimal performance of the solar geysers and photovoltaic plant while high evaporation rates improve the efficiency of the evaporation ponds.

5.3 TOPOGRAPHY AND DRAINAGE

The project area is located about 3 km from the main channel of the Fish River. The landscape is described as a wide valley draining in a southern direction with a basalt covered plateau to the north and a Kalahari covered plateau (Weissrand) to the east.

Drainage in the area occur through the Fish River. The Fish River originates in the area northwest of Maltahöhe and flows in a north-eastern direction around an uplifted block until it reaches the vicinity of Mariental, where the direction shifts to a southern direction. The site is located in the upper portions of the Fish River catchment, just downstream of the Hardap Dam.

Various flow diversions structures have been established on the site and on surrounding properties to alter the ultimate drainage pattern of the area, thereby restricting and diverting some of the flow around operations. These structures are visible in Figure 5-2 and the altered flow is likely different from the flow indicated in Figure 5-2.

Implications and Impacts

During the operational phase, any pollutants that are not contained, and are transported via surface water flow, will be transported out of the site via water drainage lines and potentially pollute the surrounding environment and the river. As the area is prone to flooding, storage of hazardous substances should be done in a way that ensures substances remain contained and safe during flooding while the existing diversion structure should be maintained.

The ponds should be protected against flooding and the installation of a flood control berm is advised. Such actions should take downstream road and rail culverts into consideration as well as the Water Act regulations regarding diversion and damming of streams.

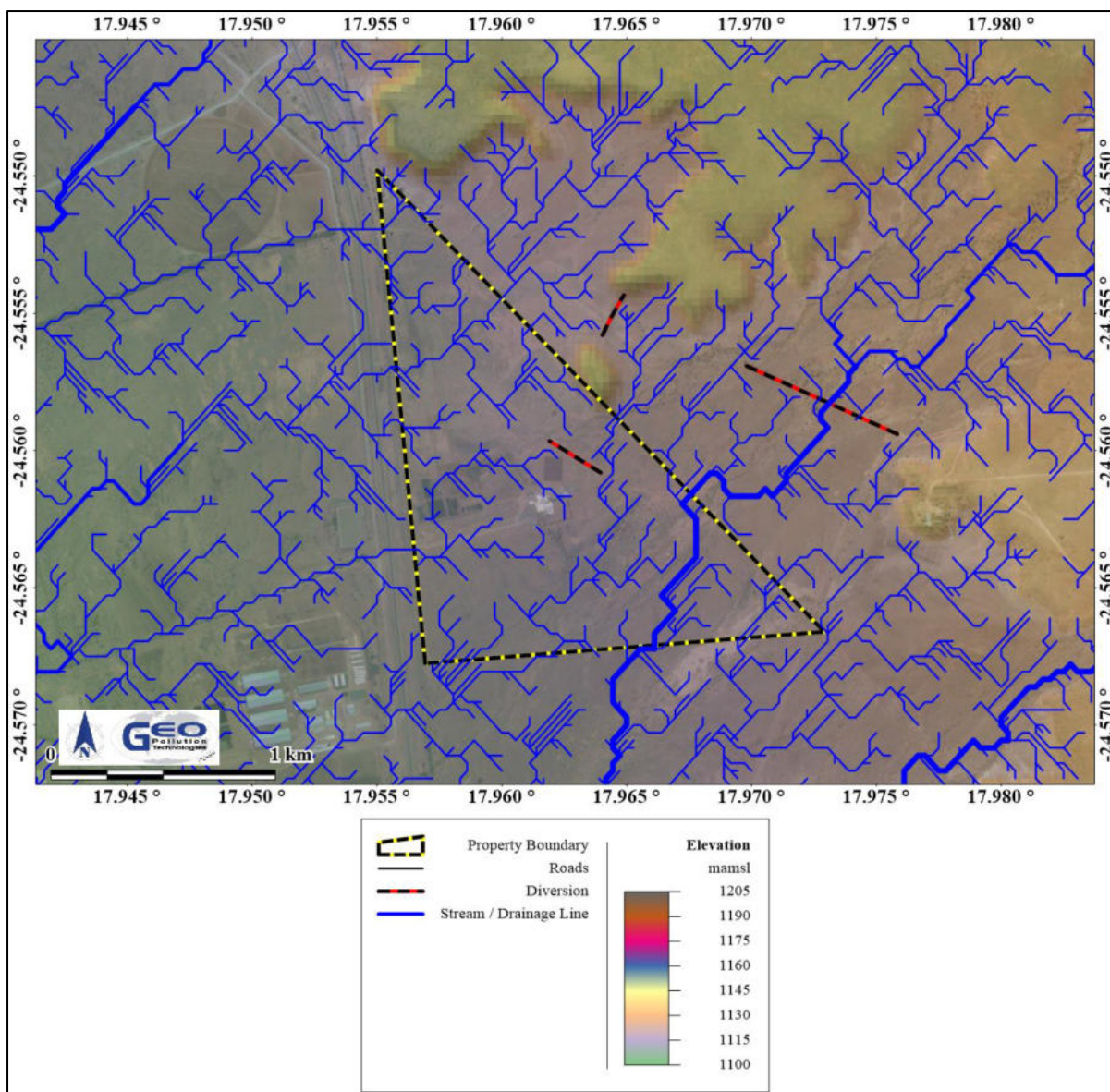


Figure 5-2 Drainage pattern and diverting structures in relation to the property boundary

5.4 GEOLOGY AND HYDROGEOLOGY

The project site is underlain by Karoo Supergroup rocks of the Aranos Karoo Basin (Carboniferous to Permian Age), which is underlain by older Nama Group rocks of the Nama Basin (Cambrian Age). Locally the Karoo formations are covered by soil with unknown thickness.

The geology of the Mariental area comprise of tillite, bolder shale, shale, sandstone and limestone, these deposits formed during the Carboniferous to Permian Age and forms part of the Dwyka Group of the Karoo Supergroup. Tillite comprises of poorly sorted sediments sand and silt and pebbles with various clast sizes in a mud matrixed formed by deposits from glacier movement.

The project area is located within the upper part of the Fish River groundwater basin and has a regional groundwater flow in a southern to southwestern direction. Groundwater flow is expected to take place through primary porosity in the surface cover, while it is expected to flow along fractures, faults (secondary porosity) and other geological structures present within the underlying formations (hard rock formations). This site falls within the Windhoek-Gobabis-Mariental - Keetmanshoop Artesian Area - Government Notice 302 of 1 October 1955.

Implications and Impacts

A risk to groundwater pollution, and ultimately the Fish River exists due to the geological sensitivity of the area. This is mainly due to the nature of the surficial deposits which is sensitive to contamination, as well as the shallow groundwater. Groundwater remains an important resource and would be at risk if effluent / sewage / fuel spills are not contained, cleaned and disposed of properly.

The property falls within a groundwater control area and thus a drilling permit will be required should any boreholes be installed (e.g. monitoring boreholes).

5.5 WATER SUPPLY

Water supply to Mariental and the Hardap Irrigation Scheme comprises of two separate systems. The first is potable water treated at the Hardap Dam and piped to the town, irrigation scheme and communities south of Mariental. The second is raw water for irrigation and garden watering purposes, distributed to the town and irrigation scheme via a network of canals, pipelines and smaller storage dams. Both potable and raw water is supplied by NamWater directly to the irrigation scheme and selected surrounding properties, while it is sold to the Mariental Municipality for distribution in the town. No alternative water sources are currently used or available to supply the town and irrigation scheme. During years of drought, irrigation restrictions are gradually introduced to ensure a sufficient volume of water remains for potable supply.

Implications and Impacts

Water usage of the abattoir is not expected to impact significantly on the availability of public water (water from the Hardap Dam). However numerous water restriction have been enacted in the past, especially to agricultural use of water.

5.6 FAUNA AND FLORA

The site falls within the Nama-Karoo biome having a dwarf shrub savanna type. Anthropogenic activities and use have significantly impacted the vegetation on site, resulting in the establishment of various invader species. The pond systems especially have experienced a proliferation of reeds and some *Prosopis* spp., both being exotic species. There are a few naturally occurring larger trees on site while the main operational area has numerous large trees which have been planted as functional trees (shade, wind breaks, aesthetics, etc).

Table 5-2 General flora data (Atlas of Namibia Project, 2002)

Biome	Nama-Karoo
Vegetation type	Dwarf shrub savanna
Vegetation structure type	Sparse shrubland
Diversity of higher plants	Low (Diversity rank = 6 [1 to 7 representing highest to lowest diversity])
Number of plant species	50 - 100

Table 5-3 General fauna data (Atlas of Namibia Project, 2002)

Mammal Diversity	61 - 75 Species
Rodent Diversity	20 - 23 Species
Bird Diversity	141 - 170 Species
Reptile Diversity	51 - 60 Species
Snake Diversity	20 - 24 Species
Lizard Diversity	28 - 31 Species
Frog Diversity	4 - 7 Species
Termite Diversity	7 - 9 Genera
Scorpion Diversity	12 - 13 Species

Implications and Impacts

Possible pollution and changes to, or creation of, habitats, may create a suitable environment for species not traditionally known in the area, to establish and proliferate. The established reeds may result in the silting up of dams reducing their capacity to store effluent, but will simultaneously aid in phytoremediation of the effluent.

Buried slaughterhouse waste may present an opportunity for wildlife scavenging etc., while uncontrolled pollution (such a hydrocarbon spill) can cause damage to the local biodiversity.

5.7 DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS

The project area falls within the Hardap Region with a population of 40,572 people and a density of 25 – 50 people per km² (National Planning Commission, 2012). Table 5-4 provides demographic information for Mariental, the region and nationally.

Table 5-4 Demographic Characteristics of Mariental, Hardap Region and Nationally (Namibia Statistics Agency, 2014; Namibia Statistics Agency, 2009/2010)

	Mariental	Hardap Region	Namibia
Population (Males)	6,000*	40,572	1,021,912
Population (Females)	6,300*	38,935	1,091,165
Population (Total)	12,300	79, 507	2,113,077
Unemployment (15+ years)	N/A	26.2%	33.8%
Literacy (15+ years)	N/A	90.9%	87.7%

*Data available from preliminary results only (National Planning Commission, 2012)

Implications and Impacts

The abattoir will provide employment to people from the area. Some skills development and training will benefit employees during the operational phase.

6 ENVIRONMENTAL MANAGEMENT PLAN

The purpose of this section is to list the most pertinent environmental impacts that are expected from the planning, operational, construction (upgrades, maintenance, etc.) and potential decommissioning activities of the abattoir.

6.1 OBJECTIVES OF THE EMP

The EMP provides management options to ensure impacts of the abattoir are minimised. The objectives of the EMP are:

- ◆ to include all components of planning, construction activities (upgrades, maintenance, etc.) and operations of the abattoir;
- ◆ to prescribe the best practicable control methods to lessen the environmental impacts associated with the abattoir;
- ◆ to monitor and audit the performance of operational personnel in applying such controls; and
- ◆ to ensure that appropriate environmental training is provided to responsible operational personnel.

6.2 IMPLEMENTATION OF THE EMP

Section 6.3 and section 6.4 outline the management of the environmental elements that may be affected by the different activities. Impacts addressed and mitigation measures proposed are seen as minimum requirements which have to be elaborated on. Delegation of prevention and mitigation measures as well as reporting activities should be determined by the Proponent and included in the EMP. The EMP is a living document that must be prepared in detail, and regularly updated, by the Proponent as the project progress and evolve.

The EMP and ECC must be communicated to the abattoir managers. A copy of the ECC and EMP should be kept on site. All monitoring results must be reported on as indicated. Reporting is important for any future renewals of the ECC and must be submitted to the MEFT. Renewal of ECC will require six monthly reports based on the monitoring prescribed in this EMP.

Various potential and definite impacts will emanate from the planning, operations, construction (care and maintenance) and decommissioning phases. The majority of these impacts can be mitigated or prevented. The prevention and mitigation measures are listed below.

6.3 MANAGEMENT OF IMPACTS: PLANNING PHASE

The following section provide management measures for the planning activities related to the abattoir operations and maintenance. During the phases of planning for operations, construction and decommissioning of the abattoir, it is the responsibility of the Proponent to ensure they are and remain compliant with all legal requirements. The Proponent must also ensure that all required management measures are in place prior to and during all phases, to ensure potential impacts and risks are minimised. The following actions are recommended for the planning phase and should continue during various other phases of the project:

- ◆ Ensure that all necessary permits from the various ministries, local authorities and any other bodies that govern abattoirs, meat processing and related activities are in place and remains valid. This includes effluent disposal permits from the Ministry of Agriculture, Water and Land Reform. Keep a register of such permits, permits requirements and adherence, and permit renewals.
- ◆ Ensure a contractor management program is in place and that it includes the EMP.
- ◆ Employees to adhere to relevant sections of the EMP, as applicable to their scope of work and general operations.
- ◆ Make provisions to have a Health, Safety and Environmental Coordinator or similar to oversee implementation of the EMP, occupational health and safety as well as general environmental related compliance at the site.
- ◆ Corporate communication processes to be followed in the event of complaints from public entities.
- ◆ Have the following emergency plans, equipment and personnel on site where reasonable to deal with all potential emergencies:
 - Risk management / mitigation / EMP/ Emergency Response Plan and HSE Manuals;
 - Adequate protection and indemnity insurance cover for incidents;
 - Relevant safety standards;
 - Procedures, equipment and materials required for emergencies.
- ◆ Develop and adopt a waste management plan inclusive of a waste minimisation strategy for all aspects of the abattoir operations.
- ◆ Ensure availability of sufficient funds or insurance spill clean-up or pollution remediation if ever required.
- ◆ Establish and / or maintain a reporting system to report on aspects of construction activities, operations and decommissioning as outlined in the EMP.
- ◆ Submit bi-annual reports to the MEFT to allow for environmental clearance certificate renewal after three years. This is a requirement by MEFT.
- ◆ Update the EIA and EMP and apply for renewal of the environmental clearance certificate prior to expiry.

6.4 MANAGEMENT OF IMPACTS: OPERATIONS AND CONSTRUCTION (MAINTENANCE)

The following sub sections provide management measures for both the operational phase and the construction (maintenance) activities related to the abattoir.

6.4.1 Economic Resilience and Employment

The re-commissioning of the abattoir will lead to changes in the way revenue is generated and paid to the national treasury. Commissioning this operation for the export market will contribute to the national GDP, a positive trade balance and economic resilience of Namibia.

Skilled and unskilled labour will be required for the operations and maintenance / construction activities associated with the abattoir. Employment increases individual and societal economic resilience through, not only the payment of wages, but also contributions to social security and fringe benefits.

Desired Outcome: Contribution to national treasury and remuneration of temporary and permanent employees as per the Labour Act. Continued contributions to social security.

Actions

Enhancement:

- ◆ The Proponent must employ local Namibians from the area where possible.
- ◆ Develop and maintain a contractor management program, inclusive of compliance reviews of service level agreements etc.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Bi-annual summary report based on employee records and financial contributions to the various institutions such as social security, receiver of revenue etc.

6.4.2 Skills, Technology and Development

During various phases of the abattoir operations, training will be provided to a portion of the workforce to be able to conduct certain tasks according to the required standards. Skills are periodically transferred to an unskilled workforce for general tasks. Development of people and technology are key to economic development. During normal operations, employees will enhance their working expertise while some individuals may be identified for promotion and additional skills development and training.

Desired Outcome: To see an increase in skills of local Namibians, as well as development and technology advancements in the meat processing industry and local community.

Actions

Enhancement:

- ◆ If the skills exist locally, employees / contractors must first be sourced from the town, then the region and then nationally. Deviations from this practice must be justified.
- ◆ Skills development and improvement programs to be made available.
- ◆ The Proponent must employ local Namibians from the area where possible. Deviations from this practise should be justified appropriately.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ Record should be kept of training provided.
- ◆ Ensure that all training is certified or managerial reference provided (proof provided to the employees) inclusive of training attendance, completion and implementation.
- ◆ Bi-annual summary report based on employee training.

6.4.3 Demographic Profile and Community Health

Greater economic prosperity, as linked to the successful operations, may lead to a change in the demographic profile of the local community. Change may result from an influx of job seekers over time and further densification of the informal settlement of Mariental. Community structures may change with an increase in population while the economic profile will be adjusted as the employment structure of the area is changed. Community health may be exposed to factors such as communicable disease like HIV/AIDS and alcoholism/drug abuse. An increase in people in the area may potentially increase the risk of criminal and socially deviant behaviour such as vandalism. More people in the area will exert additional pressure on governmental services, particularly essential services such as health care. Medical assistance, emergency services and the policing of the community may become strained.

Desired Outcome: To prevent the occurrence of social ills and prevent the spread of diseases such as HIV/AIDS.

Actions:

Prevention:

- ◆ Employ only local people from the area where possible, deviations from this practice should be justified appropriately.
- ◆ Adhere to all local authority by-laws relating to environmental health which includes sanitation requirements.
- ◆ Ensure sanitation facilities and all related sanitation requirements are available and maintained at the abattoir for all employees.
- ◆ Appointment of reputable contractors.
- ◆ Educational programmes for employees on HIV/AIDs and general upliftment of employees' social status.

◆ **Responsible Body:**

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Facility inspection sheet for all areas which may present environmental health risks, kept on file.
- ◆ Bi-annual summary report based on educational programmes and training conducted.

6.4.4 Health, Safety and Security

Activities associated with operations and maintenance / construction are reliant on human labour and therefore health and safety risks exist. Activities such as the operation of slaughtering equipment (knives, saws, steel hooks, etc), cold rooms, vehicles and machinery, as well as handling of hazardous chemicals pose risks to employees. Accidental release of ammonia from the refrigeration system can pose health and safety risks. Ammonia is corrosive and can cause freeze burns. In addition the majority of the facility's operational areas have numerous risks associated with sharp instruments and slippery surfaces. The continued slaughtering process may further pose risks to some employee's psychological and behavioural patterns including coping mechanisms.

Potentially harmful *Legionella* bacteria may proliferate in the hot water tanks and heaters, plumbing systems, water-based air washers and water storage tanks. *Legionella* bacteria which, if it becomes airborne in small droplets through for example the ventilation system or through wash water spray, can be inhaled. This may lead to Legionnaires' disease or Pontiac fever in exposed individuals.

The effluent ponds pose a danger of people falling in and drowning or becoming ill from contaminated water.

Pollution incidents related to chemical, fuel or effluent spillages may pose a health risk. Such a risk also exist in any pathogen contaminated material which may leave or be scavenged from the facility. Security risks will be related to unauthorized entry, theft and sabotage.

The site is located within a peri-urban area and occurrences of wild animals, including venomous species of snakes and scorpions are possible. Encounters with these wild animals, may pose risks to staff.

Desired Outcome: To prevent injury, health impacts and theft.

Actions

Prevention:

- ◆ Compile a thorough Microbiological Hazard Assessment, with applicable monitoring plan, specifically related to the landfill and effluent ponds.
- ◆ All health and safety standards specified in the Labour Act should be complied with.
- ◆ All industry specific health and safety procedures and regulations applicable should be in place and adhered to, this should include a food handler's medical survey programme.
- ◆ Implement and maintain an integrated health and safety management system, to act as a monitoring and mitigating tool, which includes:
 - operational, safe work, first aid and medical procedures;
 - permit to work system for dangerous work;
 - job hazard analysis and standard operating procedures where required;
 - emergency response plans and drills;
 - lockout tagout protection when servicing or maintaining potentially dangerous equipment;
 - housekeeping programmes;
 - MSDS's and signage requirements (PPE, flammable etc.);
 - a medical surveillance program;
 - hygiene and ergonomic survey for the site;
- ◆ Selected staff should be trained in first aid and first aid kits must be readily available together with the contact numbers for emergency ambulance and professional medical services.
- ◆ All relevant staff should receive adequate training on hygiene in the working environment and on the correct methods of executing their respective tasks and handling of equipment (specifically dangerous equipment such as electrical saws, high pressure equipment, boilers, etc.).

- ◆ Clearly label dangerous and restricted areas as well as dangerous equipment and products. These include the slaughtering area, ammonia compressor room, boilers, the chemical store, fuel storage area. Clearly indicate compulsory personal protective equipment (PPE) requirements for specific areas.
- ◆ The effluent ponds should be fenced with warning signs prohibiting entry by unauthorised persons.
- ◆ Provide all relevant employees with required and adequate PPE.
- ◆ Identify trip hazards and remove where possible. Where such structures form part of the required operational infrastructure, they should be painted in bright or distinguishable colours.
- ◆ Develop and maintain an infrastructure, machinery and tools register for the abattoir inclusive of a maintenance and inspection schedule, this should include driven machinery, fuel storage, chemical storage, etc.
- ◆ A *Legionella* risk assessment and management plan should be compiled which includes inspection and analysis of water sources potentially containing *Legionella* spp. Since the facility was dormant for some years, all sources potentially containing *Legionella* should be cleaned and sterilized with suitable products prior to start-up.
- ◆ Ensure legal appointments, of appropriately qualified and trained personnel, are in place for all necessary maintenance and specialised operational activities.
- ◆ The abattoir must have emergency plans to deal with diseased animals that may be found among livestock delivered and kept in pens prior to slaughtering. This includes the design and planning for isolation pens and mass disposal areas.
- ◆ Staff must be regularly trained in procedures pertaining to containment of disease outbreaks and destruction and disposal of diseased animals.
- ◆ Ammonia has a strong smell and leaks are typically quickly detected by smell only. However, leak detectors should be considered since personnel will not always be present in the compressor rooms.
- ◆ Staff should be educated / trained on human wildlife conflict management and not to confront wild animals or other potentially venomous / dangerous animals that may be encountered on site.
- ◆ Security procedures and proper security measures must be in place and equipment and goods must be locked away on site or be placed in a way that does not encourage criminal activities (e.g. theft).

Mitigation:

- ◆ Report any injuries or incidents to the appropriate manager and take appropriate action (e.g. first aid, transport to medical facility, etc.).
- ◆ Implement mental awareness programs specifically related to the continued slaughtering process' risks to employees' psychological and behavioural patterns including coping mechanisms.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ Microbiological Hazard Assessment with monitoring results.
- ◆ Health and safety management system.
- ◆ Any health, safety and security incidents must be recorded with remedial action taken and actions to prevent future occurrences.
- ◆ A bi-annual report should be compiled of all incidents reported. The report should contain dates when training were conducted and when safety equipment and structures were inspected and maintained.

6.4.5 Fire

Failing electrical infrastructure, maintenance and construction activities, incorrect chemical storage, boiler operations, kitchen operations, etc. all can result in accidental fires. Vehicles can also ignite dry vegetation if sufficient heat (e.g. exhaust pipes) or sparks are produced when such vehicles for example access the solid waste disposal area, do earth works or are used to clear vegetation at the photovoltaic plant. Such a fire can cause veld fires spreading to neighbouring properties when dry vegetation is abundant.

Ammonia, if present in low volumes in air becomes flammable, and a fire and explosion risk is present where ammonia forms a 15% to 28% mixture with air. Typically experienced in boiling liquid expanding vapour fires/explosions.

Desired Outcome: To prevent property damage, veld fires, possible injury and impacts caused by uncontrolled fires.

Actions:

Prevention:

- ◆ Prepare a holistic fire protection, prevention and response plan. This plan must include evacuation plans and signage, an emergency response plan and a firefighting plan.
- ◆ Personnel training (safe operational procedures, firefighting, fire prevention and responsible housekeeping practices).
- ◆ Maintain firefighting equipment at approved intervals and keep a maintenance register.
- ◆ Ensure good housekeeping to reduce fire risks associated with accumulated waste materials, dry vegetation, etc.
- ◆ No open fires to be allowed on site (e.g. for cooking) except at designated areas and with the necessary approval from management.
- ◆ No fires may be ignited with the intent to clear vegetation or burn garden waste on site without managements consent. If planned burns are contemplated, all measures to prevent the spread of fire into the veld and nearby farms must be in place including firefighting equipment and personnel. No general, slaughterhouse or hazardous waste should be burned on site.
- ◆ Ensure the relevant authorities are notified if the powerline servitude must be maintained and vegetation removed to prevent elevated fire risks.
- ◆ Ensure all fuel and chemicals, including ammonia, are stored and handled according to MSDS and SANS instructions.
- ◆ The compressor room must have an emergency response plan specific to ammonia related fire risks if leaks or accidental release of ammonia occur. This could include explosive proof lighting, extractor fans, PPE and water hoses with water diffusing nozzles. Water absorbs ammonia vapour if sprayed by a fine mist or droplets of water. Refer to MSDS and SANS 10147.
- ◆ See section 6.4.6 for ammonia leak detection.
- ◆ Have an electrical maintenance / service and inspection plan in place, this should include; regular inspections on high and low voltage reticulation systems; annual infrared scans on all main distribution boards and electrical equipment; annual Earth leakage tests, transformer management plan and legal appointments of responsible, qualified personnel.

Mitigation:

- ◆ Implement the fire response plan in the event of a fire and notify neighbours in case of potential spreading of a fire to nearby farms.
- ◆ Quick response time by trained staff will limit the spread and impact of fire.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ In-house fire protection, prevention and response plan

- ◆ A register of all fire related incidents must be maintained. This should include measures taken to ensure that such incidents do not repeat themselves.
- ◆ A bi-annual report should be compiled of all incidents reported. The report should contain dates when fire drills were conducted and when fire equipment was tested and maintained and when training was conducted.

6.4.6 Air Quality – Odour, Gas Emissions and Dust

The abattoir will include the operations of an evaporation pond system and septic tanks. Methane, hydrogen sulphide and mercaptans are the primary foul smelling emissions from abattoir effluent treatment plants, abattoir solid (biological) waste storage and disposal facilities, and domestic septic tanks. Apart from being foul smelling and a nuisance, some gases such as methane are also major contributors to the greenhouse effect and global warming.

If effluent ponds malfunction or if solid wastes are not disposed of properly, odours may be produced in significant volumes to become a nuisance. While no immediate neighbours are present, the wind can cause such odours to reach receptors some distance away. Effluent treatment pond failure is likely due to the very high organic load together with detergents and disinfecting chemicals disposed with the effluent.

The small stock holding pens can cause bad odours (e.g. ammonia) if urine and faeces are not regularly removed / cleaned. Ammonia can also be harmful to animals in the holding pens.

Ammonia may also be accidentally released from the refrigeration system and is corrosive and an irritant and can cause significantly reduced air quality in the immediate vicinity of the leak or if contained inside a closed building.

Dust may be generated should any construction take place or during the excavation and or maintenance of the disposal pits.

The boiler is the principal emitter of air pollutants and of key concern are the “exhaust” gases: nitrous oxides, sulphurous oxides, hydrocarbons, carbon monoxide, carbon dioxide, and particulate matter, which are all considered to be significant sources of air pollution. Gases emitted from the boiler contribute to the greenhouse effect. The volume associated with these releases during the operational phase are insignificant, however may have a cumulative effect on the airshed. Mariental is associated with a lower relief due to the Fish River. The valley accommodates air inversions especially during the winter months, when cooler air is trapped, accumulating pollution. However, the site is located outside the Mariental urban centre (with related, elevated greenhouse gas emissions) and will contribute negligible amounts of pollution to the airshed.

Although diesel is not as volatile, limited fuel vapours may still be released into the air during refilling of the bulk diesel storage tank. Prolonged exposure may have carcinogenic effects.

Desired Outcome: To prevent any nuisance and reduce emissions.

Actions

Prevention:

- ◆ Good housekeeping is essential not only to stop odours from developing, but also to ensure hygienic conditions.
- ◆ The boiler must use clean fuels free of heavy metals and toxic wastes.
- ◆ The boiler stack should be high enough to prevent ground level concentrations of pollutants from reaching undesirable levels (refer to International Finance Corporation / World Bank: General Environmental, Health, and Safety Guidelines: Environmental Air Emissions and Ambient Air Quality)
- ◆ Adopt strategies to reduce odours from the animal holding pens. These can include:
 - Scraping and removing the manure for disposal, then washing down using low volume high pressure water spray as soon as possible after sheep leaves the pen.
 - If sheep remain in the pens for longer periods, manure should be collected and disposed of daily.
- ◆ Obtain expert input in the best practice (and rehabilitation or re-design) of effluent ponds to ensure their optimum functioning. During commissioning, odours produced by anaerobic waste treatment ponds can potentially be reduced by aspects such as:

- Allowing some fat and manure solids to pass to the pond to establish a crust of 100 mm thick on the surface of the anaerobic ponds (first ponds).
- Layering of reeds on the surface of the anaerobic pond.
- Using the minimum amount of chemicals necessary for cleaning purposes to reduce the volume of chemicals entering the ponds as well as investigating biodegradable chemical alternatives.
- An appropriate starter culture or enzyme can be used to establish pond equilibrium (also in the event of a pond treatment failure).
- ◆ All slaughterhouse waste should be buried under at least 60 cm deep soil to prevent odours from escaping or exposure of the waste by animals, wind or storm water. The addition of ammonium sulphate or lime to slaughterhouse waste should be contemplated to speed up decay.
- ◆ The skin drying area should be well ventilated.
- ◆ Ammonia has a strong smell and leaks are typically quickly detected by smell only. However, leak detectors should be considered since personnel will not always be present.

Mitigation:

- ◆ Compressor rooms and ammonia storage rooms, if not well ventilated, must have extractors in case of leaks or accidental ammonia releases.
- ◆ Dust suppression to be conducted if required during earthworks (e.g. digging pits at landfill, maintaining effluent ponds, etc.)

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ Maintain a complaints register.
- ◆ Bi-annual reporting on complaints and actions taken to address complaints and prevent future occurrences.

6.4.7 Noise

The multifaceted operations of an abattoir involve various systems and machines which will generate noise of various intensity. These include compressors, pressure washers, electrical saws, etc. Maintenance and construction activities may cause temporary elevated noise levels. Noise impacts will be limited to workers and visitors present on site as no other receptors (neighbours) are present near the facility.

Desired Outcome: To prevent any nuisance and hearing loss due to loud noise.

Actions

Prevention:

- ◆ For various components of the abattoir and surroundings, adhere to the applicable prescribed noise levels as contained in:
 - *Labour Act, 1992: Regulations relating to the health and safety of employees at work*
 - *European Union noise standards for export abattoirs.*
 - *World Health Organization (WHO) guidelines on maximum noise levels (Guidelines for Community Noise, 1999).* [Applicable where new receptors establish on neighbouring properties.]
- ◆ All machinery and vehicles must be regularly serviced and lubricated where applicable to ensure minimal noise production.
- ◆ Where relevant, install mechanical equipment on mounts designed to isolate structure-borne vibration and noise.
- ◆ All ventilation and extractor fans should be noise efficient or fitted with silencers, and all ducts could be lined with sound-absorbent material, if required.

Mitigation:

- ◆ Follow recommendations from occupational hygiene survey regarding occupational exposures and mitigation which may include noise barriers such as screens around noisy equipment and operations and hearing protectors as standard PPE for workers in situations with elevated noise levels.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ WHO Guidelines.
- ◆ Maintain a complaints register.
- ◆ Bi-annual reporting on complaints and actions taken to address complaints and prevent future occurrences.

6.4.8 Liquid Waste – Industrial Waste Water

Industrial waste water to be managed on site consists of wash water from the slaughtering, processing and cold storage areas, wash water from the holding pens and truck washing area, blood, excrement, cleaning chemicals, and slaughterhouse wastes.

Waste water containing solids is screened to separate solids from water and/or solids are allowed to settle out of suspension in the sump. Due to the blood and biological contents of the waste water, it has a very high organic load with a high BOD / COD. The waste water is disposed of in on-site effluent ponds while solids are disposed of in a land fill as indicated in section 6.4.10. In terms of the *Department of Water Affairs and Forestry, Code of Practice volume 2 Pond Systems General Guidelines*, no effluent from a pond system may be released into the environment. It states: “Generally, open ponds cannot produce a final effluent complying with the currently applicable Namibian standards for effluent discharge, viz the General Standard of Act No. 24 of 2004 [Water Resources Management Act, 2004]. Therefore, final effluent produced by a pond system will not be allowed for discharge into the environment. However, this effluent would be suitable for limited reuse, provided maturation ponds and proper disinfection is included. Limited reuse would typically include gardening, lawns, sports fields and certain agricultural produce. Where new ponds are constructed and the final effluent is not reused for irrigation, they should be of sufficient size (area) to ensure that all water is evaporated. Since water is a scarce commodity in Namibia, reuse thereof is strongly encouraged. A reuse permit obtainable from the Department of Water Affairs is required for this purpose.”

Desired Outcome: To reduce the amount of industrial waste water produced, and to adequately contain and treat waste water to prevent pollution of the environment and to prevent health hazards associated with the effluent treatment facilities. Treated water released into the environment must comply with effluent disposal permit conditions and specifically Namibian standards for effluent discharge, as per the Water Resources Management Act of 2004.

Actions

Prevention:

- ◆ Develop and implement an effluent management plan, this should include waste water reduction initiatives and regular inspection and maintenance of wastewater reticulation and treatment infrastructure.
- ◆ Effluent ponds to be managed as per the *Department of Water Affairs and Forestry, Code of Practice volume 2 Pond Systems General Guidelines*. Obtain expert input in the best practice (and rehabilitation or re-design) of effluent ponds to ensure their optimum functioning and adherence to *Code of Practice volume 2*.
- ◆ Regular monitoring, sampling and analysis of the oxidation ponds to ensure adequate treatment as per *Code of Practice volume 2* and effluent discharge permit conditions.
- ◆ No effluent may be released (accidentally or purposefully) from any of the ponds, but should instead be allowed to evaporate from the final evaporation ponds, unless the final effluent first pass through additional treatment processes to ensure quality complies with Department of Water Affairs’ prescribed standards. The beneficial use of wastewater could then be considered (e.g. irrigation use).
- ◆ The ponds should be fenced as per *Code of Practice volume 2*.
- ◆ All foreign material must be collected and prevented from entering the wastewater stream.
- ◆ Regular monitoring and periodic cleaning of ponds to ensure depth and capacity remain adequate (employment of management measures to reduce sedimentation, etc.).

Mitigation:

- ◆ To reduce effluent volumes the following should be considered:
 - Operators should be trained in water conservation and water usage monitoring.
 - Use high pressure low volume water hoses to minimise the amount of water required for cleaning operational areas.
 - Water used for general washing must be pressurized.

- Cold water must be used to clean surfaces soiled with blood (except periodic deep cleaning at the end of the day) as the use of hot water causes congealing of the blood, making cleaning more difficult, thus resulting in unnecessary wastage of water.
- All hoses must be fitted with self-closing nozzles to prevent wastage when not in use. Where the hoses are frequently used, pistol grips must be used.
- All hoses, fittings and connections must be leak free and replaced if leaks are detected.
- Slaughterhouse waste and manure in the pens can be dry swept and removed prior to the areas being washed.
- ◆ To reduce the organic load of industrial wastewater beneficial use of blood can be investigated. This will not only improve the conditions in the effluent ponds, but may also create additional economic spinoffs.
- ◆ Biodegradable cleaning materials should be investigated to limit impacts on the effluent ponds and the environment.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ *Department of Water Affairs and Forestry, Code of Practice volume 2 Pond Systems General Guidelines.*
- ◆ Effluent discharge permit.
- ◆ Monitoring results of the effluent pond system should be kept on file, including effluent quality and quantity. Refer to effluent discharge permit monitoring requirements.
- ◆ All information and reporting to be included in a bi-annual report.

6.4.9 Liquid Waste – Sewage Effluent

Sewage originates from ablution facilities and kitchens. It is disposed of in two septic tanks.

Desired Outcome: To reduce the amount of sewage produced, and to adequately contain and treat sewage to prevent pollution of the environment and to prevent health hazards associated with the septic tanks

Actions

Prevention:

- ◆ The septic tanks should be designed and operated according to the general guidelines set forth in the *Department of Water Affairs and Forestry, Code of Practice: Volume 1, Septic tank Systems* including wastewater discharge permit conditions.
- ◆ Ensure all ablution facilities are connected to the septic tanks to prevent groundwater contamination.
- ◆ No foreign objects, hazardous chemicals, fuels or excessive amounts of cooking grease may enter the sewage system.
- ◆ Switch to bio-degradable, septic tank friendly cleaning chemicals where available.
- ◆ When septic tanks are full, the liquid can be pumped into the effluent pond system or alternatively be collected and disposed of at the municipal sewage treatment facility. No effluent may be disposed of directly into the environment.
- ◆ Should the septic tanks be decommissioned, all waste should be removed from the tank and disposed of at a registered sewage treatment facility prior to decommissioning. The septic tanks should then be backfilled to prevent collapse and animals or people falling into them.

Mitigation:

- ◆ Promote and implement water saving strategies including water saving devices in ablution facilities in order to reduce the volume of sewage produced.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ *Department of Water Affairs and Forestry, Code of Practice: Volume 1, Septic tank Systems*
- ◆ Wastewater discharge permit.
- ◆ A register of septic tank maintenance should be kept.
- ◆ All information and reporting to be included in a bi-annual report.

6.4.10 Solid Waste Production

Solid waste can be faeces from the holding pens, slaughterhouse wastes or it can be waste originating from kitchens, offices, workshops, etc. Maintenance waste can include discarded or obsolete equipment. Some wastes can be dangerous / hazardous such as diseased animal carcasses, obsolete or expired chemicals, contaminated fuels or chemicals, etc.

Slaughterhouse waste and condemned material are disposed of by means of burying. All other waste is disposed of at the Mariental municipal refuse disposal facility.

Desired Outcome: To reduce the amount of waste produced, and prevent pollution and littering.

Actions

Prevention:

- ◆ Develop and implement a waste management program, this should include waste reduction and recycling initiatives and regular inspection and maintenance of waste storage and disposal areas.
- ◆ All employees should be educated on proper waste handling and disposal and importantly on the segregation of waste according to the different waste streams and their appropriate disposal locations.
- ◆ Ensure adequate temporary waste storage facilities are available that prevents waste being blown away by wind and prevent scavenging (human and non-human) of waste.
- ◆ Composting of manure should be done in pits or bunkers instead of stacks and heaps and according to best practise for abattoir compost waste.
- ◆ Only slaughterhouse waste and condemned material resulting from the slaughtering process should be disposed of at the landfill area and no foreign materials such as plastic, glass, ear tags, etc. may be disposed there.
- ◆ Slaughterhouse waste that are buried must be covered by at least 60 cm of clean soil and not less than 100 m from the abattoir, providing such material may not be harmful to the hygiene of the abattoir.
- ◆ No unauthorised people should be allowed access to the landfill area.
- ◆ All hazardous materials, including chemical container disposal, should be conducted as per their MSDS instructions.
- ◆ Should any buildings or structures be decommissioned, all waste and infrastructure should be disposed of at a pre-approved landfill site.
- ◆ See the material safety data sheets available from suppliers for disposal of contaminated products and empty containers. All hazardous waste chemicals containers requiring a triple rinse system for disposal purposes, should have the rinse water collected in a separate system and not disposed of into the oxidation ponds unless approved as per a chemical and biological assessment of the ponds and related interaction with the hazardous chemicals.

Mitigation:

- ◆ Waste should be disposed of regularly.
- ◆ Liaise with the local authority regarding waste and handling of hazardous waste.
- ◆ Investigate alternative techniques for disposal of slaughterhouse wastes such as composting by anaerobic digestion in windrows, alkaline hydrolysis, etc., with adequate destruction of all pathogens to enable beneficial use as for example fertilizers. This will not only reduce the environmental impact, but may also have positive economic spinoffs.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ A register of hazardous waste disposal should be kept. This should include type of waste, volume as well as disposal method/facility.

- ◆ Any complaints received regarding waste should be recorded with notes on action taken.
- ◆ All information and reporting to be included in a bi-annual report.

6.4.11 Ecosystem and Biodiversity Impact

The facility was established many years ago and no major infrastructure additions are planned in the near future. Operational areas around the abattoir are devoid of vegetation however the inherent nature of the effluent ponds is that of a man-made wetland which provides a suitable habitat for various species of plants and animals, notably birds. Some of these species are beneficial to the pond system, e.g. reeds, and may continue to thrive in suitable conditions. However, the risk of contamination of the site and surrounding remains if the ponds' embankments are damaged and effluent drains into the surrounding environment or if the ponds' efficiency is low and effluent is not decomposed sufficiently.

The landfill areas has been used extensively in the past. As such the vegetation structure has changed significantly and *Prosopis* trees proliferate in these disturbed areas. No protected trees were observed to be present in the area. Condemned material disposed in the landfill pose risks of transferring pathogens to wild animals scavenging on exposed waste.

Soil contamination due to hazardous substance or fuel spillages may present risks to ecosystems.

Infrastructure components such as the powerline and transformers present areas for bird nesting sites. The powerline and photovoltaic plant also presents a hazard to some birds while flying.

Diseased wild animals may enter the holding pens and infect livestock to be slaughtered, especially if they are kept in the pens for longer periods due to unforeseen circumstances.

Desired Outcome: To avoid impacts on the ecological environment.

Actions.

Prevention:

- ◆ Educate all contracted and permanent employees on the value of biodiversity.
- ◆ Disciplinary actions to be taken against all employees failing to comply with contractual conditions related to poaching and the environment.
- ◆ Fencing of areas such as the oxidation ponds and disposal pit to prevent scavenging by animals. Regular inspection and maintenance of all fences.
- ◆ All fuel and chemical storage to be conducted as per relevant SANS or MSDS instructions to prevent ecological damage.
- ◆ Birds should be deterred from nesting on infrastructure.
- ◆ Regular monitoring of the powerline and photovoltaic plant for bird strikes and nesting. For the powerline the relevant authority needs to be informed of such events while the Proponent should implement deterrent measures for the photovoltaic plant.
- ◆ Removal of trees, especially protected species and large trees, must be avoided and is subject to permitting from the Directorate of Forestry.

Mitigation:

- ◆ Mitigation measures related to waste handling and the prevention of groundwater, surface water and soil contamination should limit ecosystem and biodiversity impacts.
- ◆ All alien invasive *Prosopis* must be eradicated from the premises.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Visual observation for scavenging animals / birds, specifically at the landfill.
- ◆ All information and reporting to be included in a bi-annual report.

6.4.12 Soil structure disturbance and / or contamination

Various activities have already occurred on site which have significantly impacted the soil structure. These include the establishment of the infrastructure (foundation and compaction of surrounds), solar photovoltaic plant, oxidation ponds, holding pens and during the operations of the landfill area. Operations will see continued movement of heavy motor vehicles across the site and around the operations, resulting in compaction or disturbance of the topsoil. Compaction of topsoil can increase runoff potential while soil disturbance can result in excessive dust during windy conditions.

Excavations required for the continued burying of solid waste material will continue soil structure compromise as excavated soil (which includes layers of topsoil and subsoil) are mixed over material to be buried. The chemical and biological nature of the waste has the potential to further change the composition of the soil and this can be accelerated during rainfall events. Decomposition of the waste in the landfill may lead to a nutrient overload, a form of soil contamination / pollution.

Contamination of soil may further occur as a result of vehicles leaking fuel, oil or hydraulic fluids and the spillages or incorrect disposal of chemicals.

Anthropogenic activities and modification of topography, by the Proponent and by neighbours, influence surface flow and may result in erosion, especially where vegetation is disturbed.

Desired Outcome: To prevent soil contamination, soil structure disturbance and erosion

Actions

Prevention:

- ◆ Proper training of employees and of operators of machinery and vehicles must be conducted on a regular basis (fuel and chemical handling, spill detection, spill control).
- ◆ All machinery and vehicles should be properly maintained to be in a good working condition during operations.
- ◆ Employ drip trays and spill kits when servicing / repairs of equipment are needed.
- ◆ Standard operating procedures should be developed and implemented for the use of hazardous materials.
- ◆ All harmful chemicals should be stored according to relevant MSDS requirements and a register maintained of all stored chemicals and their volumes.
- ◆ Fuel storage and handling according to SANS standards including storing fuel in a closed, banded area and the use of drip trays or spill proof surfaces where fuel is handled. The banded area should only be drained after rain events, once it is assured no fuel is present, or after any fuel present is removed (oil / water separator).
- ◆ No off-road driving should be allowed.
- ◆ Investigate the flood risk posed by changes in topography and devise a flood management strategy to protect infrastructure and people, prevent erosion and prevent water from carrying pollutants (effluent and slaughterhouse waste) away from the site.

Mitigation:

- ◆ Spill clean-up means must be readily available on site as per the relevant MSDS for all chemicals and fuels and spills should be cleaned immediately.
- ◆ Any fuel spillage of more than 200 litres must be reported to the Ministry of Mines and Energy. Keep proof of submission.
- ◆ The fuel storage bund area must be cleaned if any fuel products are present and this waste must be disposed of at a suitably classified hazardous waste disposal facility.
- ◆ Any erosion gullies should be documented and repaired together with preventative measures implemented.

- ◆ Any berm erosion should be repaired as soon as possible and documented together with preventative measures implemented.
- ◆ Any erosion of effluent pond embankments or related structures should be repaired immediately and documented together with preventative measures implemented.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ A report should be compiled bi-annually of all spills or leakages reported. The report should contain the following information: date and duration of spill, product spilled, volume of spill, remedial action taken.
- ◆ Records should be kept of any berm repairs conducted.
- ◆ Records should be kept of any pond repairs conducted.
- ◆ All reporting to be included in a bi-annual summary report.

6.4.13 Groundwater and Surface Water Contamination

Groundwater is not utilised in the area and is expected to be slightly saline. Contamination of groundwater can occur should untreated or partially treated effluent (sewage and industrial), decomposing biological waste (buried), chemicals or fuels from the abattoir seep into the soil and ultimately the groundwater.

Surface runoff from the site drains to the Fish River, downstream of the Hardap Dam. Water in the river here mainly originates from the Hardap Irrigation Scheme and as such is highly degraded as a result of extensive use of fertilizers and pesticides. It does however support some aquatic life. The Fish River will get contaminated if potential pollutants wash into drainage lines and ultimately the Fish River during high rainfall events. Contamination of the river will decrease the dissolved oxygen content of water and may impact aquatic life. In addition, macronutrients such as nitrogen and phosphorus may cause eutrophication which further reduces the dissolved oxygen levels. Chemical compounds from surfactants and detergents will also impact aquatic life while some pathogens may also be present in the effluent. While water from the Fish River in the Hardap Irrigation Scheme area is not utilised, the pollutants may travel downstream to areas where water is utilised for stock watering and even as potable source.

Fuel supply is handled by a third party supplier, but the facility is operated by the Proponent. The Proponent is thus responsible for daily checks and for emergency procedures to be executed in case of a leak / spill since the supplier will not always be present on site.

Desired Outcome: To prevent the contamination of surface and groundwater.

Actions

Prevention:

- ◆ All effluent ponds to be managed as per the *Department of Water Affairs and Forestry, Code of Practice volume 2 Pond Systems General Guidelines*. Obtain expert input in the best practice (and rehabilitation or re-design) of effluent ponds to ensure their optimum functioning and adherence to *Code of Practice volume 2*.
- ◆ The septic tank should be designed and operated according to the general guidelines set forth in the *Department of Water Affairs and Forestry, Code of Practice: Volume 1, Septic tank Systems*.
- ◆ Embankments of oxidation ponds must be regularly inspected and maintained to ensure their integrity is maintained and that they do not become eroded due to overflowing or rain.
- ◆ Continual cleaning and monitoring of ponds to ensure depth and capacity remain adequate. Remove sludge when build-up is approximately half the total volume of the dam. Liaise with the municipality for the disposal of sludge.
- ◆ See the material safety data sheets available from suppliers for disposal of contaminated products and empty containers. All hazardous waste chemicals containers, requiring a triple rinse system for disposal purposes, should have the rinse water collected in a separate system and not disposed of into the oxidation ponds unless approved as per a chemical and biological assessment of the ponds and related interaction with the hazardous chemicals.
- ◆ Proper training of employees and of operators of machinery and vehicles must be conducted on a regular basis (fuel and chemical handling, spill detection, spill control).
- ◆ All machinery and vehicles should be properly maintained to be in a good working condition during operations.
- ◆ Employ drip trays and spill kits when servicing / repairs of equipment are needed.
- ◆ Standard operating procedures should be developed and implemented for the use of hazardous materials.
- ◆ All hazardous chemical should be stored in a sufficiently bunded area and a register maintained of all such chemicals and their volumes.

- ◆ Fuel storage and handling according to SANS standards including storing fuel in a closed bunded area and the use of drip trays or spill proof surfaces where fuel is handled. The bunded area should only be drained after rain events once it is assured no fuel is present or after any fuel present is removed (oil / water separator).

Mitigation:

- ◆ Spill clean-up means must be readily available on site as per the relevant MSDS for all chemicals and fuels.
- ◆ Any fuel spillage of more than 200 litres must be reported to the Ministry of Mines and Energy.
- ◆ The fuel storage bund area must be cleaned if any fuel products are present and this waste must be disposed of at a suitably classified hazardous waste disposal facility.
- ◆ Any incident related to the contamination from the oxidation ponds, should be communicated to downstream community and relevant authorities.
- ◆ Groundwater monitoring and corrective action if water quality deteriorates.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ *Department of Water Affairs and Forestry, Code of Practice volume 2 Pond Systems General Guidelines.*
- ◆ *Department of Water Affairs and Forestry, Code of Practice: Volume 1, Septic tank Systems.*
- ◆ Wastewater discharge permits for both the ponds and the septic tanks.
- ◆ At least one monitoring borehole must be installed on the downstream slope of the effluent ponds and one downstream of the landfill area. An upstream monitoring hole for baseline comparison should be placed near the property boundary, upstream of any site related contamination sources. Groundwater must be monitored quarterly for potential contamination or deterioration. Samples must be analysed for levels of copper, zinc, faecal coliforms, conductivity, pH, free and saline ammonia, nitrates and nitrites, and orthophosphates, or according to the effluent disposal permit, if specified. Potable water standards stipulated by the DWA for the above mentioned components must be used as a baseline for comparative analyses to monitor potential groundwater contamination by the activities.
- ◆ A report should be compiled bi-annually of all spills or leakages reported. The report should contain the following information: date and duration of spill, product spilled, volume of spill, remedial action taken.

6.4.14 Water Supply

Water usage is minimal between slaughtering events but relatively large volumes are required during slaughtering. Water use is however not expected to impact on any nearby users, but water saving remains paramount in a dry country like Namibia. Interruptions in freshwater supply to the abattoir will negatively impact operations of the abattoir. Poor quality water may have health impacts.

Desired Outcome: To utilise water sustainably and ensure an adequate supply of water remains available to the abattoir.

Actions

Prevention:

- ◆ The abattoir must have suitable water storage on site to ensure a sufficient volume of water for animal watering and cleaning purposes are available in the eventuality that a water supply interruption occurs during a slaughtering event. Slaughtering of animals only to commence when proven water supply is available.
- ◆ The water must be clean, potable and free of suspended material and substances which could put health at risk.

Mitigation:

- ◆ Develop and implement a water management programme, which includes water use reduction measures, monitoring of water utilised and consumption volumes and regular inspections and maintenance of the water reticulation system.
- ◆ Periodic testing of water from the onsite water reservoir to determine quality and microbial proliferation problems.
- ◆ Should the water storage tank be contaminated, sterilisation, flushing and cleaning of the tank should be performed as appropriate.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Record water use statistics and water quality monitoring results.

6.4.15 Visual Impact

This impact is not only associated with the aesthetics of the site, but also the structural integrity of infrastructure. Glint and glare are concerns associated with the panels of the photovoltaic system. The facility is relatively isolated from receptors and will thus have a low glint and glare and visual impact. Operations will require cleaning of the entire slaughtering facility after each slaughtering event.

Desired Outcome: To minimise aesthetic impacts associated with the abattoir.

Actions

Prevention:

- ◆ Regular waste disposal and clearing of wastes on the entire premises.
- ◆ Solar panels of the photovoltaic system are to be well maintained and cracked or broken panels replaced.
- ◆ Earthworks to be conducted in an orderly fashion without scarring of the environment and clear indications of restricted areas.
- ◆ Regular waste disposal, good housekeeping and routine maintenance on infrastructure will ensure that the longevity of structures are maximised and a low visual impact is maintained.
- ◆ The minimal lighting required should be used at night and it must be directed downwards to ensure a minimal visual impact. Auto dimming lights, when no movement is detected, should be considered for external operational areas.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ A report should be compiled of all complaints received and actions taken.

6.4.16 Traffic

Operations of the abattoir will increase traffic flow on the B1 Highway and potential incidents and accidents at the turnoff to the abattoir. Slow moving traffic (tractors) originating from the Hardap Irrigation Scheme use the B1 Highway and increases collision risks.

Desired Outcome: Minimum impact on traffic and no transport or traffic related incidents.

Actions

Prevention:

- ◆ Erect clear signage regarding the turnoff from the B1 Highway to the facility.
- ◆ All vehicles owned by the Proponent to operate within the Traffic and Transport Act regulation, specifically also in terms of roadworthiness.

Mitigation:

- ◆ If any traffic impacts are expected, traffic management should be performed to prevent these.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ Any complaints received regarding traffic issues should be recorded together with action taken to prevent impacts from repeating itself.
- ◆ A bi-annual report should be compiled of all incidents reported, complaints received, and action taken.

6.4.17 Cumulative Impact

Possible cumulative impacts associated with the operational phase and any maintenance / construction activities are mainly linked to employment (positive impact) and pollution, water demand, traffic and greenhouse gas emissions (negative impacts).

Desired Outcome: To minimise all cumulative negative impacts associated with the facility, while enhancing positive impacts.

Actions

Mitigation:

- ◆ Addressing each of the individual impacts as discussed and recommended in the EMP would reduce the cumulative impact.
- ◆ Reviewing biannual and annual reports for any new or re-occurring impacts or problems would aid in identifying cumulative impacts and help in planning if the existing mitigations are insufficient.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Bi-annual summary report based on all other impacts must be created to give an overall assessment of the impact of the operational phase.

6.5 DECOMMISSIONING AND REHABILITATION

Decommissioning is not foreseen during the validity of the ECC. Construction activities may however include modification and decommissioning of some onsite structures. Should decommissioning occur at any stage, rehabilitation of the area may be required. Prior to the complete decommissioning of the abattoir, the post closure land use should be assessed. It is recommended that the abattoir either be sold, or all infrastructure be offered to the local community in order to continue with the operations. This will mitigate the possible impacts associated with job losses etc. The existing EIA and EMP should further be transferred to the new owner to ensure continual compliance with EMP requirements.

In the event where the abattoir cannot be sold, decommissioning will entail the complete removal of all infrastructure including buildings and underground infrastructure, if any, not forming part of post decommissioning land use. Any pollution present on the site must be remediated. The impacts associated with this phase include noise and waste production as structures are dismantled. Noise must be kept within WHO standards and waste should be contained and disposed of at an appropriately classified and approved waste facility and not dumped in the surrounding areas. Should operations be decommissioned with no employment or remuneration plan for the employees, a significant social and economic impact will be suffered by the local community. The EMP for the abattoir will have to be reviewed and updated prior to decommissioning to cater for changes made to the site and implement guidelines and mitigation measures related to social and environmental aspects.

6.6 ENVIRONMENTAL MANAGEMENT SYSTEM

The Proponent could implement an Environmental Management System (EMS) for their operations. An EMS is an internationally recognized and certified management system that will ensure ongoing incorporation of environmental constraints. At the heart of an EMS is the concept of continual improvement of environmental performance with resulting increases in operational efficiency, financial savings and reduction in environmental, health and safety risks. An effective EMS would need to include the following elements:

- ◆ A stated environmental policy which sets the desired level of environmental performance;
- ◆ An environmental legal register;
- ◆ An institutional structure which sets out the responsibility, authority, lines of communication and resources needed to implement the EMS;
- ◆ Identification of environmental, safety and health training needs;
- ◆ An environmental program(s) stipulating environmental objectives and targets to be met, and work instructions and controls to be applied in order to achieve compliance with the environmental policy; and
- ◆ Periodic (internal and external) audits and reviews of environmental performance and the effectiveness of the EMS.
- ◆ The EMP.

7 CONCLUSION

Reinstating the operations of the abattoir will have a positive impact on the agricultural sector operational in the area and Namibia. It will provide employment opportunities and skills development to a local workforce. Revenue will be generated and the export of meat will contribute to a positive trade balance.

Negative impacts associated with the operations and maintenance / construction activities related to some onsite structures, can successfully be mitigated. Implementing a safety, health, environment and quality (SHEQ) policy will contribute to effective management procedures to prevent and mitigate impacts. All regulations relating to abattoirs, the meat industry and health and safety legislation should be implemented. Groundwater and soil pollution must be prevented at all times and this requires adequate treatment of wastewater in the effluent ponds and septic tanks. As well as adequate decomposition of slaughterhouse wastes without overloading the soil with nutrients. Fire prevention should be key and fire response plans must be in place and regular training provided. Any waste

produced must regularly be removed and/or disposed of. Beneficial use or recycling of waste should be investigated / promoted where possible. Hazardous waste must be disposed of at an approved hazardous waste disposal site.

The updated EMP should be used as an on-site reference document for the operations of the abattoir. Parties responsible for transgressing of the EMP should be held responsible for any rehabilitation that may need to be undertaken. The Proponent could use an in-house environment management system in conjunction with the environmental management plan. All operational personnel must be taught the contents of these documents.

8 REFERENCES

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Directorate of Environmental Affairs, 2008. Procedures and Guidelines for Environmental Impact Assessment (EIA) and Environmental Management Plans (EMP), Directorate of Environmental Affairs, Ministry of Environment and Tourism, Windhoek.

Funk, C., Peterson, P., Landsfeld, M., Pedreros, D., Verdin, J., Shukla, S., Husak, G., Rowland, J., Harrison, L., Hoell, A. and Michaelsen, J., (2015) The climate hazards group infrared precipitation with stations - A new environmental record for monitoring extremes. *Scientific Data*, 2, 150066. <https://doi.org/10.1038/sdata.2015.66>

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<https://www.intechopen.com/chapters/52474> accessed 30 May 2022

Meteorological Services Department; Climate Data.

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Namibia Statistics Agency. Namibia household Income and Expenditure Survey 2009/2010.

Appendix A: Supporting Documentation

Registration with the Meat Board of Namibia

ABATTOIR REGISTRATION CERTIFICATE

THIS IS TO CERTIFY THAT





Meat Board of Namibia

Name of Facility: Farmers Meat Market Abattoir (PTY) LTD
Physical Address of Abattoir: Mariental
Class: B
Owner: O & L
Operator: H. M. Louw
Identification Number: 95/286


Has been registered and graded as an Abattoir / Processing Facility in terms of the Meat Industry Act, 1981 (Nr. 12 of 1981) And as amended by the Meat Industry Act, 1992 (Nr. 21 of 1992).

Registration No: 2022/04
Abattoir Producer No: 2717
Effective from: 24 February 2022
Expiry Date: 30 June 2023


Chief Executive Officer


Manager Meat Standards

Municipal Registration of Fitness


REPUBLIC OF NAMIBIA
MARIENTAL DISTRICT OFFICE

Private Bag 2014 Tel No: 063-245250
Fax No: 063-240303

CERTIFICATE OF FITNESS

This is to certify that the premises of the under mentioned person/s have been registered in terms of the General Health Regulations(GN 121 dated 14 October 1969) as amended for carrying on a business as stipulated.

Trade Name: FARMERS MEAT MARKET

Physical Address: PORTION 6 OF FARM KEIKANACHAB


Name of Owner/Manager: O & L

ABATTOIR


REQUIREMENTS ON WHICH CERTIFICATE OF FITNESS IS GRANTED

To comply with the requirements as laid down in General Health Regulation[GN 121/1969] as amended.

As soon as the above mentioned have been completed with, application must be made for the necessary certificate of Registration. This certificate expires on 31st March 2023



ENVIRONMENTAL HEALTH PRACTITIONER


DATE/STAMP

Notice of Intent to Reopen Farmers Meat Market: Ministry of Agriculture, Water and Land Reform



REPUBLIC OF NAMIBIA

MINISTRY OF AGRICULTURE, WATER AND LAND REFORM

Tel:	(+264) 61 2087509	Directorate of Veterinary Services
Fax:	(+264) 61 2087779	Private Bag 12022
Enquiry:	Dr. J.A Kamwi-Jolaiya	AUSSPANPLATZ
Email:	Jessey.Kamwi@mawlr.gov.na	

Ref. No: V14/1/P

16 March 2022

**TO: MANAGING DIRECTOR HARTLIEF
FARMERS MEAT MARKET MARIENTAL ABATTOIR
P.O BOX 862, MARIENTAL
NAMIBIA
TEL: 063-241001; FAX: 063-240356
EMAIL: fmweb@mweb.co.na**

ATT: MR. GUNTHER LING

RE: NOTICE OF INTENT TO REOPEN FARMERS MEAT MARKET ABATTOIR NA21 FOR EXPORT

Dear Mr. Ling,

Your letter on the above mentioned subject is received and hereby acknowledged.

The Ministry of Agriculture, Water and Land Reform through the Directorate of Veterinary Services welcomes Farmers' Meat Market Abattoir's (FMM) intention to re-open for the export of lamb/mutton and game meat to domestic (Namibia), regional (South Africa and Botswana), and international markets (EU, EFTA as initial markets and long term to China and Middle East).

As explained at our meeting held at the Ministry on 16 February 2022, FMM abattoir managers (Mr Nazeem and team) engaged DVS in December 2021 and received the application form which contains the details required to be in place for starting/re-starting the process for an abattoir to be approved for exports.

DVS awaits confirmation from FMM on its readiness for audits to commence towards certification for export approval. As explained previously, the establishment has to be in production and needs to comply with national and export market regulatory requirements inclusive of food safety management system (food safety certification is conducted by a third party engaged by FMM).

There is a team of Veterinary Officials at FMM headed by Dr. Kanutus. Mr. Nazeem and managers at FMM need to liaise with Dr. Kanutus once the abattoir is ready for inspections by DVS. Once FMM implements all that is required they will request audit(s) from DVS HQ through Dr. Kotokeni and her team.

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Recommendation for export approval and certification thereof will be done once there is compliance and importing countries have accepted the recommendations for export approval.

N.B. FMM should engage with:

1. Ministry of Environment, Tourism and Forestry to obtain the necessary hunting permits for springbok in preparation of game meat exports (trials and production);
2. DVS Animal Disease Control for requirements pertaining to *Brucella mellitensis* testing and other Animal Health requirements;
3. DVS NamLITs for requirements related registration on the NamLITs database as an abattoir (irrespective of market access status) as well as other requirements e.g. monthly data submissions etc;
4. DVS Veterinary Public Health, Mariental (Dr Kanutus) for export compliance, (monthly returns, monthly payments etc when abattoir is operational)

Kindly take note that approval for the marketing of meat and meat products on the domestic (Namibian) market falls under the jurisdiction of the local authority (Mariental Town Council). However once FMM is certified as an export abattoir, products produced under the direct supervision of Veterinary officials can also be marketed domestically.

For ease of reference kindly find attached Annexure that contains a list of regulatory requirements that FMM needs to acquaint itself with for export market compliance. The complete list will be availed to your officials at FMM; they are familiar with a number of the legislations contained below with the exception of perhaps Botswana.

Thanking you in advance for your cooperation.

Regards,



DR. JESSEY A. KAMWI-JOLAIYA
DEPUTY CHIEF VETERINARY OFFICER, VETERINARY PUBLIC HEALTH
For **CHIEF VETERINARY OFFICER**



Summary of national and international laws that FMM needs to implement and comply with for export approval

a) Animal health and livestock identification and traceability

EU LEGISLATION	NATIONAL (NAMIBIAN) LEGISLATION /PROVISION	SOUTH AFRICAN LEGISLATION/ PROVISION	BOTSWANA LEGISLATION/ PROVISION
Regulation (EU) 2016/429	Animal Health Act, No. 1 of 2011	Animal Health Act, No. 35 of 1984	Diseases of Animals Act (Chapter 37:01)
Delegated Regulation (EU) 2020/692			
Council Regulation (EC) No 21/2004 and amendments	Animal Identification Regulations (Animal Health Act, No. 1 of 2011)	Animal Identification Act, No.6 of 2002	Diseases Of Animals (Animal Information System) Regulations (Section 19) (26th January, 2018)

b) Food safety

EU LEGISLATION	NATIONAL LEGISLATION/PROVISION	SOUTH AFRICAN LEGISLATION/ PROVISION	BOTSWANA LEGISLATION/ PROVISION
Directive 98/83/EC	Codex Alimentarius standards and guidelines	Compulsory National Standards for the Quality of Potable Drinking Water (DWAF, 1996), SANS 241 and amendments	National Water Standards, BOS 32
Directive (EU) 2020/2184	Water Resources Management Act, No.11 of 2013 DVS Circular V4/2007	Meat Safety Act, 40 of 2000	
Regulation (EU) No 1169/2011 and amendments	RSA and EU legislations is used at respective abattoirs for export compliance	Foodstuffs, Cosmetics and Disinfectants Act, No.54 of 1972 and Food Labeling	Model animal health certificate for export to Botswana

					Regulations Consumer Protection Act 68 of 2008	
Regulation (EC) No 178/2002	General Food law (food safety)			Codex Alimentarius standards and guidelines DVS Circular V3/2012 and DVS Circular V19/2015 DVS Circular V3/2018	Foodstuffs, Cosmetics and Disinfectants Act, No.54 of 1972 and Regulation R908 Meat Safety Act, 40 of 2000	Food Control Act, 1993
Regulation (EC) No 852/2004	Hygiene of foodstuffs				Foodstuffs, Cosmetics and Disinfectants Act, No.54 of 1972 and Regulation R638 National Health Act, 2003 Meat Safety Act, 40 of 2000	Model animal health certificate for export to Botswana
Regulation (EC) No 853/2004	Hygiene of food of animal origin, in particular Annex I, II and III (sections I, V and XIII)			Codex Alimentarius standards and guidelines DVS Circular V3/2018 (sanitation/hygiene of foodstuffs)	Meat Safety Act, 40 of 2000	Model animal health certificate for export to Botswana
Council Directive 96/23/EC Commission Decision 2011/163/EU	Residues in livestock, meat and meat products and prohibited substances			Prevention of Undesirable Residues in Meat Act, No. 21 of 1991	Medicines and Related Substances Control Act, No. 15 of 1997 Animal Health Act, No. 35 of 1984 Meat Safety Act, 40 of 2000	Model animal health certificate for export to Botswana
Regulation (EC) No. 396/2005	Pesticide residues in food of animal origin					
Regulation (EC) No 854/2004	Official controls on products of animal origin, in particular article 12 and 14 and Annex I and VI			DVS Circular V3/2018, DVS Circular V5/2018 (post mortem inspection)	Meat Safety Act, 40 of 2000	Model animal health certificate for export to Botswana
Regulation (EC) No 2073/2005	Microbiological criteria for foodstuffs			Codex Alimentarius standards and guidelines DVS Circular V16/2007, DVS Circular V20/2015	Model animal health certificate for export to RSA Meat Safety Act, 40 of 2000	Model animal health certificate for export to Botswana
Commission Regulation (EC) No. 1688/2005	Microbiological criteria of foodstuffs: Salmonella for consignments destined for Finland, Sweden and Norway					
Commission Implementing Regulation (EU) 2020/2235	Model animal health certificate (meat) for export to the EU			DVS Circular V22/2013	Model animal health certificate for export to RSA Animal Health Act, No. 35 of 1984 Meat Safety Act, 40 of 2000	Model animal health certificate for export to Botswana
Regulation (EC) No 999/2001 and amendments	TSE Specified Risk Material (Bovine Spongiform Encephalopathy in bovines and Scrapie in sheep and goats)			DVS Circular V9/2008, DVS Circular V14/2013, DVS Circular V9/2017	Animal Health Act, No. 35 of 1984 Meat Safety Act, 40 of 2000	

c) *Animal welfare at slaughter*

EU LEGISLATION	NATIONAL LEGISLATION/PROVISION	SOUTH AFRICAN LEGISLATION/ PROVISION	BOTSWANA LEGISLATION/ PROVISION
Regulation (EC) No 1099/2009 Animal welfare at the time of killing	DVS Circular V10/2010, DVS Circular V4/2018	Animal Protection Act, No.71 of 1962 Meat Safety Act, 40 of 2000	

d) *Certification procedures*

EU LEGISLATION	NATIONAL LEGISLATION/PROVISION	SOUTH AFRICAN LEGISLATION/ PROVISION	BOTSWANA LEGISLATION/ PROVISION
Regulation (EC) No 854/2004 Certification of products of animal origin, in particular article 14 and Annex VI Commission Implementing Regulation (EU) 2020/2235 Model animal health certificate (meat) for export to the EU	DVS Circular V5/2008, DVS Circular V22/2013	Model animal health certificate for export to the RSA Animal Health Act, No. 35 of 1984	Model animal health certificate for export to the Botswana

*all listed regulatory requirements are available online for free. Abattoir management are required to be familiar with these for ease of reference and implementation.

**the minimum standards for trade in meat and meat products are dictated by Codex Alimentarius and OIE (World Organization for Animal Health) which are the International standards setting bodies for hygiene and food safety management systems and animal health respectively. Most countries have aligned their legislations to these two organizations. Namibia is a signatory to both of these two organizations and applies these standards as minimum requirements for any export approved establishment in addition to the importing country's laws.

Appendix B: Consultants' Curriculum Vitae

ENVIRONMENTAL SCIENTIST**André Faul**

André entered the environmental assessment profession at the beginning of 2013 and since then has worked on more than 160 environmental impact assessments including assessments of the petroleum industry, harbour expansions, irrigation schemes, township establishment and power generation and transmission. André's post graduate studies focussed on zoological and ecological sciences and he holds a M.Sc. in Conservation Ecology and a Ph.D. in Medical Bioscience. His expertise is in ecotoxicological related studies focussing specifically on endocrine disrupting chemicals. His Ph.D. thesis title was The Assessment of Namibian Water Resources for Endocrine Disruptors. Before joining the environmental assessment profession he worked for 12 years in the Environmental Section of the Department of Biological Sciences at the University of Namibia, first as laboratory technician and then as lecturer in biological and ecological sciences.

CURRICULUM VITAE ANDRÉ FAUL

Name of Firm : Geo Pollution Technologies (Pty) Ltd.
 Name of Staff : ANDRÉ FAUL
 Profession : Environmental Scientist
 Years' Experience : 21
 Nationality : Namibian
 Position : Environmental Scientist
 Specialisation : Environmental Toxicology
 Languages : Afrikaans – speaking, reading, writing – excellent
 English – speaking, reading, writing – excellent

EDUCATION AND PROFESSIONAL STATUS:

B.Sc. Zoology : University of Stellenbosch, 1999
 B.Sc. (Hons.) Zoology : University of Stellenbosch, 2000
 M.Sc. (Conservation Ecology): University of Stellenbosch, 2005
 Ph.D. (Medical Bioscience) : University of the Western Cape, 2018

First Aid Class A : EMTSS, 2017
 Basic Fire Fighting : EMTSS, 2017

PROFESSIONAL SOCIETY AFFILIATION:

Environmental Assessment Professionals of Namibia (Practitioner)

AREAS OF EXPERTISE:

Knowledge and expertise in:

- ◆ Water Sampling, Extractions and Analysis
- ◆ Biomonitoring and Bioassays
- ◆ Biodiversity Assessment
- ◆ Toxicology
- ◆ Restoration Ecology

EMPLOYMENT:

2013-Date : Geo Pollution Technologies – Environmental Scientist
 2005-2012 : Lecturer, University of Namibia
 2001-2004 : Laboratory Technician, University of Namibia

PUBLICATIONS:

Publications: 5
 Contract Reports +160
 Research Reports & Manuals: 5
 Conference Presentations: 1

ENVIRONMENTAL ASSESSMENT PRACTITIONER**Quzette Bosman**

Quzette Bosman has 16 years' experience in the Impact Assessment Industry, working as an Environmental Assessment Practitioner and Social Assessment practitioner mainly as per the National Environmental Legislation sets for South Africa and Namibia. Larger projects have been completed in terms of World Bank and IFC requirements. She studied Environmental Management at the Rand Afrikaans University (RAU) and University of Johannesburg (UJ), including various Energy Technology Courses. This has fuelled a passion towards the Energy and Mining Industry with various projects being undertaken for these industries. Courses in Sociology has further enabled her to specialize in Social Impact Assessments and Public Participation. Social Assessments are conducted according to international best practise and guidelines. Work has been conducted in South Africa, Swaziland and Namibia.

CURRICULUM VITAE QUZETTE BOSMAN

Name of Firm	:	Geo Pollution Technologies (Pty) Ltd.
Name of Staff	:	QUZETTE BOSMAN
Profession	:	Social Impact Assessor / Environmental Assessment Practitioner
Years' Experience	:	16
Nationality	:	South African
Position	:	Senior Environmental Consultant
Specialisation	:	ESIA & ESMP; SIA
Languages	:	Afrikaans – speaking, reading, writing – excellent English – speaking, reading, writing – excellent German –speaking - fair

First Aid Class A	EMTSS, 2017
Basic Fire Fighting	EMTSS, 2017

EDUCATION AND PROFESSIONAL STATUS:

BA	Geography & Sociology	:	Rand Afrikaans University, 2003
BA	(Hons.) Environmental Management	:	University of Johannesburg, 2004

PROFESSIONAL SOCIETY AFFILIATION:

Namibian Environment and Wildlife Society
International Association of Impact Assessors South Africa (IAIA SA)
Member 2007 - 2012
Mpumalanga branch Treasurer 2008/2009

OTHER AFFILIATIONS

Mkhondo Catchment Management Forum (DWAF): Chairperson 2008-2010
Mkhondo Water Management Task Team (DWAF): Member 2009

AREAS OF EXPERTISE:

Knowledge and expertise in:

- ◆ environmental impact assessments
- ◆ project management
- ◆ social impact assessment and social management planning
- ◆ community liaison and social monitoring
- ◆ public participation / consultation, social risk management
- ◆ water use licensing
- ◆ environmental auditing and compliance
- ◆ environmental monitoring
- ◆ strategic environmental planning

EMPLOYMENT:

2015 - Present	:	Geo Pollution Technologies – Senior Environmental Practitioner
2014-2015	:	Enviro Dynamics – Senior Environmental Manager
2010 - 2012	:	GCS – Environmental Manager (Mpumalanga Office Manager)
2007 - 2009	:	KSE-uKhozi - Technical Manager: Environmental
2006 -2007	:	SEF – Environmental Manager
2004 - 2005	:	Ecosat – Environmental Manager

PUBLICATIONS:

Contract reports	:	+190
Publications	:	1