

ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIA REPORT)

PROJECT TITLE

**Environmental Impact Assessment for the Proposed Pig Abattoir Development
at Okonjima Farm No. 3, Otjozondjupa Region, Republic of Namibia**

Prepared in accordance with:

- Environmental Management Act, 2007 (Act No. 7 of 2007)
 - Environmental Impact Assessment Regulations, 2012
-

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Date of Report

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DOCUMENT STATUS

Final Environmental Impact Assessment Report

Submitted to the **Environmental Commissioner**, Ministry of Environment, Forestry and Tourism, as part of the application for an **Environmental Clearance Certificate** in terms of the Environmental Management Act, 2007.

This report incorporates the outcomes of:

- The Environmental Impact Assessment process
- Public participation and stakeholder consultation
- Specialist inputs where applicable

DISCLAIMER

This Environmental Impact Assessment Report has been prepared by KPM Environmental Consulting as an independent Environmental Assessment Practitioner on behalf of the Project Proponent. The information contained in this report is based on data, documentation, site observations, and stakeholder inputs available at the time of preparation.

KPM Environmental Consulting has exercised due care, professional judgement, and reasonable skill in compiling this report in accordance with the Environmental Management Act, 2007 and the Environmental Impact Assessment Regulations, 2012. However, KPM Environmental Consultants does not accept responsibility for decisions taken by authorities, third parties, or stakeholders based on interpretations of this report beyond its stated scope.

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DOCUMENT CONTROL

Item	Description
Report Title	Environmental Impact Assessment Report
Project Name	Proposed Pig Abattoir Development at Okonjima Farm No. 3
Region	Otjozondjupa Region
Country	Republic of Namibia
Prepared by	KPM Environmental Consulting
Report Status	Final
Date	March 2026

EXECUTIVE SUMMARY

ES1. Introduction

This Environmental Impact Assessment (EIA) Report has been prepared by KPM Environmental Consulting as an independent Environmental Assessment Practitioner in support of an application for an Environmental Clearance Certificate for the Proposed Pig Abattoir Development at Okonjima Farm No. 3, Otjozondjupa Region, Republic of Namibia.

The EIA has been undertaken in accordance with the Environmental Management Act, 2007 (Act No. 7 of 2007) and the Environmental Impact Assessment Regulations, 2012, and provides an assessment of the potential environmental, social, health, and operational impacts associated with the proposed development to inform decision-making by the Environmental Commissioner.

ES2. Project Overview

The proposed project entails the development and operation of a small-scale, on-farm pig abattoir at Okonjima Farm No. 3, located approximately 40 km north of Otjiwarongo in the Otjozondjupa Region.

The abattoir is intended to:

- Slaughter pigs produced on-site at the existing piggery;
- Operate on a low-volume, intermittent basis, with a maximum throughput of approximately 10 - 15 pigs per week, not exceeding 50 pigs per month;
- Undertake slaughter and primary dressing only, with split carcasses transported to a licensed processing facility in Windhoek for further value addition.

The proposed layout has been designed in line with internationally accepted abattoir principles, including separation of clean and dirty zones, controlled process flow, hygiene control points, and biosecurity measures.

ES3. Project Location and Receiving Environment

The project is located within an established commercial farming area in the Otjozondjupa Region, characterised by low population density and livestock-based land use. The surrounding environment is predominantly agricultural, with no proclaimed protected areas or formally conserved biodiversity areas within the immediate project footprint.

The receiving environment is characterised by:

- **Semi-arid climatic conditions** with variable and seasonal rainfall;
- **Gently undulating terrain** suitable for agricultural infrastructure;

- **Karoo Supergroup geology** with calcrete layers providing generally stable foundation conditions;
- **Sandy loam to calcareous soils** with moderate permeability;
- A strong **reliance on groundwater resources**, which are regarded as environmentally sensitive receptors.

ES4. Need and Motivation for the Project

Namibia remains significantly dependent on imported pork products, with an estimated 75 - 77% of pork consumed nationally sourced externally. Limited local slaughter capacity, long transport distances, and biosecurity considerations constrain the growth of domestic pork value chains.

The proposed abattoir seeks to:

- Strengthen local agricultural value chains;
- Reduce live-animal transport distances and improve animal welfare;
- Contribute to food security and import substitution;
- Enhance traceability, veterinary oversight, and quality assurance; and
- Support rural employment and skills development.

ES5. Legal Requirement for the EIA

The establishment and operation of an abattoir constitutes a **listed activity** in terms of the Environmental Management Act, 2007 and the Environmental Impact Assessment Regulations, 2012, due to the nature of animal slaughter, wastewater generation, handling of biological waste, and associated public and environmental health risks.

An Environmental Clearance Certificate is therefore legally required prior to the operation of the proposed facility.

ES6. Environmental Impact Assessment Methodology

The EIA process comprised:

- A desktop review of relevant legislation, policies, guidelines, and project documentation;
- A site reconnaissance visit conducted on Saturday, 24 January 2026, at Okonjima Farm No. 3 to verify baseline conditions and identify environmental sensitivities;
- Engagement with the project proponent and on-site personnel;
- Identification and assessment of potential environmental and socio-economic impacts using a significance-rating framework;
- Development of mitigation measures in line with the mitigation hierarchy; and

- Preparation of an Environmental Management Plan (EMP).

ES7. Public Participation Process

A structured public participation process was undertaken in compliance with the EIA Regulations and included:

- Publication of **two newspaper advertisements** announcing the EIA process and public commenting period;
- Distribution of a Background Information Document (BID);
- Registration of Interested and Affected Parties (I&APs);
- Engagement with stakeholders, including farm workers and relevant authorities; and
- Compilation of a Comments and Responses Trail.

The public commenting period closed on 6 February, 2026.

ES8. Summary of Key Environmental Impacts

Construction Phase

Potential impacts during construction are expected to be localised and short-term and include:

- Minor soil disturbance;
- Temporary dust and noise generation;
- Construction waste generation; and
- Occupational health and safety risks.

Operational Phase

Key potential operational impacts include:

- Increased **water consumption**;
- Generation of **wastewater and effluent**;
- Handling and disposal of **offal and organic waste**;
- Potential **odour generation** if hygiene controls are inadequate;
- **Biosecurity and public health risks** associated with slaughter activities.

Socio-Economic Impacts

Positive impacts include:

- Employment creation;
- Skills development;
- Strengthening of local livestock value chains; and
- Contribution to national food security.

ES9. Mitigation and Management Measures

The EIA has demonstrated that all identified impacts can be effectively mitigated through:

- Appropriate facility layout and engineering controls;
- Implementation of Standard Operating Procedures (SOPs);
- Strict hygiene, sanitation, and biosecurity protocols;
- Controlled waste and effluent management systems; and
- Ongoing monitoring and adaptive management.

These measures are consolidated in the Environmental Management Plan (EMP).

ES10. Conclusion and Recommendation

The EIA concludes that the Proposed Pig Abattoir Development at Okonjima Farm No. 3 is environmentally acceptable, provided that the mitigation measures and management commitments contained in the Environmental Management Plan are fully implemented.

It is therefore recommended that the Environmental Commissioner **grant an Environmental Clearance Certificate** for the proposed project, subject to appropriate conditions of approval.

ACRONYMS AND ABBREVIATIONS

Acronym	Description
AU	African Union
BID	Background Information Document
CAADP	Comprehensive Africa Agriculture Development Programme
ECC	Environmental Clearance Certificate
EAP	Environmental Assessment Practitioner
EAR	Environmental Assessment Report
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMA	Environmental Management Act, 2007 (Act No. 7 of 2007)
FAO	Food and Agriculture Organization of the United Nations
IFC	International Finance Corporation
I&AP	Interested and Affected Party
IPM	Integrated Pest Management
ISO	International Organization for Standardization
MAWLR	Ministry of Agriculture, Water and Land Reform
MEFT	Ministry of Environment, Forestry and Tourism
MoHSS	Ministry of Health and Social Services
OHS	Occupational Health and Safety
OIE	World Organisation for Animal Health
SADC	Southern African Development Community
SOP	Standard Operating Procedure
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme

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1 INTRODUCTION AND BACKGROUND

1.1 Purpose of the Environmental Impact Assessment

This Environmental Impact Assessment (EIA) Report has been prepared to evaluate the potential environmental, social, public health, and operational impacts associated with the Proposed Pig Abattoir Development at Okonjima Farm No. 3, Otjozondjupa Region, Republic of Namibia.

The EIA is undertaken in compliance with the Environmental Management Act, 2007 (Act No. 7 of 2007) and the Environmental Impact Assessment Regulations, 2012, which establish a legal framework to ensure that activities with the potential to cause significant effects on the environment, human health, or socio-economic conditions are subject to prior environmental assessment and regulatory approval.

The establishment and operation of an abattoir involves activities such as animal slaughter, handling of biological material, wastewater generation, solid and liquid waste management, and occupational health considerations. These activities carry inherent environmental and public health risks if not properly planned, managed, and monitored. The purpose of this EIA is therefore to ensure that such risks are identified early in the project lifecycle and addressed through appropriate design, mitigation, and management measures.

Specifically, the EIA aims to:

- Provide a systematic assessment of potential impacts associated with both the construction and operational phases of the proposed development;
- Ensure that environmental considerations are integrated into project planning and decision-making;
- Promote sustainable agricultural and agro-processing development in line with national policy objectives; and
- Support informed and transparent decision-making by the Environmental Commissioner regarding the issuance of an Environmental Clearance Certificate.

1.2 Objectives of the EIA Report

The objectives of this Environmental Impact Assessment Report are to:

- Present a comprehensive description of the proposed pig abattoir development, including its location, scale, layout, operational processes, and supporting infrastructure;
- Describe the biophysical, socio-economic, and institutional context of the receiving environment within which the project is proposed;
- Identify and assess potential environmental, health, and socio-economic impacts that may arise during construction and operation of the abattoir;
- Evaluate the significance of identified impacts using a structured and transparent assessment methodology;
- Identify feasible and practical mitigation measures to avoid, minimise, manage, or remedy adverse impacts;
- Assess reasonable project alternatives, including the no-go option, in order to demonstrate informed decision-making;
- Document the outcomes of stakeholder consultation and public participation undertaken as part of the EIA process; and
- Provide a sound technical and legal basis for regulatory decision-making and environmental authorisation.

1.3 Role of the Environmental Assessment Practitioner

KPM Environmental Consultants was appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the Environmental Impact Assessment for the proposed project.

In accordance with the Environmental Management Act and the EIA Regulations, the EAP is responsible for ensuring that the EIA process is conducted in an objective, transparent, and professional manner. The responsibilities of the EAP include, but are not limited to:

- Managing and coordinating the overall EIA process in compliance with legislative and regulatory requirements;
- Undertaking a desktop review of relevant legislation, guidelines, policies, and project documentation;
- Conducting site reconnaissance and verification, including a site visit undertaken on Saturday, 24 January 2026, to observe baseline conditions and identify environmental sensitivities;
- Facilitating and documenting public participation, including the registration of Interested and Affected Parties (I&APs);
- Identifying potential environmental and socio-economic impacts associated with the proposed development;
- Applying an impact significance assessment methodology to evaluate identified impacts;
- Recommending appropriate mitigation and management measures;
- Preparing the Environmental Impact Assessment Report and Environmental Management Plan (EMP) for submission to the Environmental Commissioner.

KPM Environmental Consultants has conducted this EIA independently and without bias. The firm has no financial, commercial, or other interest in the proposed development that could reasonably be regarded as compromising the objectivity or integrity of the assessment.

1.4 Structure of the Environmental Impact Assessment Report

This Environmental Impact Assessment (EIA) Report has been structured to ensure logical progression, regulatory compliance, and ease of review by the Environmental Commissioner, sector authorities, and Interested and Affected Parties. The structure is aligned with the requirements of the Environmental Management Act, 2007, the Environmental Impact Assessment Regulations, 2012, and international best practice for environmental assessment reporting.

The report is organised as follows:

Executive Summary

Provides a concise, non-technical overview of the proposed development, the EIA process undertaken, key findings, principal environmental and socio-economic impacts, proposed mitigation measures, and the overall recommendation regarding environmental authorisation.

Section 1: Introduction and Background

Introduces the proposed project and its context, outlines the purpose and objectives of the EIA, describes the role and independence of the Environmental Assessment Practitioner, and explains the structure of the report.

Section 2: Project Description

Provides a detailed description of the proposed pig abattoir development, including project rationale, location, layout, infrastructure, operational processes, production capacity, and project phases.

Section 3: Project Location and Receiving Environment

Describes the physical, biological, and socio-economic characteristics of the receiving environment, including regional context, climate, geology, soils, groundwater, land use, population, and socio-economic conditions.

Section 4: Legal, Policy and Institutional Framework

Identifies and discusses applicable national legislation, regulations, policies, and institutional arrangements, as well as relevant regional and international frameworks governing the proposed development.

Section 5: Environmental Impact Assessment Methodology

Describes the methodology used to identify, assess, and evaluate potential impacts, including baseline data collection, site reconnaissance, stakeholder engagement methods, impact significance criteria, and limitations.

Section 6: Public Participation Process

Documents the public consultation process undertaken in accordance with the EIA Regulations, including notification methods, stakeholder engagement activities, issues raised by Interested and Affected Parties, and the comments-and-responses trail.

Section 7: Assessment of Environmental and Socio-Economic Impacts

Presents the assessment of potential environmental and socio-economic impacts associated with the construction, operational, and decommissioning phases of the project, including cumulative and positive impacts, with significance ratings before and after mitigation.

Section 8: Analysis of Alternatives

Evaluates reasonable and practicable alternatives to the proposed development, including the no-go alternative, site, design, operational, and waste management alternatives, and provides justification for the preferred project option.

Section 9: Environmental Management Plan (EMP)

Sets out the mitigation, monitoring, reporting, governance, compliance, and enforcement measures required to manage identified impacts throughout the full project life cycle, including pre-construction, construction, operation, and decommissioning phases.

Section 10: Environmental Clearance Certificate (ECC) Conditions Extracted from the EMP
Presents a consolidated schedule of proposed Environmental Clearance Certificate conditions, extracted directly from the EMP, to support regulatory decision-making and ensure enforceable post-approval compliance.

Section 11: Overall Conclusion and Recommendation

Summarises the findings of the EIA, evaluates residual environmental risks, and provides a clear professional recommendation regarding the granting of an Environmental Clearance Certificate.

Section 12: References

Lists all legislation, policy documents, guidelines, reports, and academic sources cited in the EIA Report.

Annexures

Contain supporting documentation, including public participation records, site visit documentation, technical drawings, monitoring matrices, and supplementary information referenced in the report.

2 PROJECT DESCRIPTION

2.1 Introduction

This chapter provides a detailed description of the proposed development, including its purpose, scale, components, operational characteristics, and resource requirements. A clear and accurate project description is a fundamental requirement of the Environmental Impact Assessment (EIA) process, as it establishes the basis for identifying, assessing, and managing potential environmental and socio-economic impacts (EMA, 2007; MET, 2012).

The proposed development involves the establishment of a small-scale, on-farm pig abattoir at Okonjima Farm No. 3, intended to support existing livestock production activities through local slaughter capacity under controlled hygienic, veterinary, and environmental conditions.

2.2 Project Rationale and Context

Agro-processing infrastructure such as abattoirs plays a critical role in agricultural value chains by enabling value addition, improving market access, and reducing logistical, animal welfare, and biosecurity risks associated with long-distance transport of live animals (FAO, 2011; IFC, 2007).

Namibia remains significantly dependent on imported pork products, with domestic slaughter and processing capacity limited in comparison to demand. Small-scale, farm-based abattoirs are increasingly recognised as a viable model for strengthening local food systems, particularly in sparsely populated agricultural regions where large commercial abattoirs are not economically feasible (MAWLR, 2020; FAO, 2011).

The proposed project is therefore positioned within a broader national and regional context of:

- Agricultural value-chain strengthening;
- Import substitution and food security;
- Improved animal welfare; and
- Compliance with veterinary and public health standards.

2.3 Overview of the Proposed Development

The proposed project entails the development and operation of a low-volume pig abattoir within an existing agricultural footprint at Okonjima Farm No. 3. The facility is designed to service pigs produced on the farm and is not intended to operate as a regional or commercial public abattoir.

The abattoir will undertake:

- Humane slaughter of pigs;
- Primary carcass dressing and splitting; and
- Temporary holding of carcasses prior to off-site processing.

No secondary processing, packaging, curing, or retail activities will be undertaken at the site.

2.4 Project Components and Infrastructure

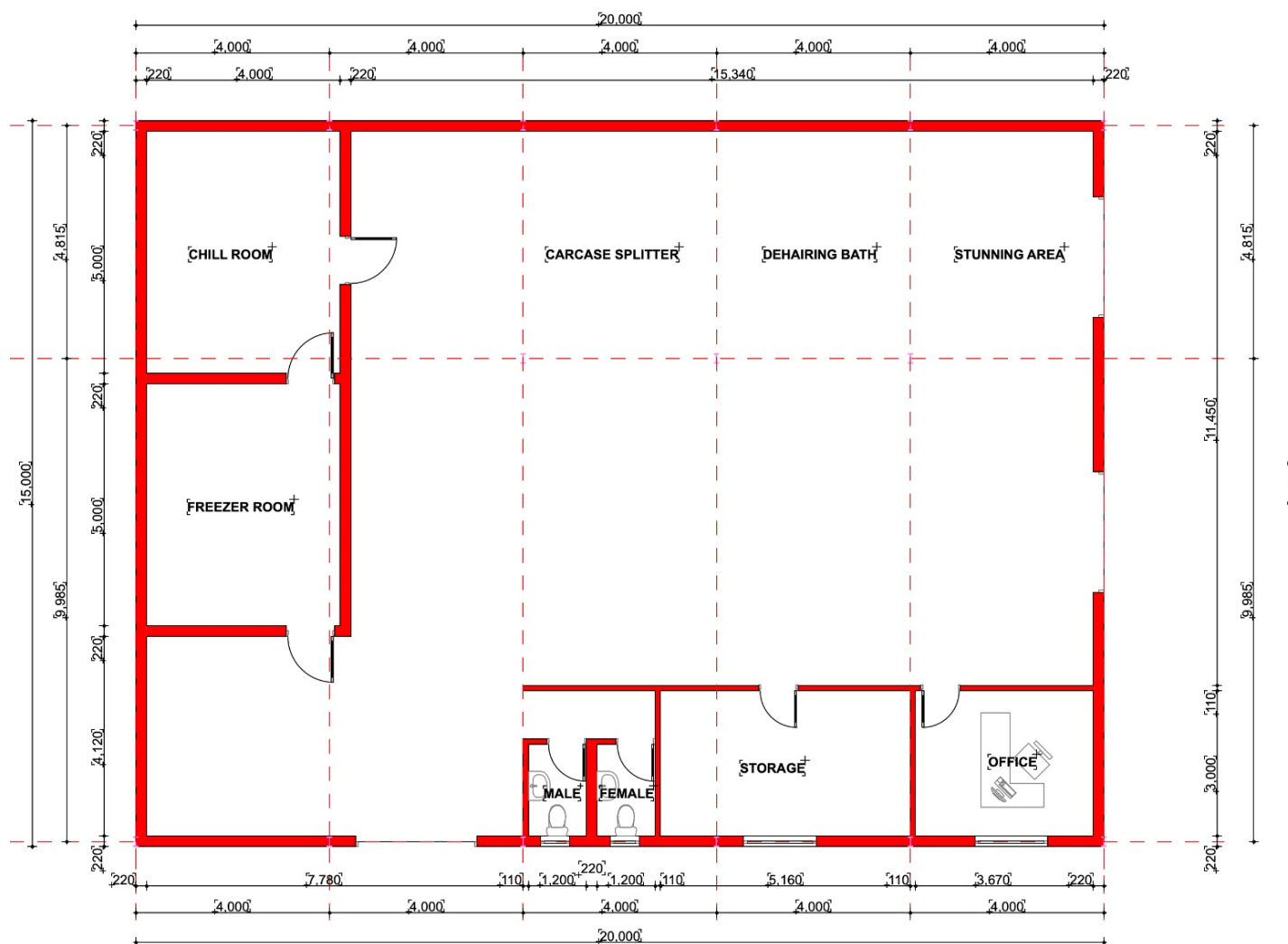
The proposed development comprises purpose-built infrastructure and operational areas designed in accordance with internationally recognised abattoir hygiene and process-flow principles (FAO, 2011; IFC, 2007).

Key components include:

- Animal stunning and bleeding area;
- Dehairing and evisceration area;
- Clean and dirty zone separation;
- Carcass handling and temporary chilling/freezing space;
- Offal handling and temporary storage area;
- Wash-down and sanitation facilities;
- Wastewater drainage and collection infrastructure;
- Staff hygiene facilities (hand-wash stations, change areas); and
- Ancillary storage and support areas.

The layout promotes linear process flow, minimising cross-contamination risks and supporting effective hygiene and biosecurity management.

Figure 1: Proposed Pig Abattoir Layout Illustrating Functional Zoning, Hygienic Separation of Processing Areas, Cold and Freezer Rooms, Sanitary Facilities, and Ancillary Spaces at Okonjima Farm No. 3, Otjozondjupa Region



2.5 Operational Activities

2.5.1 Slaughter and Processing Activities

Operational activities at the abattoir will include:

- Stunning of pigs using approved humane methods;
- Bleeding and dehairing;
- Evisceration and carcass dressing;
- Carcass splitting; and
- Temporary holding of carcasses prior to transport.

All activities will be undertaken in compliance with veterinary and hygiene requirements to ensure food safety and minimise environmental and health risks (FAO, 2011; OIE, 2019).

2.5.2 Operational Capacity

The abattoir is designed to operate on a small-scale, intermittent basis, with limited throughput to match on-farm production.

Table 1: Operational Capacity

Parameter	Description
Maximum weekly throughput	±10–15 pigs
Maximum monthly throughput	≤50 pigs
Operational frequency	Intermittent
Animal source	On-site piggery only

The limited operational scale significantly reduces the magnitude and spatial extent of potential environmental impacts.

2.6 Project Phases

2.6.1 Construction Phase

The construction phase will involve:

- Installation of abattoir structures within an existing agricultural footprint;
- Placement of equipment and fittings;
- Installation of drainage and sanitation infrastructure; and
- Minor earthworks associated with foundations and services.

Construction impacts are expected to be localised, temporary, and reversible.

2.6.2 Operational Phase

During operation, the primary activities will include:

- Slaughter and primary processing of pigs;
- Facility cleaning and sanitation;
- Wastewater generation from wash-down activities;
- Handling and temporary storage of offal and solid waste; and
- Transport of carcasses to an off-site licensed processing facility.

2.7 Water Supply and Water Use

Water required for slaughter operations, cleaning, and hygiene will be sourced from existing farm water infrastructure, primarily groundwater abstraction via boreholes. In semi-arid regions such as Otjozondjupa, groundwater is a critical and sensitive resource (Mendelsohn et al., 2009).

Although overall water demand is expected to be low due to limited throughput, water efficiency and protection of groundwater quality are treated as priority considerations in the impact assessment and Environmental Management Plan.

2.8 Waste and Effluent Streams

2.8.1 Wastewater

Wastewater will be generated from:

- Slaughter and processing activities;
- Wash-down of floors and equipment; and
- Hygiene facilities.

If inadequately managed, abattoir wastewater can pose risks to soil and groundwater quality (IFC, 2007). Controlled collection, treatment, and disposal measures are therefore essential components of the project design.

2.8.2 Solid Waste and Offal

Solid waste streams include:

- Offal and biological waste;
- Packaging materials;
- General operational waste.

Offal and organic waste will be handled and stored under hygienic conditions and managed in accordance with veterinary and environmental requirements to minimise odour, pest attraction, and contamination risks (FAO, 2011).

2.9 Hygiene, Health and Biosecurity

Abattoir operations present inherent public health and biosecurity risks if not properly managed. The proposed facility incorporates:

- Physical separation of clean and dirty operational zones;
- Controlled access points;
- Hand-washing and sanitation facilities;
- Biosecurity measures to prevent disease transmission between piggery and abattoir operations.

These measures align with international best practice for meat processing facilities (IFC, 2007; OIE, 2019).

2.10 Transport and Access

The site is accessed via existing farm roads connected to the regional and national road network. Transport activities associated with the project are limited to:

- Delivery of operational supplies; and
- Removal of carcasses to an off-site licensed processing facility.

Given the low operational scale, traffic volumes are expected to remain minimal and are not anticipated to materially affect road safety or traffic conditions.

2.11 Employment and Socio-Economic Contribution

The proposed abattoir will create limited but positive employment opportunities, primarily for farm-based workers. In addition to direct employment, the project contributes to:

- Skills development in hygiene and processing;
- Strengthening of local livestock value chains; and
- Support for regional food security objectives.

2.12 Supporting Tables and Photographs (Placeholders)

Site Visit Photographs

(Photographs taken during the site visit conducted on 24 January 2026.)

Figure 2: Controlled Access Gate and Perimeter Security at the Proposed Pig Abattoir Site, Okonjima Farm No. 3, Otjozondjupa Region, Namibia (taken during site visit, January 24th, 2026)



Figure 3: On-Site Water Storage Infrastructure and Ancillary Service Area at the Proposed Pig Abattoir Site, Okonjima Farm No. 3, Otjozondjupa Region



Figure 4: Piglets Observed Within Existing Livestock Housing Facilities at Okonjima Farm No. 3 During the Site Visit, January 24th, 2026



Figure 5: Biosecurity and Occupational Health and Safety Signage Displayed Within Restricted Access Areas at the Proposed Pig Abattoir Facility, Okonjima Farm No. 3



Figure 6: General View of Existing Agricultural Infrastructure and Surrounding Land Use at Okonjima Farm No. 3, Otjozondjupa Region



Table 2: Summary of Project Components and Activities

Project Component	Description	Associated Activities	Relevant Project Phase(s)
Site location and land use	Rural agricultural farm (Okonjima Farm No. 3) within Otjozondjupa Region	Land allocation for abattoir infrastructure; integration with existing farming activities	Pre-construction, Operation
Abattoir building and processing areas	Purpose-built pig abattoir structure including stunning area, dehairing bath, carcass splitting area, chill room, freezer room, and storage areas	Animal slaughter and primary processing; carcass handling; hygiene and sanitation operations	Construction, Operation
Animal handling and slaughter systems	Facilities and equipment for humane handling and slaughter of pigs	Stunning, bleeding, dehairing, carcass splitting	Operation
Cold storage facilities	Chill room and freezer room for meat preservation	Chilling, freezing, temporary storage of carcasses and meat products	Operation
Wastewater management systems	On-site effluent management infrastructure	Collection, treatment, and controlled disposal or reuse of wastewater	Pre-construction, Operation
Biological waste management	Systems for managing blood, offal, and condemned material	Blood collection; offal handling; disposal in approved condemnation pit	Operation
Solid waste management	Storage and removal of non-biological waste	Temporary waste storage; transport to licensed disposal facilities	Construction, Operation
Water supply systems	Groundwater abstraction and internal water distribution	Water abstraction; wash-down; sanitation; hygiene activities	Operation
Sanitation and hygiene facilities	Staff ablution facilities and hygiene control points	Handwashing; personal hygiene; sanitation management	Operation
Administrative and support facilities	Office and storage areas	Record keeping; management; staff supervision	Operation
Access and internal circulation	Access routes and internal movement areas	Movement of staff, animals, and materials within the facility	Construction, Operation
Decommissioning and rehabilitation	Closure-related infrastructure and activities	Decommissioning of waste systems; site rehabilitation	Decommissioning

Table 3: Summary of Operational Capacity and Resource Use

Parameter	Description / Estimated Capacity	Relevance to Environmental Management
Operational activity	Pig slaughter and primary meat processing	Determines nature and scale of environmental risks
Slaughter capacity	Small- to medium-scale throughput (as approved by veterinary authorities)	Influences wastewater volumes, waste generation, and biosecurity controls
Operating schedule	Daytime operations; limited daily shifts	Affects noise, traffic, and resource demand patterns
Water source	Groundwater abstraction (on-site borehole)	Groundwater sensitivity requires strict protection and monitoring
Estimated water use	Dependent on throughput and hygiene requirements; monitored per animal slaughtered	High-risk pathway for groundwater contamination if mismanaged
Wastewater generation	Effluent from slaughter, wash-down, and sanitation activities	Requires engineered treatment prior to disposal or reuse
Wastewater treatment	On-site multi-stage treatment system (grease trap, anaerobic and aerobic treatment)	Primary control for organic loading and pathogen reduction
Biological waste generation	Blood, offal, condemned carcasses	Requires source separation and veterinary-approved disposal
Solid waste generation	Packaging materials, general refuse	Managed through temporary storage and off-site disposal
Energy source	Grid electricity and/or backup generators	Limited direct environmental impact; supports cold storage
Cold storage capacity	Chill room and freezer room for carcass and meat products	Influences energy use and operational hygiene
Staffing levels	Small operational workforce	Relevant to OHS management and sanitation facilities
Chemical use	Cleaning agents and sanitizers	Requires controlled storage and safe handling procedures

Table 4: Summary of Identified Environmental Aspects and Potential Impacts

Project Aspect / Activity	Environmental Aspect	Potential Impact	Primary Receptor(s)	Project Phase(s)
Site establishment and land allocation	Land occupation and surface disturbance	Localised soil disturbance and alteration of surface conditions	Soil resources	Pre-construction
Construction activities	Earthworks and material handling	Soil compaction, erosion, and sediment mobilisation	Soil, drainage patterns	Construction
Construction machinery operation	Noise and dust generation	Temporary disturbance to local environment	Adjacent land users, workers	Construction

Construction waste generation	Solid waste accumulation	Localised contamination and visual nuisance	Soil, site cleanliness	Construction
Animal handling and slaughter	Biological material generation	Potential contamination if improperly managed	Soil, groundwater, public health	Operation
Wastewater generation	High-strength organic effluent	Groundwater contamination risk	Groundwater resources	Operation
Effluent treatment and disposal	Wastewater treatment system performance	Odour generation and contamination risk if system fails	Groundwater, air quality	Operation
Biological waste handling	Blood and offal management	Pathogen spread and attraction of pests	Public health, livestock, wildlife	Operation
Solid waste management	Storage and removal of general waste	Localised pollution if not removed	Soil, visual environment	Operation
Water abstraction	Groundwater use	Over-abstraction or depletion risk if unmanaged	Aquifer resources	Operation
Chemical use	Use of cleaning agents and sanitizers	Chemical spills and worker exposure	Soil, workers	Operation
Energy use	Electricity consumption	Indirect environmental footprint	Energy resources	Operation
Staff activities	Occupational exposure	Worker injury or illness	Employees	Operation
Traffic and access	Vehicle movement	Dust, noise, and safety risks	Workers, access routes	Construction, Operation
Decommissioning activities	Removal of infrastructure	Disturbance and waste generation	Soil, site condition	Decommissioning
Closure and rehabilitation	Site restoration	Residual contamination if unmanaged	Soil, groundwater	Decommissioning

Table 5: Impact Significance Rating Criteria

Criterion	Description
Nature of Impact	Indicates whether the impact is positive or negative, and whether it is direct, indirect, or cumulative.
Extent	The geographical area over which the impact occurs (site-specific, local, regional, or national).
Duration	The time period over which the impact is expected to occur (short-term, medium-term, long-term, or permanent).
Intensity (Magnitude)	The severity of the impact on the affected environment or receptor, ranging from low to high.
Probability	The likelihood of the impact occurring, taking into account design, controls, and operational context.
Reversibility	The extent to which the impact can be reversed through natural recovery or intervention.

Significance (Pre-Mitigation)	Overall significance of the impact before mitigation, derived from extent, duration, intensity, and probability.
Significance (post-mitigation)	Residual impact significance after implementation of mitigation and management measures.

Significance Rating Categories

Rating	Interpretation
Low	Impact is minor, easily managed, and within acceptable limits
Medium	Impact is noticeable and requires management to remain acceptable
High	Impact is significant and may be unacceptable without substantial mitigation
Very High	Impact is unacceptable and may constitute a fatal flaw

Note: Only impacts with **Medium or higher pre-mitigation significance** are subjected to detailed mitigation and monitoring in the EMP.

Table 6: Summary of Key Mitigation and Management Measures

Impact / Risk Area	Mitigation and Management Measure	Project Phase	Responsibility
Soil disturbance and erosion	Limit disturbance to demarcated areas; stabilise disturbed surfaces immediately after works	Construction	Site Manager / EO
Construction waste generation	Prohibit burial or burning of waste; remove all waste to licensed facilities	Construction	Contractor / EO
Dust generation	Apply water suppression where required; limit vehicle speeds	Construction	Contractor
Noise disturbance	Restrict construction activities to daytime hours	Construction	Contractor
Wastewater contamination risk	Implement multi-stage effluent treatment (grease trap, anaerobic and aerobic treatment)	Operation	Proponent / EO
Groundwater pollution	Monitor groundwater quality through downstream borehole testing	Operation	Proponent
Excessive water use	Monitor water use per animal slaughtered; investigate deviations	Operation	EO
Biological waste and blood handling	Separate blood from wash-water; dispose of condemned material in lined, fenced condemnation pit	Operation	EO / Veterinary Authority
Odour generation	Maintain wastewater systems and hygiene standards	Operation	Site Manager
Pest and vector attraction	Implement Integrated Pest Management (IPM) programme	Operation	Site Manager
Occupational health and safety	Provide PPE; maintain equipment; conduct medical surveillance	Operation	Site Manager
Chemical spills	Store chemicals in bunded areas; maintain MSDS and spill kits	Operation	EO

Decommissioning contamination	Decommission waste systems safely; remove residues and rehabilitate site	Decommissioning	Proponent
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2.13References (Indicative)

(Full citations to be provided in Section 11)

- Environmental Management Act, 2007 (Act No. 7 of 2007)
- MET. 2012. *Environmental Impact Assessment Regulations*
- FAO. 2011. *Guide to Good Hygiene Practices for Meat Processing*
- IFC. 2007. *Environmental, Health and Safety Guidelines for Meat Processing*
- OIE. 2019. *Terrestrial Animal Health Code*
- MAWLR. 2020. *National Agricultural Policy*
- Mendelsohn, J. et al. 2009. *Climate Change and Adaptation in Namibia*

3 PROJECT LOCATION AND RECEIVING ENVIRONMENT

3.1 Project Location

The proposed Pig Abattoir Development is located at Okonjima Farm No. 3, within the Otjozondjupa Region of the Republic of Namibia. The project site is situated approximately 40 kilometres north of Otjiwarongo, along the B1 national trunk road toward Otavi, which constitutes the primary north–south transport corridor through the region.

Access to the project site is obtained via a secondary access road branching off the B1 in the vicinity of the Okorusu Mine turn-off, from where the farm is reached after approximately 3 kilometres. The site is therefore accessible via existing regional road infrastructure and is located within a predominantly agricultural landscape.

For spatial reference and mapping purposes, the project area is located in the vicinity of the following indicative geographic coordinates (WGS 84):

- Approximate latitude: 20.10° South
- Approximate longitude: 16.95° East

These coordinates are provided for environmental assessment and mapping purposes only and represent an indicative location of the project area rather than surveyed cadastral boundaries. This approach is consistent with standard EIA practice and provides sufficient spatial context for the assessment of environmental sensitivities, access routes, and surrounding land uses.

The immediate surroundings of the project site are characterised by commercial and mixed agricultural land uses, with no formally proclaimed urban settlements in the immediate vicinity. The nearest major urban centre is Otjiwarongo, which functions as the principal administrative, commercial, and service hub for the Otjozondjupa Region.

The national, regional, and local spatial context of the project site is illustrated in the following figures:

3.2 Regional and Administrative Context

3.2.1 Regional Location

The proposed development is located at Okonjima Farm No. 3, approximately 40 kilometres north of Otjiwarongo, within the Otjozondjupa Region, Republic of Namibia.

Otjozondjupa Region occupies a strategic central position within Namibia and is widely recognised as one of the country's most important livestock-producing regions. The regional economy is strongly anchored in commercial agriculture, particularly cattle, small stock, and emerging pig production systems, and plays a critical role in national food supply chains and agro-processing value addition (NSA, 2023; MAWLR, 2020).

3.2.2 Administrative and Political Context

Administratively, the proposed development falls within Namibia's decentralised system of governance, as established under the Regional Councils Act, 1992 (Act No. 22 of 1992) and the Local Authorities Act, 1992 (Act No. 23 of 1992). Under this governance framework, Regional Councils are mandated to coordinate regional development planning, land-use management, and service delivery, in collaboration with national line ministries and local authorities (GRN, 1992a; GRN, 1992b).

The Otjozondjupa Regional Council operates within this decentralised system and plays a coordinating role in facilitating development initiatives, supporting agricultural production systems, and aligning regional activities with national development priorities as articulated in Namibia's Vision 2030 and National Development Plans (NDPs) (NPC, 2018).

Political governance within the Otjozondjupa Region is regarded as stable and institutionally well-established, with clear regulatory oversight exercised by sector-specific authorities relevant to agro-processing developments. These include:

- The **Ministry of Environment, Forestry and Tourism (MEFT)**, through the Environmental Commissioner, responsible for environmental regulation and compliance under the Environmental Management Act;
- The **Directorate of Veterinary Services (DVS)** within the **Ministry of Agriculture, Water and Land Reform (MAWLR)**, responsible for animal health, disease control, and regulation of abattoir operations;
- **Environmental Health Practitioners** operating under the **Ministry of Health and Social Services (MoHSS)** and local authority structures, responsible for public and environmental health oversight; and
- National and regional water resource management authorities responsible for regulating groundwater abstraction and protecting water quality.

This multi-institutional governance framework provides a robust regulatory and compliance environment for abattoir developments, ensuring that environmental protection, animal welfare, public health, and sustainable resource use are subject to coordinated oversight and enforcement (MAWLR, 2020; MEFT, 2021; MoHSS, 2014).

Figure 7: Locality and Access Map Showing the Route to Okonjima Farm No. 3 from Otjiwarongo and the B1 Trunk Road, Otjozondjupa Region, Namibia

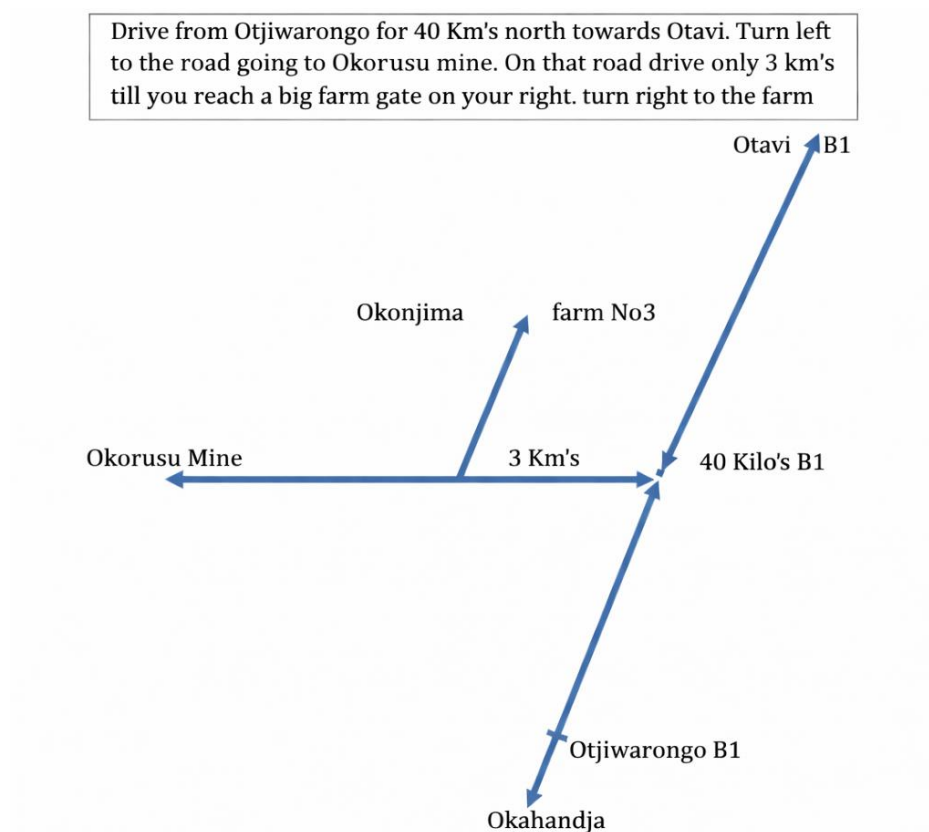


Figure 8: Regional Locality Map Showing the Otjozondjupa Region (Highlighted) within the Republic of Namibia

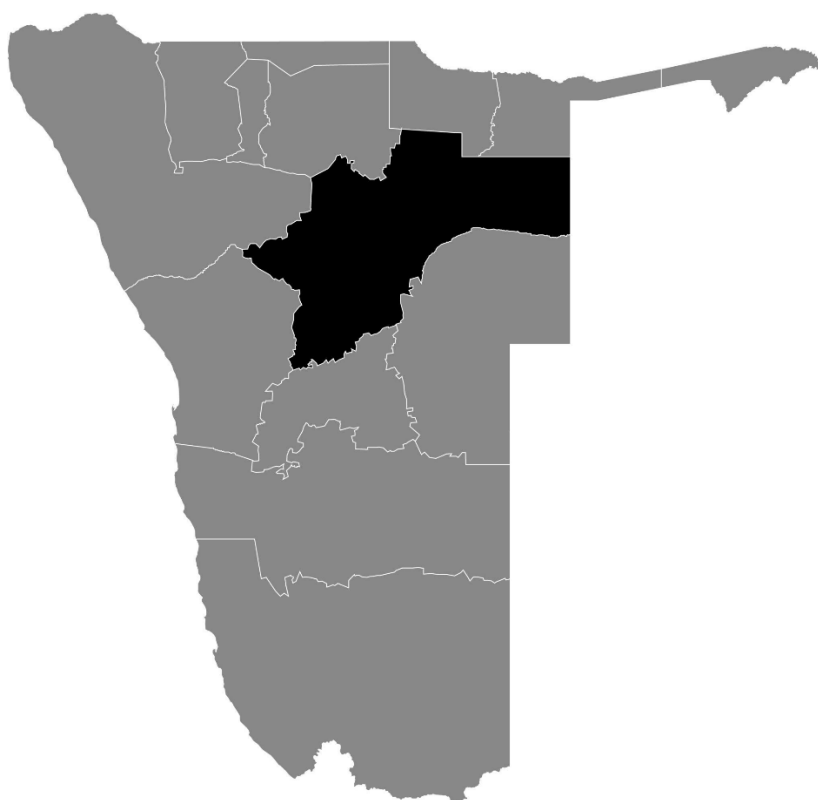
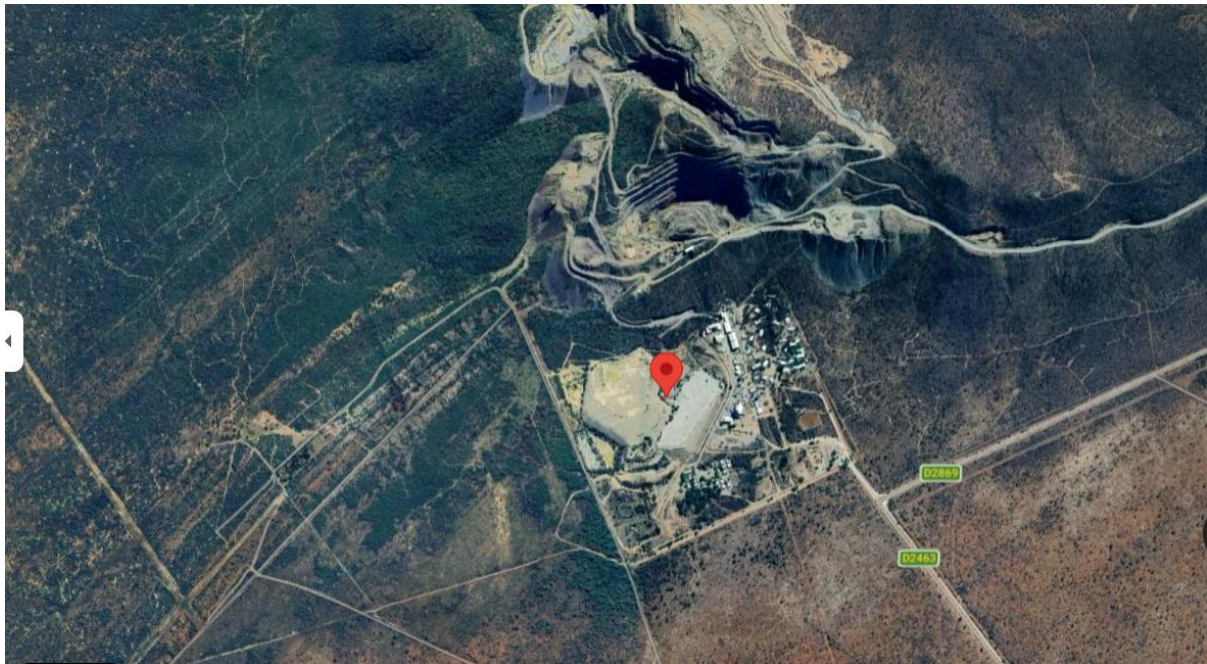


Figure 9: Google Maps extract showing Otjiwarongo, the B1 national road, Okorusu Mine, and surrounding settlements. The approximate location of Okonjima Farm No. 3 is indicated relative to the Okorusu access route. Source: Google Maps (2026); annotations by KPM Environmental Consultants.



3.3 Population and Settlement Pattern

Otjozondjupa Region has an estimated population of approximately 180,000 - 200,000 people, with population distribution concentrated in urban centres such as Otjiwarongo, Otavi, and Grootfontein. Rural areas are characterised by very low population densities, with settlement patterns dominated by commercial farming units and associated worker accommodation (NSA, 2023).

The project site itself is located within a sparsely populated rural environment, with no high-density residential settlements, schools, healthcare facilities, or community infrastructure in the immediate vicinity. Human presence is largely limited to farm owners, farm workers, and agricultural support activities.

Figure 10: Aerial view of Otjiwarongo illustrating the urban settlement pattern, transport network, and surrounding semi-arid landscape within the Otjozondjupa Region.



3.4 Socio-Economic Context

3.4.1 Regional Economic Profile

The economy of Otjozondjupa Region is predominantly agriculture-based, with livestock farming forming the backbone of regional economic activity. The region contributes significantly to Namibia's national agricultural output and supports upstream and downstream activities such as feed production, veterinary services, transport, and agro-processing (NSA, 2023; MAWLR, 2020).

Agro-processing infrastructure, including small-scale abattoirs, is recognised as a critical enabler of local value addition, reduced transaction costs, improved animal welfare outcomes, and enhanced food security (FAO, 2011).

3.4.2 Employment and Livelihoods

Employment opportunities within the project area are primarily linked to commercial farming and associated support services. Livelihoods are therefore closely tied to the sustainability and productivity of agricultural activities.

The proposed abattoir is expected to generate incremental employment opportunities, support skills development related to hygiene and processing standards, and contribute positively to the resilience of farm-based livelihoods, albeit on a limited scale due to the low-volume nature of operations.

Table 7: Summary of Regional Socio-Economic Characteristics

Aspect	Description
Region	Otjozondjupa
Dominant economic activity	Livestock farming
Population density	Low (rural areas)
Employment base	Agriculture and support services
Development context	Agro-processing support

3.5 Infrastructure and Services

3.5.1 Transport and Access Infrastructure

The project site is accessed via existing farm access roads, which connect to the regional and national road network, including the B1 corridor linking Otavi, Otjiwarongo, and central Namibia. Traffic volumes in the area are low and primarily associated with agricultural activities.

3.5.2 Water Supply Infrastructure

Water supply in the project area is derived primarily from groundwater abstraction via boreholes, which is the dominant water source for both agricultural and domestic use in the region. Groundwater resources are therefore regarded as strategically important and environmentally sensitive (Mendelsohn et al., 2009).

3.5.3 Energy and Other Services

Energy supply is provided through existing farm-based systems. The proposed development does not require new bulk infrastructure upgrades or extensions beyond existing services.

3.6 Physical Environment

3.6.1 Climate

The project area lies within a semi-arid to arid climatic zone, characterised by hot summers, cool winters, and low, highly variable rainfall. Rainfall is typically seasonal and occurs in short, intense events, increasing sensitivity to poor drainage design and effluent mismanagement (Mendelsohn et al., 2009).

3.6.2 Topography, Geology and Soils

Topography is generally gently undulating, with no steep slopes or major drainage channels. The underlying geology is dominated by formations of the Karoo Supergroup, with widespread calcrete development typical of central Namibia. Soils are predominantly sandy loam to

calcareous, with moderate permeability and susceptibility to contamination if exposed to untreated effluent or organic waste (Geological Survey of Namibia, 2015; FAO, 2011).

3.6.3 Groundwater

Groundwater is the primary water source in the region and is regarded as a key sensitive environmental receptor. Protection of groundwater quality is therefore a central consideration of this EIA, particularly in relation to wastewater management, spill prevention, and waste handling (GRN, 2007; IFC, 2007).

Table 8: Summary of Physical Environmental Characteristics

Component	Description
Climate	Semi-arid; variable rainfall
Topography	Gently undulating
Geology	Karoo Supergroup
Soils	Sandy loam to calcareous
Groundwater	Primary water source

3.7 Biological Environment (Flora and Fauna)

The project site occurs within a transformed agricultural landscape, where natural vegetation has been modified through long-term farming activities. Vegetation is typical of savanna and thornbush systems, with no known endemic or critically endangered species recorded within the immediate project footprint (MET, 2014).

Faunal presence is largely limited to common species adapted to agricultural environments. No protected areas, wildlife corridors, or critical biodiversity areas occur within or adjacent to the project site.

3.8 Environmental Sensitivity Summary

Based on the baseline assessment, the receiving environment is considered to have low to moderate environmental sensitivity, primarily due to:

- Dependence on groundwater resources;
- Dominance of agricultural land use; and
- Absence of protected ecological areas or densely populated settlements.

These sensitivities inform the impact assessment and Environmental Management Plan presented in subsequent chapters of this report.

4 LEGAL, POLICY AND INSTITUTIONAL FRAMEWORK

4.1 Introduction

This chapter outlines the legal, policy, and institutional framework applicable to the proposed Pig Abattoir Development at Okonjima Farm No. 3, Otjozondjupa Region, Republic of Namibia. Identification of the applicable framework is a mandatory requirement of the Environmental Impact Assessment (EIA) process in terms of the Environmental Management Act, 2007 (Act No. 7 of 2007) and the Environmental Impact Assessment Regulations, 2012.

The purpose of this chapter is to:

- Identify all relevant national legislation and regulations governing the proposed activity;
- Situate the project within national development and sectoral policy frameworks;
- Reference regional and continental instruments to which Namibia is a signatory; and
- Align the assessment with international best-practice environmental and social safeguard standards.

This framework provides the legal and institutional context within which the project is assessed and informs the development of mitigation and management measures contained in the Environmental Management Plan (EMP).

4.2 National Legislative and Regulatory Framework

4.2.1 Environmental Management Act, 2007 (Act No. 7 of 2007)

The Environmental Management Act, 2007 (EMA) is Namibia's principal environmental statute and establishes the legal basis for environmental protection and sustainable development. Section 27 of the Act requires that listed activities which may have a significant effect on the environment must obtain an Environmental Clearance Certificate prior to implementation (GRN, 2007).

Core principles of the EMA relevant to this project include:

- Sustainable development and intergenerational equity;
- Prevention and minimisation of environmental harm;
- Public participation and access to information; and
- The polluter-pays principle.

The establishment and operation of an abattoir constitutes a listed activity due to the potential for impacts associated with wastewater generation, biological waste handling, odour, and public health risks.

4.2.2 Environmental Impact Assessment Regulations, 2012

The Environmental Impact Assessment Regulations, 2012, promulgated under the EMA, prescribe the procedural requirements for undertaking EIAs in Namibia. These include requirements relating to screening, scoping, preparation of a Background Information Document (BID), public participation, impact assessment, reporting, and submission to the Environmental Commissioner (MET, 2012).

This EIA has been undertaken in accordance with these procedural requirements.

4.2.3 Animal Health Act, 2011 (Act No. 1 of 2011)

The Animal Health Act, 2011 provides the statutory framework for animal disease control, animal welfare, and veterinary oversight in Namibia. The Act regulates slaughter activities, disease prevention, animal movement, biosecurity, and veterinary inspection of abattoirs (GRN, 2011).

Oversight of the proposed abattoir falls under the Directorate of Veterinary Services (DVS) within the Ministry of Agriculture, Water and Land Reform (MAWLR).

4.2.4 Meat Inspection and Veterinary Regulations

Meat inspection and hygiene requirements applicable to slaughter facilities are regulated through veterinary legislation and associated regulations administered by MAWLR. These instruments govern:

- Inspection of slaughter animals and carcasses;
- Approval and licensing of abattoir facilities;
- Hygiene standards and disease control; and
- Disposal of condemned material.

4.2.5 Public and Environmental Health Act, 2015 (Act No. 1 of 2015)

The Public and Environmental Health Act, 2015 provides the legal basis for protection of public health and regulation of environmental health matters in Namibia. The Act addresses sanitation, food safety, waste management, and prevention of health risks associated with food-processing facilities (MoHSS, 2015).

Environmental Health Practitioners operating under the Ministry of Health and Social Services (MoHSS) play a key oversight role in this regard.

4.2.6 Water Resources Management Act, 2013 (Act No. 11 of 2013)

The Water Resources Management Act, 2013 governs the abstraction, use, protection, and pollution prevention of water resources in Namibia. Given the reliance on groundwater in

Otjozondjupa Region, provisions relating to groundwater protection and prevention of contamination are directly applicable to the proposed development (GRN, 2013).

4.2.7 Labour and Occupational Health Legislation

Employment and occupational health considerations are governed by the Labour Act, 2007 (Act No. 11 of 2007), which regulates conditions of employment, workplace safety, and worker welfare. The Affirmative Action (Employment) Act, 1998 further promotes equitable employment practices.

4.2.8 Additional Relevant Legislation

Additional legislation of relevance includes:

- **Regional Councils Act, 1992** and **Local Authorities Act, 1992** (development planning and local governance);
- **Soil Conservation Act, 1969** (prevention of land degradation);
- **Atmospheric Pollution Prevention Ordinance, 1976** (air quality and odour control);
- **Hazardous Substances Ordinance, 1974** (handling of chemicals and disinfectants);
- **National Heritage Act, 2004** (protection of cultural and archaeological resources).

Table 9: Applicable Namibian Legislation and Regulations

Legislation	Relevance
Environmental Management Act, 2007	Environmental authorisation
EIA Regulations, 2012	EIA process
Animal Health Act, 2011	Veterinary oversight
Meat Inspection Regulations	Hygiene & carcass inspection
Public & Environmental Health Act, 2015	Public health & sanitation
Water Resources Management Act, 2013	Groundwater protection
Labour Act, 2007	Occupational health & safety
Soil Conservation Act, 1969	Land degradation control
Atmospheric Pollution Ordinance	Odour & air quality
National Heritage Act, 2004	Cultural heritage protection

4.3 National Policy and Strategic Framework

4.3.1 Vision 2030

Namibia's Vision 2030 provides the long-term national development framework, emphasising sustainable economic growth, food security, environmental protection, and value addition within primary sectors (NPC, 2004).

4.3.2 National Development Plans (NDPs)

The National Development Plans, particularly NDP5, prioritise agricultural productivity, agro-processing, employment creation, and sustainable resource management (NPC, 2018).

4.3.3 National Agricultural Policy

The National Agricultural Policy promotes diversification, local value addition, improved market access, and biosecure livestock systems. Small-scale, farm-based agro-processing infrastructure is recognised as a key enabler of these objectives (MAWLR, 2020).

4.4 Regional and Continental Frameworks

4.4.1 Southern African Development Community (SADC)

Namibia is a member of SADC, which promotes harmonised standards for agriculture, food safety, animal health, and environmental management. SADC protocols support regional food security, sustainable livestock production, and responsible agro-processing (SADC, 2014).

4.4.2 African Union (AU)

At continental level, Namibia aligns with the African Union's Comprehensive Africa Agriculture Development Programme (CAADP), which promotes sustainable agricultural growth, food security, and inclusive rural development (AU, 2015).

4.5 International Development and Safeguard Frameworks

4.5.1 World Bank Group and IFC

The World Bank Group, through the International Finance Corporation (IFC), has developed Environmental and Social Performance Standards and EHS Guidelines for Meat Processing, which provide international benchmarks for wastewater management, waste handling, occupational health, and hygiene (IFC, 2007).

4.5.2 United Nations System (UNDP, FAO)

The United Nations Development Programme (UNDP) promotes sustainable development and environmental governance in line with the Sustainable Development Goals (SDGs), particularly SDGs 2, 6, 8, and 12 (UNDP, 2015).

The Food and Agriculture Organization (FAO) provides globally recognised technical guidance on slaughterhouse design, meat hygiene, and waste management (FAO, 2011).

4.5.3 International Monetary Fund (IMF)

The International Monetary Fund (IMF) emphasises economic resilience, domestic production capacity, and efficient resource use as part of macro-economic stability frameworks. Investments that reduce food imports and strengthen domestic value chains align with these objectives (IMF, 2022).

4.5.4 World Organisation for Animal Health (OIE)

The OIE sets international standards for animal welfare, disease control, and slaughter practices, which inform veterinary oversight and biosecurity measures for abattoir operations (OIE, 2019).

4.6 Institutional Roles and Responsibilities

Key institutions involved in regulation and oversight include:

- **Environmental Commissioner (MEFT)** – Environmental authorisation and compliance;
- **Directorate of Veterinary Services (MAWLR)** – Animal health and slaughter regulation;
- **Ministry of Health and Social Services (MoHSS)** – Public and environmental health;
- **Water resource authorities** – Groundwater protection;
- **Otjozondjupa Regional Council** – Regional development coordination.

4.7 Compliance Statement

The proposed development has been assessed against the applicable national, regional, and international frameworks and is considered capable of complying with all relevant requirements, subject to implementation of mitigation measures and management commitments contained in the Environmental Management Plan.

5 ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGY

5.1 Introduction

This chapter describes the methodological approach applied in undertaking the Environmental Impact Assessment (EIA) for the Proposed Pig Abattoir Development at Okonjima Farm No. 3, Otjozondjupa Region, Republic of Namibia. The methodology has been designed to ensure that the assessment is systematic, transparent, evidence-based, and compliant with the requirements of the Environmental Management Act, 2007 (Act No. 7 of 2007) and the Environmental Impact Assessment Regulations, 2012 (GRN, 2007; MET, 2012).

The approach further aligns with internationally accepted EIA good practice, including guidance issued by the International Finance Corporation (IFC), the World Bank Group, and the United Nations Environment Programme (UNEP), which emphasise risk-based assessment, stakeholder engagement, and adaptive management (IFC, 2007; World Bank, 2017; UNEP, 2018).

5.2 Methodological Framework and Principles

The EIA methodology is underpinned by the following principles:

- **Legal compliance:** Full alignment with Namibian statutory and regulatory requirements (GRN, 2007; MET, 2012);
- **Proportionality:** The depth of assessment reflects the scale and risk profile of the proposed abattoir (IFC, 2007);
- **Precautionary principle:** Sensitive receptors, particularly groundwater and public health, are assessed conservatively (UNEP, 2018);
- **Integration:** Environmental, social, health, and occupational aspects are assessed in an integrated manner;
- **Participation and transparency:** Stakeholder knowledge, including farm-worker perspectives, informs impact identification (World Bank, 2017).

5.3 Overview of the EIA Process

The EIA followed a structured, sequential process consistent with Namibian regulations and international best practice.

Table 10: Summary of the EIA Process

Phase	Description	Key References
Screening	Confirmation that the activity requires an EIA	GRN (2007); MET (2012)
Scoping	Identification of key issues and boundaries	MET (2012); UNEP (2018)
Baseline studies	Environmental and socio-economic context	IFC (2007)
Site visit	Field verification	World Bank (2017)

Stakeholder engagement	Interviews & notifications	IFC (2007); UNDP (2015)
Impact assessment	Significance rating	UNEP (2018)
EMP development	Mitigation & monitoring	GRN (2007)

Figure 11: Cyclical Environmental Impact Assessment (EIA) Process for the Proposed Pig Abattoir Development

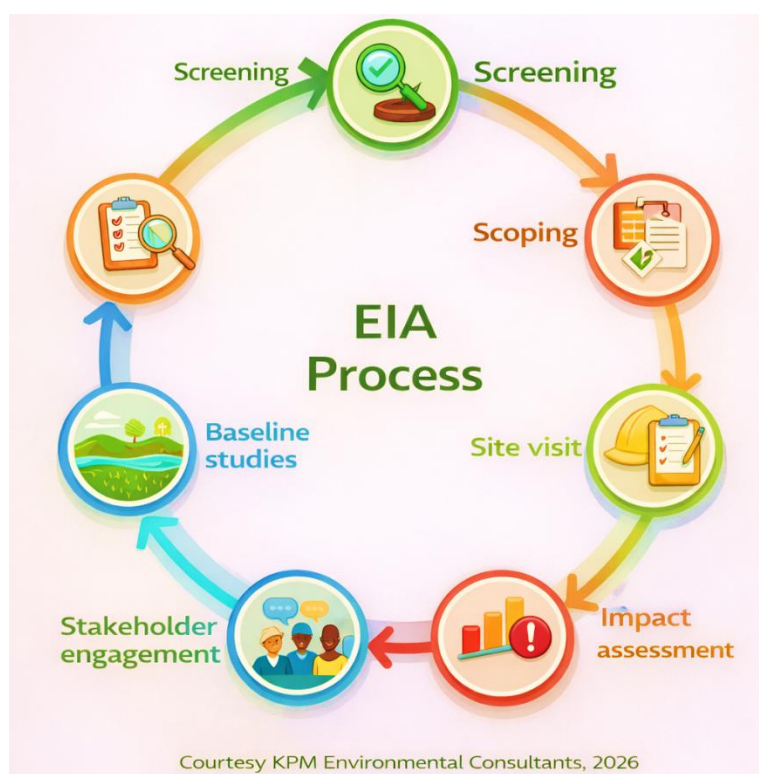


Illustration of the iterative EIA process, showing the progression from screening and scoping through baseline studies, site verification, stakeholder engagement, impact assessment, and EMP development, with feedback loops enabling adaptive refinement at each stage in line with Namibian regulatory requirements and international best practice. *Courtesy: KPM Environmental Consultants (2026).*

5.4 Screening and Scoping

The proposed pig abattoir development was screened against the list of activities contained in the Environmental Management Act, 2007 and the EIA Regulations, 2012, which identify abattoirs and meat-processing facilities as activities with the potential to cause significant environmental and public health impacts (GRN, 2007; MET, 2012).

Scoping was undertaken to identify key environmental and socio-economic issues requiring assessment. These included:

- Water use and groundwater protection;
- Wastewater, effluent, and ofal management;
- Odour and hygiene considerations;
- Occupational health and safety;

- Public health risks; and
- Socio-economic implications for farm workers.

Issues such as large-scale biodiversity loss or urban displacement were scoped out, as they were not considered relevant given the rural setting and scale of the project (IFC, 2007).

5.5 Baseline Data Collection Methods

Baseline data were collected using a mixed-methods approach, combining secondary and primary sources.

Table 11: Baseline Data Sources and Methods

Data Category	Method	Source
Legal & policy	Desktop review	GRN; sector policies
Environmental	Literature review	Regional studies
Socio-economic	Desktop analysis	NSA data
Site conditions	Field observation	Site visit
Operations	Interviews	Project proponent

Baseline conditions are presented in detail in Chapter 3 and form the reference point for impact assessment.

5.6 Site Reconnaissance and Field Verification

A site reconnaissance visit was conducted on Saturday, 24 January 2026, at Okonjima Farm No. 3. Site visits are regarded as a critical component of credible EIA practice, allowing verification of baseline assumptions and identification of site-specific sensitivities (UNEP, 2018; World Bank, 2017).

The site visit focused on:

- Existing land use and infrastructure;
- Proximity to sensitive receptors;
- Water supply and drainage conditions;
- Existing waste handling practices; and
- Occupational conditions on site.

5.7 Stakeholder Engagement as a Methodological Tool

Stakeholder engagement formed an integral component of data collection, not merely a compliance exercise.

5.7.1 Interviews with the Project Proponent

Structured interviews were conducted with the project proponent and farm management to obtain detailed information on:

- Project rationale and objectives;
- Design layout and operational processes;
- Water use and waste management systems;
- Biosecurity and veterinary controls; and
- Employment arrangements and health and safety measures.

Information provided was used to inform the project description and impact identification, while remaining subject to independent verification against site observations and regulatory standards (IFC, 2007).

5.7.2 Interviews with Farm Workers

Informal interviews were conducted with farm workers during the site visit as part of a qualitative social and occupational assessment. These interviews aimed to:

- Understand current working conditions;
- Identify occupational health and safety risks;
- Assess awareness of hygiene and biosecurity practices; and
- Identify potential socio-economic benefits or concerns.

Interviews were voluntary, non-intrusive, and conducted without recording personal identifiers, consistent with ethical research and engagement principles (UNDP, 2015; World Bank, 2017).

Table 12: Summary of Stakeholder Interviews

Stakeholder Group	Method	Key Focus Areas
Project proponent	Structured interview	Operations, compliance
Farm workers	Informal interviews	OHS, hygiene, livelihoods
Authorities	Written / verbal input	Regulatory requirements

5.8 Public Notification Methods Used in the EIA

Public notification was incorporated into the methodology in accordance with Regulation 21 of the EIA Regulations.

The following notification methods were applied:

- **Two newspaper advertisements** published in widely circulated newspapers, announcing the proposed project, EIA process, and public commenting period (MET, 2012);

- **Direct email notifications** sent to identified Interested and Affected Parties, including regulatory authorities with environmental, veterinary, health, and water management mandates; and
- Distribution of a **Background Information Document (BID)** summarising the proposed development and potential impacts.

These methods ensured both general public disclosure and targeted regulatory engagement, consistent with international good practice (IFC, 2007).

5.9 Impact Identification

Impact identification was undertaken through systematic analysis of:

- Project activities during construction and operation;
- Baseline environmental and socio-economic conditions;
- Site reconnaissance observations;
- Stakeholder interviews and inputs; and
- Regulatory and best-practice guidance (IFC, 2007; UNEP, 2018).

Impacts were grouped into the following categories:

- Physical environment;
- Biological environment;
- Socio-economic environment;
- Occupational health and safety;
- Public health; and
- Cumulative impacts.

5.10 Impact Assessment and Significance Rating

Each identified impact was assessed using a multi-criteria significance rating framework, consistent with international EIA practice (UNEP, 2018).

Table 13: Impact Significance Assessment Criteria

Criterion	Description
Nature	Positive / Negative
Extent	Site / Local / Regional
Duration	Short / Medium / Long-term
Intensity	Low / Medium / High
Probability	Unlikely / Possible / Likely
Reversibility	Reversible / Irreversible

Significance ratings were assigned before and after mitigation, allowing assessment of residual impacts.

5.11 Mitigation Hierarchy

Mitigation measures were developed in accordance with the internationally recognised mitigation hierarchy, prioritising:

- Avoidance;
- Minimisation;
- Rehabilitation; and
- Compensation (where applicable) (IFC, 2007; World Bank, 2017).

5.12 Environmental Management Plan (EMP) Development

An Environmental Management Plan (EMP) was prepared to translate mitigation measures into implementable actions. The EMP includes:

- Mitigation measures;
- Monitoring indicators;
- Institutional responsibilities;
- Reporting requirements; and
- Corrective action mechanisms.

The EMP forms a core component of environmental authorisation under the EMA (GRN, 2007).

5.13 Assumptions, Limitations, and Adaptive Management

The EIA is based on information available at the time of assessment. Limitations include reliance on secondary data and potential evolution of project design. These uncertainties are addressed through adaptive management provisions within the EMP (UNEP, 2018).

6 PUBLIC PARTICIPATION PROCESS

6.1 Introduction

Public participation is a mandatory and integral component of the Environmental Impact Assessment (EIA) process in terms of the Environmental Management Act, 2007 (Act No. 7 of 2007) and the Environmental Impact Assessment Regulations, 2012. The purpose of public participation is to ensure that Interested and Affected Parties (I&APs) are informed of the proposed development, afforded a reasonable opportunity to comment, and that their inputs are considered prior to decision-making by the Environmental Commissioner.

For the Proposed Pig Abattoir Development at Okonjima Farm No. 3, Otjozondjupa Region, the public participation process was undertaken in compliance with Regulations 21 and 22 of the EIA Regulations and was guided by international best-practice principles of transparency, inclusiveness, proportionality, and good-faith engagement (IFC, 2007; World Bank, 2017).

6.2 Objectives of the Public Participation Process

The objectives of the public participation process were to:

- Comply with statutory requirements under the EMA and EIA Regulations;
- Notify stakeholders and the general public of the proposed project and EIA process;
- Provide accessible, non-technical information regarding the proposed development;
- Identify potential environmental, public health, occupational, and socio-economic concerns;
- Engage relevant authorities with regulatory and oversight mandates; and
- Ensure that stakeholder inputs informed the impact assessment and Environmental Management Plan (EMP).

6.3 Identification of Interested and Affected Parties (I&APs)

Interested and Affected Parties were identified based on their regulatory mandate, direct involvement, or potential exposure to project-related impacts. Identification was undertaken using a combination of stakeholder mapping, site observations, and institutional review.

Identified I&AP categories included:

- The project proponent and farm management;
- Farm workers employed at Okonjima Farm No. 3;
- National and regional government authorities with statutory oversight responsibilities;
- Adjacent land users and neighbouring farms (where applicable); and
- Members of the general public with an interest in environmental or agricultural matters.

An Interested and Affected Party Registration Form was made available to allow stakeholders to formally register and receive ongoing communication.

Table 14: Categories of Interested and Affected Parties

I&AP Category	Basis for Inclusion
Project proponent	Project initiation and implementation
Farm workers	Occupational health and livelihoods
Environmental authorities	Environmental regulation and compliance
Veterinary authorities	Animal health and slaughter regulation
Health authorities	Public and environmental health oversight
Water authorities	Groundwater protection
Adjacent land users	Potential indirect exposure

6.4 Public Notification and Disclosure Methods

6.4.1 Newspaper Advertisements

In accordance with Regulation 21 of the EIA Regulations, two newspaper advertisements were placed in widely circulated newspapers. The advertisements informed the public of:

- The proposed pig abattoir development;
- The commencement of the EIA process;
- Availability of the Background Information Document (BID); and
- The public commenting period and closing date.

The advertisements included contact details of the Environmental Assessment Practitioner (EAP) and instructions on how to submit comments or register as an I&AP.

6.4.2 Direct Written Notifications (Emails)

In addition to newspaper advertisements, direct email notifications were issued to identified authorities and stakeholders with statutory or oversight responsibilities. This ensured targeted disclosure to institutions required to review, comment on, or regulate aspects of the proposed development.

The Background Information Document was circulated via email to, inter alia:

- Ministry of Environment, Forestry and Tourism, through the Environmental Commissioner, responsible for environmental regulation and compliance under the Environmental Management Act;
- Directorate of Veterinary Services within the Ministry of Agriculture, Water and Land Reform, responsible for animal health, disease control, and regulation of abattoir operations;
- Ministry of Health and Social Services, including Environmental Health Practitioners responsible for public and environmental health oversight; and
- National and regional water resource management authorities, responsible for regulating groundwater abstraction and protecting water quality.

Table 15: Summary of Public Notification Methods

Notification Method	Target Audience	Purpose
Newspaper adverts (x2)	General public	Statutory public notice
Email notifications	Authorities & stakeholders	Targeted regulatory engagement
BID distribution	All I&APs	Project information disclosure

6.5 Stakeholder Engagement Activities

6.5.1 Engagement with the Project Proponent

Structured consultations were undertaken with the project proponent and farm management to obtain information regarding:

- Project objectives and rationale;
- Proposed operational processes and scale;
- Water use, waste management, and biosecurity measures;
- Employment arrangements and occupational health considerations; and
- Regulatory compliance planning.

Information obtained informed the project description and impact identification but remained subject to independent assessment against site observations and regulatory benchmarks.

6.5.2 Engagement with Farm Workers

Engagement with farm workers was conducted during the site visit on 24 January 2026 through informal, non-intrusive discussions. The purpose of these engagements was to:

- Understand existing working conditions and practices;
- Identify occupational health and safety concerns;
- Assess awareness of hygiene and biosecurity procedures; and
- Identify perceived risks or benefits associated with the proposed abattoir.

Engagements were voluntary and conducted without recording personal identifiers.

6.5.3 Engagement with Authorities and Key Informants

Engagement with relevant authorities and technical stakeholders focused on clarifying:

- Regulatory requirements applicable to abattoir operations;
- Veterinary inspection and disease-control standards;
- Environmental health and hygiene requirements; and
- Water resource protection and abstraction controls.

Table 16: Summary of Stakeholder Engagement Activities

Stakeholder Group	Engagement Method	Key Focus Areas
Project proponent	Structured interviews	Operations, compliance
Farm workers	On-site discussions	OHS, hygiene, livelihoods
Authorities	Written & verbal consultation	Regulatory requirements

6.6 Public Commenting Period

The public commenting period was conducted in accordance with the EIA Regulations and remained open for the prescribed duration. The commenting period closed on 6th February, 2026.

During this period, I&APs were invited to submit written comments, questions, or objections via email or other indicated channels.

6.7 Issues Raised and Comments-and-Responses Trail

All comments received during the public participation process were:

- Logged and acknowledged;
- Reviewed by the Environmental Assessment Practitioner;
- Considered during impact assessment; and
- Addressed through appropriate mitigation measures where applicable.

A Comments and Responses Trail has been compiled and is included as an appendix to this EIA Report.

Table 17: Summary of Key Issues Raised

Issue Theme	General Response
Groundwater protection	Controlled wastewater management
Waste and offal handling	Veterinary-approved disposal
Worker health and safety	OHS measures in EMP
Hygiene and odour	Operational controls

6.8 Limitations of the Public Participation Process

The EIA acknowledges that:

- The rural location and low population density limited the number of directly affected stakeholders;
- Participation was voluntary and dependent on stakeholder availability; and
- Some stakeholders may not have elected to participate despite notification.

These limitations are considered reasonable given the scale and context of the proposed development and do not undermine the adequacy or legality of the public participation process.

6.9 Conclusion

The public participation process for the proposed pig abattoir development was conducted in full compliance with the Environmental Management Act, 2007 and the Environmental Impact Assessment Regulations, 2012, and aligned with international best practice. Inputs from stakeholders, including authorities, the project proponent, and farm workers, have informed the impact assessment and Environmental Management Plan.

7 ASSESSMENT OF ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS

7.1 Introduction

This chapter provides a comprehensive assessment of the potential environmental, public health, occupational, and socio-economic impacts associated with the proposed Pig Abattoir Development at Okonjima Farm No. 3, Otjozondjupa Region, Republic of Namibia. The assessment is undertaken in accordance with the Environmental Management Act, 2007 (Act No. 7 of 2007) and the Environmental Impact Assessment Regulations, 2012, and applies internationally recognised impact assessment principles and methodologies (GRN, 2007; MET, 2012; IFC, 2007; UNEP, 2018).

Impacts are assessed across the construction (establishment) and operational phases of the project. For each identified impact, the following are explicitly considered:

- The **source and cause** of the impact;
- The **environmental or social receptor** affected;
- The **pathway** through which the impact may occur;
- The **magnitude and significance** of the impact prior to mitigation;
- The **effectiveness of mitigation measures**; and
- The **residual impact significance** after mitigation.

This structured approach ensures transparency, traceability, and defensibility of conclusions reached.

7.2 Impact Assessment Methodology and Significance Framework

Impact significance was evaluated using a multi-criteria assessment framework, as described in Chapter 5. The framework considers both the severity of potential effects and the contextual sensitivity of the receiving environment described in Chapter 3.

Table 18: Impact Significance Criteria

Criterion	Definition
Nature	Whether the impact is beneficial or adverse
Extent	Geographic area affected (site, local, regional)
Duration	Temporal scale (short-, medium-, long-term)
Intensity	Degree of change from baseline conditions
Probability	Likelihood of occurrence
Reversibility	Ability of the environment to recover

Significance ratings are expressed qualitatively as **Low, Medium, High, or Very High**, consistent with Namibian and international EIA practice (UNEP, 2018).

7.3 Construction Phase Impacts

Construction-related activities are expected to be limited in duration and spatial extent, given the small-scale nature of the proposed development. Nevertheless, potential impacts are assessed to ensure full regulatory compliance.

7.3.1 Soil Disturbance, Compaction, and Erosion

Source and pathway:

Site preparation, foundation works, and installation of infrastructure may disturb surface soils, leading to compaction and increased susceptibility to erosion.

Receiving environment sensitivity:

As described in Chapter 3, soils in the project area are predominantly sandy loam to calcareous, which are moderately permeable but vulnerable to erosion if left exposed (Mendelsohn et al., 2009).

Table 19: Impact assessment: Soil Disturbance, Compaction, and Erosion

Impact Attribute	Rating	Colour Code	Rationale
Nature	Negative	 Red	Red universally denotes adverse or undesirable effects
Extent	Site-specific	 Orange	Localised impact with limited spatial spread
Duration	Short-term	 Yellow	Temporary impact with reversible effects
Intensity	Low	 Light Green	Minor magnitude, limited environmental stress
Probability	Likely	 Orange	Expected to occur under normal operating conditions

Visual Key for Use in Tables / Matrices

-  **Red** – Adverse / negative effect
-  **Orange** – Localised or likely occurrence
-  **Yellow** – Temporary or transitional effect
-  **Green** – Low intensity / manageable impact

Pre-mitigation significance: Low - Medium

Mitigation measures:

- Restrict construction activities to demarcated areas;
- Avoid unnecessary stripping of topsoil;
- Stabilise disturbed areas promptly after construction.

Residual significance: Low

7.3.2 Dust, Noise, and Temporary Nuisance

Source and Pathway

Dust and noise impacts may arise primarily during the construction phase as a result of:

- Operation of construction machinery and equipment;
- Vehicle movement on unpaved surfaces; and
- Temporary earthworks associated with site preparation.

Dust is generated through the disturbance of dry soils and vehicle movement, while noise is produced by mechanical equipment and intermittent construction activities. These impacts are typically **localised and episodic**, occurring only during active construction periods.

Receiving Environment Sensitivity

The project is located within a rural agricultural setting characterised by low population density and the absence of nearby sensitive receptors such as residential clusters, schools, or health facilities. Human receptors are therefore limited primarily to on-site workers, and the surrounding environment exhibits a low sensitivity to short-term nuisance impacts.

Table 20: Impact Assessment Colour Coding

Impact Attribute	Rating	Colour Code	Interpretation
Nature	Negative	 Red	Adverse impact identified
Extent	Site-specific	 Orange	Impact confined to the project footprint
Duration	Short-term	 Yellow	Temporary and reversible
Intensity	Low	 Light Green	Minor magnitude and easily manageable
Probability	Possible	 Yellow	May occur under certain construction conditions

Probability Scale (for reference):

- Unlikely –  Green
- Possible –  Yellow
- Likely –  Orange
- Almost Certain –  Red

Impact Significance

Pre-mitigation significance: **Low**

Given the **temporary nature**, **site-specific extent**, and **low intensity** of dust and noise generation, combined with the low sensitivity of surrounding receptors, the pre-mitigation significance of this impact is assessed as **low**.

Mitigation Measures

To further minimise nuisance effects during construction, the following standard mitigation measures shall be implemented:

- Application of **water spraying** to exposed surfaces and access routes during dry and windy conditions to suppress dust;
- **Restriction of construction activities to daylight hours** to limit noise disturbance;
- **Routine maintenance of construction equipment** to reduce excessive noise and emissions; and
- Good housekeeping practices to limit unnecessary vehicle movement and soil disturbance.

Residual Impact Significance

Residual significance: Low

With the implementation of the above mitigation measures, residual dust and noise impacts are expected to remain **minor, temporary, and fully manageable**, and are therefore considered **acceptable** within the context of the proposed development.

Table 21: Construction Phase Impact Summary

Impact	Primary Source	Receptor	Residual Significance
Soil disturbance	Earthworks and site preparation	Soil resources	Low
Dust and noise	Construction machinery and vehicles	On-site workers / local environment	Low

7.4 Operational Phase Impacts

Operational impacts represent the most significant risk profile of the proposed pig abattoir and are therefore assessed in detail.

7.4.1 Groundwater Contamination

Source and pathway:

Wastewater, blood, fats, and cleaning effluent generated during slaughter and processing activities may infiltrate soil and contaminate groundwater if not properly managed.

Receiving environment sensitivity:

Groundwater is the primary water source in the Otjozondjupa Region and is regarded as a highly sensitive receptor (Chapter 3). Protection of groundwater is therefore a central consideration of this EIA.

Table 22: Impact Assessment: Potential Groundwater Contamination

Impact Attribute	Rating	Colour Code	Groundwater-Specific Interpretation
Nature	Negative	● Red	Adverse impact affecting a critical natural resource
Extent	Local	● Dark Orange	Impact may extend beyond the site via subsurface flow
Duration	Long-term	● Dark Red	Groundwater impacts persist for decades once established
Intensity	Medium–High	● Red-Orange	Potential for significant degradation of water quality
Probability	Possible	● Yellow	May occur if containment or treatment systems fail

Significance Interpretation

Although the probability of occurrence is assessed as *possible*, the long-term persistence, medium–high intensity, and local-to-off-site migration potential of groundwater contamination elevate the overall pre-mitigation significance of this impact. Groundwater constitutes the primary water resource within the Otjozondjupa Region, and contamination would represent a high-consequence environmental and public health impact. Accordingly, this impact is treated conservatively in line with the precautionary principle, requiring engineered controls, redundancy, and continuous verification.

Post-Mitigation Significance (to link to EMP)

With the implementation of a multi-stage effluent treatment system, source separation of high-organic waste streams, groundwater monitoring boreholes, and adaptive management measures, the residual significance of groundwater contamination is expected to be reduced to Low–Medium, provided that all EMP measures are implemented and maintained.

Impact Significance and Mitigation Summary: Groundwater Contamination

Pre-mitigation significance: **High**

Given the sensitivity of groundwater resources in the Otjozondjupa Region and the persistence of subsurface contamination once established, the potential impact on groundwater quality is assessed as high significance prior to mitigation, despite a moderate probability of occurrence. This conservative rating reflects the long-term duration, medium–high intensity, and potential public health implications associated with groundwater pollution, and is consistent with the precautionary approach required under the Environmental Management Act, 2007.

Mitigation measures:

- Installation of **engineered, controlled wastewater collection and multi-stage treatment systems**, including source separation of high-organic waste streams;
- **Prohibition of any discharge of untreated or inadequately treated effluent** to soil, surface water, or the natural environment;

- **Routine inspection, preventative maintenance, and performance monitoring** of all wastewater treatment and containment infrastructure;
- Implementation of **spill prevention measures**, including bunding of high-risk areas and the availability of spill kits;
- Establishment of **emergency response procedures** to ensure rapid containment and remediation in the event of accidental releases; and
- **Groundwater quality monitoring** through designated monitoring boreholes to verify the effectiveness of mitigation measures.

Residual significance: **Low–Medium**

With full and sustained implementation of the above mitigation measures, the residual impact on groundwater quality is expected to be reduced to low–medium significance. This residual rating reflects the presence of engineered controls, redundancy, and ongoing verification, and is considered acceptable within the context of the proposed development.

This assessment and mitigation approach is aligned with the precautionary principle as required under the Environmental Management Act, 2007, and with international best practice as reflected in the IFC Environmental, Health and Safety (EHS) Guidelines.

7.4.2 Waste and Offal Management

Source and Pathway

Offal, condemned material, and other solid organic waste generated during abattoir operations may result in odour generation, attraction of pests, and biosecurity risks if improperly handled, stored, or disposed of. The primary impact pathways include direct exposure of workers, attraction of disease vectors, and potential transmission of animal diseases to surrounding agricultural activities.

Receiving Environment Sensitivity

Although the project site is located in a rural agricultural setting with low population density, the receiving environment exhibits moderate sensitivity due to:

- The presence of on-site workers directly exposed to waste handling;
- The proximity of livestock and agricultural land uses susceptible to disease transmission; and
- The regulatory sensitivity associated with animal health and food safety.

Table 23: Waste and Offal Management Impact Assessment (Colour Coding)

Impact Attribute	Rating	Colour Code	Interpretation
Nature	Negative	● Red	Adverse impact identified
Extent	Site-specific	● Orange	Impact confined to the project footprint
Duration	Medium–Long term	● Orange	Impact may persist if poorly managed

Intensity	Medium	● Yellow	Moderate magnitude requiring management
Probability	Possible	● Yellow	May occur under certain conditions

Probability Scale (for reference):

- Unlikely – ● Green
- Possible – ● Yellow
- Likely – ● Orange
- Almost Certain – ● Red

Impact Significance

Pre-mitigation significance: **Medium–High**

The pre-mitigation significance is assessed as medium–high, reflecting the biosecurity implications, potential persistence of impacts, and regulatory sensitivity associated with improper waste and offal management, despite the site-specific extent.

Mitigation Measures

- Disposal of all offal and condemned material strictly in accordance with veterinary and meat inspection requirements;
- Use of secure, sealed waste storage facilities to prevent pest access;
- Oversight and compliance monitoring by the Directorate of Veterinary Services;
- Regular waste removal or disposal at approved facilities or veterinary-approved condemnation pits; and
- Implementation of hygiene and sanitation procedures to minimise secondary contamination.

Residual Impact Significance

Residual significance: Low

With the consistent application of the above mitigation measures, residual impacts associated with waste and offal management are expected to be low, localised, and fully manageable, and are therefore considered acceptable.

7.4.3 Occupational Health and Safety

Source and Pathway

Occupational health and safety risks may arise during abattoir operations due to exposure to biological materials, use of sharp tools and cutting equipment, wet and slippery working

surfaces, and repetitive or physically demanding tasks. If not adequately managed, these hazards may result in injuries, occupational illness, or long-term health effects among workers.

Receiving Environment Sensitivity

The receiving environment is characterised by the presence of on-site workers, who represent a direct and continuous receptor group for occupational hazards. As workers are exposed on a daily basis, the sensitivity of this receptor is considered moderate to high, notwithstanding the site-specific extent of the impact.

Table 24: Occupational Health and Safety Impact Assessment (Colour Coding)

Impact Attribute	Rating	Colour Code	Interpretation
Nature	Negative	 Red	Adverse impact identified
Extent	Site-specific	 Orange	Impact confined to the project footprint
Duration	Long-term	 Dark Red	Persistent exposure over the operational life
Intensity	Medium	 Yellow	Moderate severity requiring active management
Probability	Possible	 Yellow	May occur under certain conditions

Probability Scale (for reference):

- Unlikely –  Green
- Possible –  Yellow
- Likely –  Orange
- Almost Certain –  Red

Impact Significance

Pre-mitigation significance: Medium

The pre-mitigation significance of occupational health and safety impacts is assessed as medium, reflecting the long-term exposure of workers, the moderate intensity of potential injuries or illnesses, and the site-specific nature of the impact.

Mitigation Measures

- Provision and mandatory use of appropriate Personal Protective Equipment (PPE);
- Worker training, induction, and ongoing supervision to promote safe working practices;
- Implementation of safe work procedures for handling biological materials and sharp equipment;
- Compliance with applicable labour, occupational health, and safety legislation; and
- Routine inspection and maintenance of work areas to reduce slip and trip hazards.

Residual Impact Significance

Residual significance: Low

With the implementation of the above mitigation measures, residual occupational health and safety risks are expected to be **low**, manageable, and acceptable within the context of the proposed development.

7.4.4 Odour and Nuisance Impacts

Source and Pathway

Odour-related nuisance impacts may arise during abattoir operations as a result of slaughter activities, temporary storage of waste and offal, and cleaning and sanitation processes. Odours may be generated through the decomposition of organic material or inadequate ventilation, with the primary impact pathway being airborne dispersion.

Receiving Environment Sensitivity

The project site is located within a rural agricultural setting with limited nearby receptors. However, odour impacts may still affect on-site workers, visitors, and surrounding agricultural land uses if not adequately controlled. Sensitivity is therefore considered low to moderate, but increases in the event of poor housekeeping or waste management practices.

Table 25: Odour and Nuisance Impacts Assessment (Colour Coding)

Impact Attribute	Rating	Colour Code	Interpretation
Nature	Negative	● Red	Adverse impact identified
Extent	Localised	● Dark Orange	Impact limited to the immediate area
Duration	Long-term	● Dark Red	Persistent over the operational life
Intensity	Low–Medium	● Yellow–Orange	Noticeable but manageable with controls
Probability	Possible	● Yellow	May occur under certain conditions

Probability Scale (for reference):

- Unlikely – ● Green
- Possible – ● Yellow
- Likely – ● Orange
- Almost Certain – ● Red

Impact Significance

Pre-mitigation significance: Medium

The pre-mitigation significance of odour and nuisance impacts is assessed as medium, reflecting the potential persistence of odour generation, the localised extent, and the likelihood of occurrence in the absence of effective housekeeping and waste management practices.

Mitigation Measures

- Prompt handling and removal of waste and offal to prevent decomposition;

- Maintenance of high standards of housekeeping and sanitation within processing and waste storage areas;
- Appropriate facility design, including adequate ventilation and separation of odour-generating activities;
- Regular inspection of waste storage and drainage systems to prevent odour build-up.

Residual Impact Significance

Residual significance: **Low**

With effective implementation of the above mitigation measures, residual odour and nuisance impacts are expected to be **low**, localised, and acceptable within the rural context of the project site.

7.5 Socio-Economic Impacts

7.5.1 Employment and Skills Development

The proposed pig abattoir development is expected to generate direct employment opportunities during the operational phase, including positions related to animal handling, meat processing, hygiene management, administration, and facility maintenance. In addition, the operation will contribute to skills development in areas such as meat hygiene, occupational health and safety, regulatory compliance, and biosecurity.

These skills are transferable and durable, strengthening the local labour base and improving employability within the agricultural and agro-processing sectors.

Table 26: Impact Assessment Colour Coding (Positive Impact)

Impact Attribute	Rating	Colour Code	Interpretation
Nature	Positive	 Green	Beneficial impact
Extent	Site-specific	 Orange	Benefits focused at project level
Duration	Long-term	 Blue	Sustained over the operational life
Intensity	Medium	 Yellow	Meaningful socio-economic benefit

Impact Significance

Significance: **Medium – Positive**

The significance of employment creation and skills development is assessed as medium-positive, reflecting the long-term nature of the benefit and its contribution to human capital development, albeit at a site-specific scale.

No mitigation is required for positive impacts; however, maximisation measures may be implemented through training, fair labour practices, and compliance with labour legislation.

7.5.2 Local Value Addition and Agricultural Resilience

The establishment of an on-farm pig abattoir contributes to local value addition by enabling slaughter and primary processing closer to the point of production. This reduces reliance on distant facilities, lowers animal transport distances, improves animal welfare, and reduces associated transport costs and stress.

By strengthening local processing capacity, the project enhances agricultural resilience and supports the development of regional agricultural value chains, contributing to food security and economic sustainability within the Otjozondjupa Region.

Impact Significance

Significance: **Medium – Positive**

The impact is assessed as **medium-positive**, reflecting its long-term contribution to farm-level efficiency, regional agricultural sustainability, and reduced logistical dependence, while recognising that benefits are primarily localised.

Table 27: Socio-Economic Impact Summary

Impact	Nature	Duration	Significance
Employment creation	Positive	Long-term	Medium – Positive
Skills development	Positive	Long-term	Medium – Positive
Local value addition	Positive	Long-term	Medium – Positive
Agricultural resilience	Positive	Long-term	Medium – Positive

7.6 Cumulative Impacts

Assessment Approach

Cumulative impacts were assessed by considering the interaction between the proposed pig abattoir development and existing or reasonably foreseeable activities within the surrounding area. This assessment takes into account the spatial scale, duration, and intensity of the proposed activity in combination with prevailing land uses, in accordance with good EIA practice and the requirements of the Environmental Management Act, 2007.

The assessment focuses on receptors that are most susceptible to cumulative pressure, including groundwater resources, land use, and public and environmental health, rather than on isolated project-specific impacts alone.

Existing and Foreseeable Activities

The project is located within a predominantly rural agricultural landscape, characterised by:

- Low development density;
- Commercial and mixed farming activities; and

- Absence of industrial clusters or high-intensity agro-processing facilities in the immediate vicinity.

No major industrial developments or high-risk activities are currently known or planned in the immediate project area that would materially compound environmental pressures associated with the proposed abattoir.

Cumulative Impact Evaluation

Given the limited scale of the proposed abattoir, its site-specific footprint, and the low intensity of surrounding land uses, cumulative impacts are generally assessed as low. Most project-related impacts - such as dust, noise, and nuisance - are temporary or localised and do not meaningfully interact with other activities to create cumulative effects.

Groundwater resources are identified as the most sensitive cumulative receptor, due to:

- Regional reliance on groundwater as the primary water source; and
- The long-term persistence of subsurface contamination should it occur.

However, potential cumulative effects on groundwater are explicitly addressed through:

- Engineered wastewater collection and treatment systems;
- Prohibition of untreated effluent discharge;
- Groundwater monitoring and verification; and
- Adaptive management measures embedded in the Environmental Management Plan.

Conclusion on Cumulative Impacts

On the basis of the above, cumulative impacts associated with the proposed development are assessed as **low**, provided that all mitigation and monitoring measures outlined in the Environmental Management Plan are implemented and maintained. No unacceptable cumulative environmental or socio-economic impacts are anticipated.

7.7 Impact Summary and Residual Risk

This section consolidates the findings of the impact assessment by summarising the pre-mitigation significance, post-mitigation (residual) significance, and overall risk profile of the proposed development across all identified environmental and socio-economic receptors.

The summary demonstrates the effectiveness of the prescribed mitigation and management measures in reducing potential adverse impacts to acceptable residual levels, in line with the Environmental Management Act, 2007, and recognised international best practice.

Table 28: Overall Impact Summary Matrix

Impact	Project Phase	Pre-Mitigation Significance	Post-Mitigation (Residual) Significance
Soil disturbance	Construction	Low–Medium	Low
Dust and noise	Construction	Low	Low
Groundwater contamination	Operation	High	Low–Medium
Waste and offal management	Operation	Medium–High	Low
Public health	Operation	High	Low
Occupational health and safety (OHS)	Operation	Medium	Low
Employment and skills development	Operation	Positive	Positive

Residual Risk Interpretation

The summary matrix indicates that:

- Construction-phase impacts are temporary, localised, and of low residual significance following implementation of standard control measures.
- Operational-phase impacts with higher inherent risk - particularly groundwater contamination, public health, and biological waste management - are reduced from high or medium–high pre-mitigation significance to low or low–medium residual significance through engineered controls, institutional accountability, and continuous monitoring.
- Positive socio-economic impacts, including employment creation and skills development, are sustained over the long term and contribute positively to local and regional development objectives.

Residual risks are therefore considered manageable, verifiable, and acceptable, provided that the Environmental Management Plan is implemented in full and maintained throughout the life of the project.

7.8 Conclusion

The impact assessment demonstrates that, with the implementation of the prescribed mitigation, monitoring, and management measures, the proposed pig abattoir development at Okonjima Farm No. 3 will not result in unacceptable environmental, public health, or socio-economic impacts.

While certain impacts - most notably those related to groundwater protection and biosecurity - are inherently high-consequence in nature, the assessment confirms that these risks can be effectively managed and reduced to acceptable residual levels through:

- Robust engineering design;
- Preventative operational controls;
- Regulatory oversight; and

- Adaptive management mechanisms embedded in the Environmental Management Plan.

On this basis, the proposed development is considered environmentally acceptable and consistent with Namibian legislative requirements and international best practice, subject to the full implementation and enforcement of the commitments set out in this Environmental Impact Assessment and associated Environmental Management Plan

8 ANALYSIS OF ALTERNATIVES

8.1 Introduction

The analysis of alternatives is a core requirement of the Environmental Impact Assessment (EIA) process in terms of the Environmental Management Act, 2007 (Act No. 7 of 2007) and the Environmental Impact Assessment Regulations, 2012, which require that feasible alternatives to a proposed activity be identified, evaluated, and compared prior to decision-making (GRN, 2007; MET, 2012).

In line with proportionality principles, the analysis focuses on alternatives that are technically feasible, economically viable, and relevant to the environmental and operational context of the proposed development.

This chapter informs regulatory decision-making by systematically evaluating reasonable alternatives and demonstrating why the preferred option represents the most environmentally responsible and practicable outcome. The purpose of this chapter is to:

- Identify reasonable and practicable alternatives to the proposed pig abattoir development;
- Assess the environmental, social, technical, and economic implications of these alternatives; and
- Provide a transparent justification for the preferred project option.

The analysis is aligned with international best practice guidance issued by the International Finance Corporation (IFC) and the United Nations Environment Programme (UNEP), which emphasise early consideration of alternatives as a means of avoiding or reducing environmental harm (IFC, 2007; UNEP, 2018).

8.2 Scope and Approach to Alternatives Analysis

The alternatives assessment focused on alternatives that are technically feasible, economically viable, and relevant to the project context. The following categories of alternatives were considered:

- The No-Go Alternative;
- Site/location alternatives;
- Design and layout alternatives;
- Operational and process alternatives; and
- Waste and wastewater management alternatives.

Alternatives that were not feasible due to regulatory, technical, or operational constraints were excluded from detailed consideration, in line with proportionality principles (IFC, 2007).

8.3 No-Go Alternative

8.3.1 Description

The No-Go Alternative assumes that the proposed pig abattoir development does **not proceed**, and that the site remains under its current agricultural land use, without the establishment of slaughter and processing facilities.

8.3.2 Environmental and Socio-Economic Implications

Under the No-Go Alternative:

- No project-related environmental impacts would occur;
- No additional pressure would be placed on groundwater resources;
- No waste or effluent would be generated; and
- Existing environmental conditions would remain unchanged.

However, the No-Go Alternative would also result in:

- Loss of potential **local value addition** opportunities;
- Continued reliance on distant slaughter facilities, increasing transport-related emissions and animal welfare risks;
- Missed employment and skills development opportunities for farm workers; and
- Reduced alignment with national agricultural and food security objectives.

8.3.3 Evaluation of the No-Go Alternative

While environmentally benign in the short term, the No-Go Alternative does not support Namibia's policy objectives relating to agro-processing, food security, and rural economic development (NPC, 2018; MAWLR, 2020). For this reason, the No-Go Alternative is not considered the preferred option.

While the No-Go Alternative avoids direct project-related impacts, it indirectly perpetuates transport-related emissions, animal welfare risks, and missed opportunities for localised value addition.

8.4 Site and Location Alternatives

8.4.1 Alternative Sites Considered

Alternative locations outside Okonjima Farm No. 3 were considered conceptually, including relocation to other farms or centralised slaughter facilities.

However, the following constraints were identified:

- Increased transport distances for livestock;
- Higher animal stress and welfare risks;

- Increased fuel consumption and emissions;
- Reduced operational control by the proponent; and
- Increased capital and operational costs.

Collectively, these factors would shift environmental risk from a controlled, site-specific context to a dispersed and less manageable regional scale.

8.4.2 Justification for the Preferred Site

The selected site at Okonjima Farm No. 3 offers:

- Existing agricultural land use compatibility;
- Low surrounding population density;
- Adequate separation from sensitive receptors;
- Existing access infrastructure; and
- Direct integration with on-farm livestock production.

Table 29: Comparison of Site Alternatives

Criterion	Preferred Site (On-Farm)	Alternative Off-Site Location
Land-use compatibility	High	Variable
Transport distance	Low	High
Environmental footprint	Low	Medium–High
Animal welfare	Improved	Reduced
Cost	Lower	Higher

8.5 Design and Layout Alternatives

8.5.1 Compact vs. Expanded Layout

Two layout options were considered:

- A **compact, low-footprint design**; and
- A larger, more dispersed layout.

The compact design was preferred due to:

- Reduced land disturbance;
- Improved hygiene control;
- Easier monitoring and management; and
- Lower infrastructure requirements.

Table 30: Design and Layout Alternatives

Aspect	Compact Design	Expanded Design
Land disturbance	Low	Medium
Waste control	Easier	More complex

Environmental risk	Lower	Higher
Cost	Lower	Higher

8.6 Operational and Process Alternatives

8.6.1 Scale of Operation

The proposed **small-scale, low-throughput operation** was compared with a higher-capacity alternative.

A higher-capacity operation was excluded due to:

- Increased wastewater volumes;
- Greater waste management complexity;
- Higher environmental risk profile; and
- Reduced proportionality relative to local production.

8.6.2 Manual vs. Highly Mechanised Processing

A semi-manual process with controlled mechanisation was preferred due to:

- Lower energy demand;
- Reduced capital intensity;
- Greater employment opportunities; and
- Easier maintenance and oversight.

Table 31: Operational Alternatives

Criterion	Small-Scale Operation	Large-Scale Operation
Water use	Low	High
Waste generation	Low–Medium	High
Employment	Moderate	Lower
Environmental risk	Lower	Higher

8.7 Waste and Wastewater Management Alternatives

8.7.1 Wastewater Treatment Options

Alternatives considered included:

- Direct discharge (excluded as non-compliant);
- Controlled on-site treatment and disposal; and
- Off-site removal by licensed operators.

Controlled on-site treatment, compliant with regulatory requirements, was identified as the preferred option due to reduced transport risk and improved oversight.

8.7.2 Offal and Biological Waste Disposal

Alternatives considered included:

- Uncontrolled burial (excluded);
- Approved burial or incineration methods; and
- Removal by licensed waste handlers.

Veterinary-approved disposal methods were selected as the preferred option.

Table 32: Waste Management Alternatives

Waste Stream	Preferred Option	Reason
Wastewater	Controlled on-site treatment	Compliance & control
Offal	Veterinary-approved disposal	Health & biosecurity
Solid waste	Licensed removal	Environmental protection

8.8 Preferred Alternative and Justification

Based on the comparative analysis, the preferred alternative comprises:

- Development at Okonjima Farm No. 3;
- A compact facility layout;
- Small-scale, low-throughput operations;
- Semi-manual processing systems; and
- Controlled waste and wastewater management.

This option provides the best balance between environmental protection, operational feasibility, socio-economic benefit, and policy alignment.

This alternative also enables environmental risks to be addressed primarily through design and engineered controls rather than reliance on corrective operational measures.

8.9 Conclusion

The alternatives analysis demonstrates that the preferred project option represents the most environmentally and socially responsible approach, consistent with Namibian legislative requirements and international best practice. The No-Go Alternative, while environmentally neutral, does not meet development objectives, whereas other alternatives present higher environmental and operational risks.

8.10 References (Indicative)

- Government of the Republic of Namibia (GRN). 2007. *Environmental Management Act*.
- IFC. 2007. *Environmental, Health and Safety Guidelines for Meat Processing*.
- UNEP. 2018. *Environmental Impact Assessment Guidelines*.
- National Planning Commission (NPC). 2018. *NDP5*.
- MAWLR. 2020. *National Agricultural Policy*.

9 ENVIRONMENTAL CLEARANCE CERTIFICATE (ECC) CONDITIONS EXTRACTED FROM THE EMP

9.1 Purpose and Regulatory Intent

This chapter presents a consolidated set of **proposed Environmental Clearance Certificate (ECC) conditions**, extracted directly from the Environmental Management Plan (EMP). The purpose of this chapter is to:

- Translate EMP commitments into clear, enforceable ECC conditions;
- Support the Environmental Commissioner in issuing a precise and unambiguous ECC;
- Provide the Project Proponent with a single compliance reference; and
- Facilitate effective monitoring, auditing, and enforcement post-approval.

The conditions set out herein are derived from the risk pathways, mitigation measures, monitoring requirements, and escalation procedures detailed in Chapter 9, and are intended to form binding conditions of the ECC issued under the Environmental Management Act, 2007 (Act No. 7 of 2007).

9.2 Legal Status of ECC Conditions

Once issued, the ECC conditions derived from this EMP shall be legally binding on the Project Proponent. Non-compliance with any ECC condition constitutes non-compliance with the Environmental Management Act and may result in enforcement action, suspension of activities, or withdrawal of the ECC.

Implementation of the EMP, including monitoring, reporting, and corrective actions, is therefore mandatory, not discretionary.

9.3 Extracted ECC Conditions

Table 33: General and Institutional Conditions

ECC Condition	Source in EMP
The Project Proponent shall implement the Environmental Management Plan (EMP) in full for the duration of the project life cycle.	Chapter 9
A Designated Environmental Officer (EO) shall be formally appointed prior to commencement of operations.	Section 9.3
The EO shall have authority to suspend or modify activities posing an environmental, public health, or safety risk.	Sections 9.3, 9.6
All staff and contractors shall undergo environmental and hygiene induction prior to commencing work.	Sections 9.4, 9.6

Table 34: Pre-Construction Conditions

ECC Condition	Source in EMP
No site clearing, earthworks, or construction shall commence prior to issuance of the ECC and all sectoral approvals.	Section 9.4
Effluent treatment systems shall be designed for peak operational demand and approved prior to construction.	Section 9.4
SOPs for hygiene, waste management, spill response, and emergency procedures shall be finalised prior to commissioning.	Section 9.4

Table 35: Construction Phase Conditions

ECC Condition	Source in EMP
Construction activities shall be confined to demarcated areas only.	Section 9.5
Disturbed surfaces shall be stabilised immediately following construction activities.	Section 9.5
Construction waste shall not be buried or burned on site and shall be disposed of at licensed facilities.	Section 9.5
Dust and erosion control measures shall be implemented throughout construction.	Section 9.5

Table 36: Operational Phase Conditions – Water and Wastewater

ECC Condition	Source in EMP
A multi-stage effluent treatment system comprising a grease trap, anaerobic treatment, and aerobic polishing shall be installed and maintained.	Section 9.6.8
Untreated effluent shall not be discharged to soil or surface water.	Section 9.6.8
Water use shall be monitored using a water-intensity benchmark (ℓ/animal slaughtered).	Section 9.6.8
Groundwater monitoring shall be undertaken bi-annually and results retained for inspection.	Section 9.6.8
Any exceedance of groundwater quality thresholds shall trigger immediate investigation and reporting.	Section 9.6.8

Table 37: Biological Waste and Biosecurity Conditions

ECC Condition	Source in EMP
Blood shall be source-separated and excluded from general wastewater streams.	Section 9.6.9
Condemned material shall be disposed of in lined, fenced, veterinary-approved facilities.	Section 9.6.9
An Integrated Pest Management (IPM) programme shall be implemented and maintained.	Section 9.6.9
Veterinary requirements shall be complied with at all times.	Section 9.6.9

Table 38: Occupational Health and Safety Conditions

ECC Condition	Source in EMP
Preventative maintenance of equipment shall be implemented.	Section 9.6.10
Annual medical surveillance for zoonotic diseases shall be undertaken.	Section 9.6.10

Chemicals shall be stored in bunded areas with MSDS available on site.	Section 9.6.10
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Table 39: Monitoring, Auditing, and Reporting Conditions

ECC Condition	Source in EMP
An independent environmental audit shall be conducted annually.	Section 9.7
Audit reports shall be submitted to the Environmental Commissioner.	Section 9.7
All complaints and incidents shall be recorded and investigated.	Section 9.7
Non-compliance shall be corrected within defined timelines.	Section 9.7

Table 40: Decommissioning and Closure Conditions

ECC Condition	Source in EMP
Wastewater systems shall be decommissioned safely upon closure.	Section 9.8
Residual sludges shall be removed and disposed of lawfully.	Section 9.8
Soil and groundwater contamination shall be assessed and remediated if detected.	Section 9.8
The site shall be rehabilitated to functional environmental stability.	Section 9.8
Responsibility for closure remains with the Project Proponent regardless of ownership change.	Section 9.8

9.4 Implementation and Enforcement

The ECC conditions extracted in this chapter are intended to be directly enforceable and measurable. Compliance shall be verified through inspections, audits, monitoring records, and reporting submitted to the Environmental Commissioner.

Where conditions are not complied with, enforcement action may be taken in accordance with the Environmental Management Act, 2007.

9.5 Conclusion

This ECC Conditions Chapter provides a clear, structured, and enforceable bridge between the Environmental Impact Assessment, the Environmental Management Plan, and post-approval regulatory oversight. By explicitly extracting ECC conditions from the EMP, the chapter enhances transparency, reduces interpretive ambiguity, and strengthens the effectiveness of environmental governance throughout the project life cycle.

10 OVERALL CONCLUSION AND RECOMMENDATION

10.1 Overview of the Environmental Impact Assessment

This Environmental Impact Assessment (EIA) was undertaken for the Proposed Pig Abattoir Development at Okonjima Farm No. 3, Otjozondjupa Region, Republic of Namibia, in accordance with the requirements of the Environmental Management Act, 2007 (Act No. 7 of 2007) and the Environmental Impact Assessment Regulations, 2012.

The EIA process followed a structured and systematic approach, incorporating:

- Project registration with the Environmental Commissioner;
- Preparation and circulation of a Background Information Document (BID);
- A formal public participation process, including newspaper advertisements and direct stakeholder notifications;
- Desktop review of relevant legal, policy, environmental, and socio-economic information;
- A site visit conducted on Saturday, 24 January 2026;
- Engagement with the project proponent and site personnel; and
- Identification, evaluation, and mitigation of potential environmental, public health, occupational, and socio-economic impacts.

The assessment was guided by the principles of precaution, prevention, sustainability, transparency, and adaptive management, as required under Namibian environmental legislation and consistent with international best practice.

10.2 Summary of Key Environmental Findings

The EIA has demonstrated that the proposed development is environmentally feasible, provided that the mitigation and management measures prescribed in this report are implemented in full.

The key findings of the assessment are summarised as follows:

- The project location is appropriate for the proposed activity, given its rural agricultural setting and compatibility with surrounding land uses;
- No environmentally sensitive habitats or protected areas were identified that would present a fatal flaw to the development;
- The most significant environmental risk associated with the project relates to wastewater and groundwater protection, which has been comprehensively addressed through engineered treatment systems, monitoring requirements, and verification mechanisms;
- Potential impacts related to biological waste management, odour, public health, occupational health and safety, and biosecurity can be effectively prevented or reduced to acceptable levels through the implementation of the Environmental Management Plan (EMP);
- Construction-phase impacts are temporary, localised, and readily manageable through standard controls; and

- No impacts of such magnitude or significance were identified that would justify refusal of the proposed development.

10.3 Adequacy of the Environmental Management Plan

The Environmental Management Plan presented in Chapter 9 provides a comprehensive, technically robust, and operationally realistic framework for managing environmental and socio-economic risks throughout the full project life cycle.

The EMP is considered adequate and appropriate because it:

- Is structured on a phase-by-phase basis, covering pre-construction, construction, operation, and decommissioning;
- Prioritises engineering and design controls over reliance on behavioural compliance alone;
- Clearly defines roles, responsibilities, monitoring indicators, and response timelines;
- Incorporates adaptive management, independent auditing, and accountability mechanisms; and
- Explicitly addresses closure and rehabilitation, ensuring that no environmental liabilities are transferred into the future.

Provided that the EMP is implemented in full and enforced as a condition of the Environmental Clearance Certificate, residual environmental impacts are expected to be low and acceptable.

10.4 Public Participation and Stakeholder Engagement

The public participation process was undertaken in compliance with the Environmental Management Act and EIA Regulations. Interested and Affected Parties (I&APs) were provided with access to project information and afforded an opportunity to submit comments during the prescribed review period.

Issues raised during the consultation process were considered in the assessment and addressed through:

- Clarification of project activities;
- Refinement of management and mitigation measures; and
- Inclusion of monitoring and reporting commitments within the EMP.

No substantive objections were raised that could not be reasonably mitigated through the measures proposed in this report.

10.5 Overall Conclusion

Based on the findings of this Environmental Impact Assessment, it is concluded that:

- The proposed pig abattoir development will not result in unacceptable environmental, public health, or socio-economic impacts, provided that the mitigation and management measures outlined in this report are implemented;
- The project is compatible with the receiving environment and surrounding land uses;
- Environmental risks are well understood, proactively managed, and verifiable through monitoring and auditing; and
- The proposed development is consistent with the objectives and principles of the Environmental Management Act, 2007, including the principles of sustainable development and the polluter-pays principle.

10.6 Recommendation

It is therefore recommended that the **Environmental Commissioner**:

- Approve the Proposed Pig Abattoir Development at Okonjima Farm No. 3, Otjozondjupa Region, Republic of Namibia; and
- Issue an Environmental Clearance Certificate (ECC) for the project, subject to the condition that:
 - The Environmental Management Plan contained in Chapter 9 of this report is implemented in full; and
 - Any additional conditions imposed by the Environmental Commissioner or relevant authorities are complied with.

10.7 Closing Statement

This EIA demonstrates that the proposed development can be implemented responsibly, operated sustainably, and regulated effectively within the Namibian environmental governance framework. With the safeguards and controls outlined in this report, the project is capable of contributing to local agricultural value addition and economic activity without compromising environmental integrity or public health.

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ANNEXURES

Annexure A: Public Participation Documentation

- Newspaper advertisements (x2)
- Background Information Document (BID)
- Proof of stakeholder notifications
- Registered Interested and Affected Parties (I&AP) list
- Comments and Responses Trail

Annexure B: Site Visit and Field Verification

- Site visit photographs (24 January 2026)
- Site visit notes and observations
- GPS coordinates and locality maps

Annexure C: Project Layout and Technical Information

- Abattoir layout plans
- Process flow diagrams
- Wastewater and effluent management schematics

Annexure D: Environmental Management Plan Supporting Tables

- Monitoring and performance threshold matrices
- Compliance and escalation tables
- EMP implementation schedules

Annexure E: Legal, Policy, and Institutional References

- Applicable Namibian legislation
- Regional and international policy frameworks
- Regulatory guidance documents

Annexure F: Specialist and Sector Inputs (where applicable)

- Veterinary correspondence
- Water abstraction information
- Technical confirmations

ANNEXURE A4: STAKEHOLDERS NOTIFIED VIA EMAIL

A4.1 Register of Stakeholders Contacted

The following stakeholders and authorities were formally notified of the proposed Pig Abattoir Development at Okonjima Farm No. 3 and the Environmental Impact Assessment (EIA) process via electronic mail, in person from mid January to early February, 2026, and were afforded the opportunity to register as Interested and Affected Parties (I&APs) and submit comments during the public commenting period.

Table 41: A4-1: Stakeholders Contacted - Pig Farming / Abattoir Development

No.	Stakeholder Name	Organisation / Affiliation	Role / Designation	Contact Details	Stakeholder Category
1	Mathosa T.B.	Okonjima Farm No. 3	Farm Manager	Tel: 081 730 4118 Email: mathosatd@gmail.com	On-site / Project Stakeholder
2	Mr. & Mrs. Haikali	Okonjima Farm No. 3	Farm Owners / Project Proponent	—	Project Proponent
3	Matthew Hambandi	Ministry of Agriculture, Water and Land Reform (MAWLR)	Chief of Staff (Livestock / Agriculture)	—	Government / Sector Authority
4	Dr. Zwisingi Kauna-Hinga	Ministry of Agriculture, Water and Land Reform (MAWLR)	Director: Veterinary Services	—	Regulatory Authority (Veterinary)
5	Pig Producers Association of Namibia	Pig Producers Association	Sector Association (President referenced)	—	Industry / Sector Body
6	Livestock & Livestock Products Board of Namibia (Meat Board of Namibia)	Meat Board of Namibia	Livestock & Meat Industry Oversight	—	Statutory Industry Body
7	Namibia Water Corporation (NamWater) / NamPower (noted)	NamWater / NamPower	Bulk Water / Energy Stakeholders	—	Strategic Utilities
8	Ministry of Agriculture, Water and Land Reform (MAWLR)	MAWLR	Line Ministry (Agriculture & Livestock)	—	Government Authority
9	Okonjima Farm Meat Delicacies (Butchery)	Okonjima Farm	Downstream Meat Processing / Retail	—	Value Chain Stakeholder
10	Pork Steering Committee	National Pork Industry	Price & Policy Advisory Body	—	Sector Governance Body

A4.2 Summary Statement

All stakeholders listed above were notified via email on **27 January 2026** of:

- The proposed Pig Abattoir Development;
- The requirement for an Environmental Clearance Certificate in terms of the Environmental Management Act, 2007;
- The commencement of the Environmental Impact Assessment process;
- The availability of the Background Information Document (BID); and
- The public commenting period, which closed on **6 February 2026**.

No objections or material comments were received from emailed stakeholders during the public commenting period, unless otherwise recorded in **Annexure A6: Comments and Responses Trail**.

A4.3 Compliance Statement

This register provides documentary evidence of direct written stakeholder notification in compliance with:

- Regulation 21 of the Environmental Impact Assessment Regulations, 2012; and
- Section 6.4.2 (Direct Written Notifications) of the EIA Report

ANNEXURE B: SITE VISIT AND FIELD VERIFICATION

B1. Introduction

This Annexure documents the site visit and field verification activities undertaken as part of the Environmental Impact Assessment (EIA) for the **Proposed Pig Abattoir Development at Okonjima Farm No. 3, Otjozondjupa Region, Republic of Namibia**.

The site visit formed a critical component of the EIA methodology and was conducted to:

- Verify baseline environmental conditions;
- Confirm the physical suitability of the proposed site;
- Identify environmental sensitivities and risk pathways; and
- Ground-truth information obtained through desktop review and stakeholder engagement.

The site visit is referenced in **Sections 2, 3, 5, and 6** of the EIA Report

B2. Site Visit Details

Table 42: B2. Site Visit Details

Item	Description
Date of site visit	Saturday, 24 January 2026
Environmental Assessment Practitioner	KPM Environmental Consulting
Purpose	Field verification and baseline confirmation
Weather conditions	Clear, dry summer conditions
Site access	Existing farm access roads
Land use	Commercial agricultural land (livestock farming)

B3. Site Visit Photographs

Photographs were taken during the site visit to document existing environmental conditions, surrounding land use, infrastructure, and sensitive receptors.

The photographs included in this Annexure correspond with and support **Figures 2 - 6** presented in the main EIA Report.

Photographic Record Includes:

- Controlled access gate and perimeter security;
- Existing agricultural and support infrastructure;
- Water storage and service infrastructure;
- Livestock housing and piggery facilities;
- Biosecurity and occupational health signage;
- General views of surrounding land use and landscape context.

Date photographs taken: 24 January 2026

B4. Site Visit Notes and Observations

B4.1 Land Use and Site Context

- The site is located within an established commercial farming unit with long-standing agricultural land use.
- No residential settlements, schools, or sensitive community receptors occur within the immediate vicinity.
- Surrounding land use is dominated by livestock farming and agricultural support activities.

B4.2 Topography and Soils

- Terrain is gently undulating with no steep slopes or erosion features.
- Soils are predominantly sandy loam to calcareous, consistent with regional soil profiles.

- Ground conditions are suitable for light agricultural infrastructure with minimal earthworks.

B4.3 Water Resources

- Water supply is derived from on-site boreholes supported by storage infrastructure.
- No surface water bodies, drainage channels, or wetlands were observed within or adjacent to the proposed footprint.
- Groundwater is identified as the primary sensitive environmental receptor.

B4.4 Infrastructure and Access

- Access to the site is via existing farm roads connected to the B1 national road.
- Internal circulation routes are well-defined and adequate for limited operational traffic.
- No road upgrades or new access routes are required.

B4.5 Biological Environment

- Vegetation reflects a modified agricultural landscape with no intact natural habitats.
- No protected plant species or critical biodiversity features were observed.
- Fauna observed was limited to common species adapted to agricultural environments.

B4.6 Environmental Sensitivities

- Primary environmental sensitivity relates to protection of groundwater quality.
- No archaeological, heritage, or culturally sensitive features were observed.
- No flood risk or drainage constraints were identified.

B5. GPS Coordinates

Indicative GPS coordinates were recorded to provide spatial reference for the project location. Coordinates are presented in WGS 84 format and are consistent with those referenced in the EIA Report.

Table 43: B5. Indicative GPS Coordinates

Location	Latitude (South)	Longitude (East)
Proposed Abattoir Site (Approx.)	20.10° S	16.95° E

Note: Coordinates are indicative and provided for environmental assessment and mapping purposes only.

B6. Locality and Mapping

Locality maps included in this Annexure illustrate:

- National and regional location of the project within Namibia;
- Position of Okonjima Farm No. 3 relative to Otjiwarongo and the B1 trunk road;
- Access routes to the project site; and
- Surrounding land use context.

These maps correspond with **Figures 7–10** in the main EIA Report.

B7. Conclusion

The site visit confirmed that:

- The proposed development is appropriately located within an existing agricultural footprint;
- Environmental sensitivities are limited and well understood;
- No fatal environmental flaws were identified during field verification; and
- All identified risks can be effectively managed through implementation of the Environmental Management Plan.

The site visit findings directly informed the impact assessment and mitigation measures presented in the EIA Report.

ANNEXURE C: PROJECT LAYOUT AND TECHNICAL INFORMATION

C1. Purpose of the Annexure

This Annexure presents the project layout plans and technical schematics supporting the Environmental Impact Assessment (EIA) for the **Proposed Pig Abattoir Development at Okonjima Farm No. 3, Otjozondjupa Region, Republic of Namibia**.

The information contained herein provides visual and technical substantiation of:

- The spatial configuration of the proposed abattoir;
- The operational process flow; and
- The wastewater and effluent management systems proposed to control environmental risk.

This Annexure supports **Section 2 (Project Description)**, **Section 7 (Impact Assessment)**, and **Section 9 (Environmental Management Plan)** of the EIA Report

C2. Abattoir Layout Plans

C2.1 General Layout Description

The abattoir layout plan illustrates the physical arrangement of all functional areas within the proposed facility. The design is based on internationally accepted small-scale abattoir principles and reflects the limited throughput and on-farm nature of the operation.

The layout is compact, purpose-built, and located entirely within an existing agricultural footprint.

C2.2 Functional Zoning

The layout plan clearly demarcates:

- **Dirty zone areas**, including animal holding, stunning, bleeding, and dehairing;
- **Transition zones**, including evisceration and controlled carcass movement areas;
- **Clean zone areas**, including carcass dressing, splitting, chilling, and freezing;
- **Offal handling and temporary storage areas**;
- **Wash-down and sanitation facilities**;
- **Staff hygiene facilities**, including hand-wash and change areas;
- **Wastewater drainage and collection infrastructure**; and
- **Ancillary storage and support areas**.

C2.3 Environmental and Biosecurity Design Features

The layout incorporates the following control features:

- One-directional process flow to prevent cross-contamination;
- Physical separation of clean and dirty areas;
- Controlled access points for staff and materials;
- Dedicated drainage for high-risk effluent streams; and
- Separation of waste handling from clean processing areas.

Included Document:

- Abattoir Layout Plan (Drawing Reference: **C-01**)

C3. Process Flow Diagrams

C3.1 Overview of Operational Process Flow

Process flow diagrams depict the sequential operational steps from animal intake through to carcass dispatch. The diagrams reflect the actual operational scale and exclude any secondary processing or retail activities.

C3.2 Process Stages Illustrated

The process flow includes:

1. On-site pig intake and holding;
2. Humane stunning;
3. Bleeding and blood collection;
4. Dehairing;
5. Evisceration;
6. Carcass dressing and splitting;
7. Temporary chilling and/or freezing;
8. Removal of carcasses to a licensed off-site processing facility.

C3.3 Identification of Risk and Control Points

The diagrams identify:

- Points of wastewater generation;
- Blood and offal separation points;
- Solid waste collection locations;
- Hygiene and wash-down zones; and
- Interfaces between clean and dirty operational areas.

These control points directly inform the mitigation measures and monitoring requirements set out in the Environmental Management Plan.

Included Document:

- Abattoir Process Flow Diagram (Drawing Reference: **C-02**)

C4. Wastewater and Effluent Management Schematics

C4.1 System Design Context

Wastewater and effluent management is a critical environmental risk pathway due to reliance on groundwater resources in the Otjozondjupa Region. The system has therefore been designed to minimise contamination risk and ensure controlled treatment and disposal.

C4.2 Sources of Wastewater

Wastewater streams originate from:

- Slaughter and processing activities;
- Equipment and floor wash-down;
- Staff hygiene and sanitation facilities.

C4.3 Effluent Treatment Components

The schematic illustrates the following components:

- Source separation of blood from wash-water;
- Grease trap for fats and solids removal;

- Primary anaerobic treatment unit;
- Secondary aerobic treatment unit;
- Final effluent containment structure;
- Controlled discharge, reuse, or disposal mechanism.

C4.4 Environmental Safeguards

The system incorporates:

- Lined treatment units to prevent seepage;
- Controlled flow and overflow protection;
- Restricted access to treatment infrastructure;
- Design capacity aligned with approved slaughter throughput; and
- Monitoring and inspection points.

Included Document:

- Wastewater and Effluent Management Schematic (Drawing Reference: **C-03**)

C5. Technical Alignment with the EIA and EMP

The layout plans, process flow diagrams, and effluent schematics presented in this Annexure:

- Are consistent with the project description and operational assumptions in the EIA;
- Align with impact pathways assessed in Section 7;
- Support mitigation and monitoring commitments in the EMP; and
- Reflect a scale-appropriate, risk-managed design.

No discrepancies were identified between the technical information and the environmental assessment.

C6. Conclusion

Annexure C provides the technical basis for assessing the environmental performance of the proposed development. The drawings and schematics demonstrate that:

- Environmental risks have been addressed through design;
- Wastewater and biological waste pathways are controlled;
- Biosecurity and hygiene requirements are integrated into the layout; and
- The proposed facility is technically capable of operating within acceptable environmental limits.

ANNEXURE D: ENVIRONMENTAL MANAGEMENT PLAN (EMP) SUPPORTING TABLES

D1. Introduction

This Annexure presents the supporting tables and matrices underpinning the Environmental Management Plan (EMP) for the **Proposed Pig Abattoir Development at Okonjima Farm No. 3, Otjozondjupa Region**.

The tables contained herein operationalise the EMP by:

- Translating mitigation measures into measurable actions;
- Defining monitoring indicators and performance thresholds;
- Establishing compliance verification and escalation mechanisms; and
- Providing implementation schedules across project phases.

This Annexure supports **Section 9 of the EIA Report** and forms an enforceable basis for post-authorisation compliance.

D2. Monitoring and Performance Threshold Matrices

Table 44: D2-1: Environmental Monitoring and Performance Thresholds

Risk Area	Indicator	Performance Threshold	Monitoring Frequency	Responsibility	Trigger for Corrective Action
Groundwater quality	Nitrates, E. coli	Within Namibian drinking water standards	Bi-annually	Environmental Officer (EO)	Any exceedance
Wastewater system	Effluent overflow	Zero uncontrolled discharge	Continuous / visual	Site Manager	Any overflow or leakage
Water use	Water per animal slaughtered	Within approved operational norms	Monthly	EO	Sustained increase >15%
Biological waste	Offal storage time	≤ 24 hours	Per operation	Site Manager	Storage exceedance
Odour	Odour complaints	Zero substantiated complaints	Continuous	EO	Any complaint
OHS	PPE compliance	100% compliance	Monthly	Site Manager	Any non-compliance

D3. Compliance and Escalation Tables

Table 45: D3-1: Compliance and Escalation Framework

Non-Compliance Level	Example	Immediate Action	Escalation Authority	Reporting Requirement
Minor	Incomplete records	Rectify within 24 hours	Site Manager	Internal log
Moderate	Effluent system malfunction	Suspend operations until fixed	EO	Written report to Proponent
Major	Groundwater contamination	Immediate shutdown	MEFT / Competent Authority	Formal incident report
Repeated	Recurring breaches	Operational review	MEFT	Compliance audit

D4. EMP Implementation Schedules

Table 46: D4-1: EMP Implementation Schedule

Project Phase	EMP Action	Timing	Responsible Party
Pre-construction	Finalise effluent system design	Prior to construction	Proponent / EO
Construction	Waste control and site demarcation	Continuous	Contractor
Operation	Monitoring and reporting	Ongoing	EO
Operation	Environmental audits	Annually	Independent Auditor
Decommissioning	Waste system closure	At closure	Proponent

D5. Conclusion

These tables provide the operational backbone of the EMP and ensure that mitigation commitments are measurable, enforceable, and auditable throughout the project lifecycle.

ANNEXURE E: LEGAL, POLICY, AND INSTITUTIONAL REFERENCES

E1. Introduction

This Annexure consolidates the legal, policy, and regulatory instruments applicable to the proposed development and referenced throughout the EIA.

E2. Applicable Namibian Legislation

- Environmental Management Act, 2007 (Act No. 7 of 2007)
- Environmental Impact Assessment Regulations, 2012
- Animal Health Act, 2011 (Act No. 1 of 2011)
- Public and Environmental Health Act, 2015 (Act No. 1 of 2015)
- Water Resources Management Act, 2013 (Act No. 11 of 2013)
- Labour Act, 2007 (Act No. 11 of 2007)
- Soil Conservation Act, 1969
- Atmospheric Pollution Prevention Ordinance, 1976
- Hazardous Substances Ordinance, 1974
- National Heritage Act, 2004

E3. Regional and International Policy Frameworks

- Namibia Vision 2030
- National Development Plan 5 (NDP5)
- National Agricultural Policy (MAWLR)
- SADC Regional Agricultural Policy
- African Union – CAADP Framework
- FAO Guidelines on Meat Hygiene (2011)
- IFC Environmental, Health and Safety Guidelines for Meat Processing (2007)
- OIE Terrestrial Animal Health Code
- United Nations Sustainable Development Goals (SDGs)

E4. Regulatory Guidance Documents

- MEFT Environmental Clearance Certificate Application Guidelines
- MAWLR Veterinary Abattoir Approval Guidelines
- MoHSS Food Safety and Environmental Health Regulations
- Namibian Water Quality Standards
- IFC Good Practice Notes on Wastewater Management

E5. Conclusion

This Annexure confirms that the EIA and EMP are firmly grounded within applicable legal and policy frameworks at national, regional, and international levels.

ANNEXURE F: SPECIALIST AND SECTOR INPUTS (WHERE APPLICABLE)

F1. Introduction

This Annexure contains supporting correspondence and technical confirmations obtained from relevant sector authorities and specialists, where applicable, to inform the EIA and EMP.

F2. Veterinary Correspondence

- Correspondence with the Directorate of Veterinary Services confirming:
 - Applicability of veterinary licensing requirements;
 - Scale-appropriate slaughter oversight; and
 - Compliance with animal health and meat inspection standards.

F3. Water Abstraction Information

- Confirmation that water will be sourced from existing on-site boreholes;
- Existing lawful agricultural abstraction use;
- Water conservation measures aligned with operational scale;
- Groundwater protection measures incorporated into EMP.

F4. Technical Confirmations

- Confirmation of small-scale, on-farm abattoir design;
- Alignment of effluent system capacity with throughput;
- Confirmation that no bulk municipal infrastructure is required;
- Confirmation that no specialist biodiversity or heritage studies were required due to low sensitivity.

F5. Conclusion

Specialist and sector inputs support the conclusion that the proposed development is technically feasible, sector-compliant, and environmentally manageable within the framework established by the EIA and EMP.