ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED OKALAGO PIGGERY ESTABLISHMENT IN OKANYA VILLAGE, OMUSATI REGION NAMIBIA.

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Prepared by:

Ouholamo Trading & Environmental Solution cc
P.O. Box 64363
Okuryangava
Cel: +264 813088204
E-mail: ouholamo.consultant@yahoo.com

Prepared for:

Okalago Piggery
P. O. Box 4630
Windhoek
Cel: +264 81 1224469

Prepareres of the Environmental Impact Assessment

Name of representative of the EAP	Education qualifications	Professional affiliations
Elina SP Vakuwile	B-tech Environmental Management	Environmental Scientist (EAPAN Member)

Client

Name	Position/ Role	Address
Okalago Piggery	Okalago Piggery (Proponent)	P. O. Box 4630 Windhoek

LIST OF ABBRECIATIONS

TERM	DEFINITION
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
RoD.	Record of Decision
EO	Environmental Officer
RE	Resident Engineer
ELO	Environmental Liaison Officer
PPE	Personal Protective Equipment
EMP	Environmental Management Plan
EIA	Environmental Impact Assessment
HDPE	High-density polyethylene
WMP	Waste Management Plan

Contents

1. INTRODUCTION AND BACKGROUND

The EMP is a working document which consists of a set of mitigation measures that will be implemented to eliminate, offset or reduce adverse environmental impacts to acceptable levels during the various phases (i.e. construction, operations and decommissioning). This document is prepared for Okalago Piggery who proposes the construction of the caretakers' house, construction, and operation of the piggery farm at Okanya Village, Okahao Constituency, Omusati Region Namibia.

Ouholamo Trading & Environmental Solutions had conducted an Environmental Impact Assessment and Environmental Management Plan (EMP) for the proposed Okalago Piggery Farm establishment project at Okanya Village, Omusati Region Namibia. The study investigated the biophysical and socio-economic, environmental issues related to the proposed project. The Environmental Impact Assessment had been conducted to meet the requisites of Namibia's Environmental Management Act (No. 7 of 2007). The proposed Project is situated in the Okanya Village, which is 8km out of Okaha town, in the Okahao Constituency in Omusati Region. See locality map (**Figure 1**).

2. PROJECT DESCRIPTION

Okalago Piggery proposes the construction of the caretakers' house, construction, and operation of the piggery farm at Okanya Village, Okahao Constituency, Omusati Region Namibia. The production process will be taking place in building block A, which will be made up of Farrowing ward with 18 bays and 20 other stalls that will be divided into: 6 recovery stalls, and 14 mating stalls. Each of the mating and recovery stalls will have the capacity to host 4 (four) sows or 2 (two) boars. Maternity stalls only, will accommodate 1 (one) birthing saw at a time. Given this restriction, all production planning will be conducted to accommodate the bottleneck. The site of the proposed project is **2ha**.

2.1. Locality of the project

The proposed Project which is the construction and operation of the piggery farm is situated in the Okanya Village, which is 8km out of Okaha town, in the Okahao Constituency in Omusati Region. The proposed project site is approximately 2ha and the proposed land site is undeveloped land but earmarked for Piggery Project. The coordinates for the proposed project are Latitude: 17.81885° S and Longitude: 15.08454° E. See locality map (**Figure 1**).

Figure 1: *Locality Map of the Project*

2.2. Description of the Proposed project Activities

The proposed development will entail the following activities:

- The construction of the caretakers' house, construction and operation of the piggery farm consisting of the units in the table below and the layout plan is attached in **Appendix B;**

TYPE OF STALLS	**NUMBER (UNITS)**
Farrowing ward	18 (Bays)
Recovery stalls	6
Mating stalls	14
For sows	12
For boars	2
Total stalls (exc. maternity)	14
Total stalls (inc. maternity + recovery)	26

The production process begins with acquiring the initial production stock of 4 (four) boars and 48 (forty-eight) sows. These 52 pigs are housed in build block A, where they occupy 14 of the mating stalls. Climbing takes place over a 2-week period where each boar is placed into a stall of 4 sows. By the end of the two-week period all 4 shows in each stall will be in gestation. Given that there are 4 boars, and each is placed individually into a stall of sows, by the end of each climbing period there will be 16 (sixteen) pregnant sows. This process repeats itself 3 times to ensure all 48 sows are pregnant. There is a 2-week gap in between each climbing session, to ensure that each group of 16 sows is 2-weeks ahead or behind the next group in terms of gestation period.

Once pregnant, the sows are kept in their stalls undisturbed, where they are fed a specific diet of xx feed until the start showing signs of labor. Sows are in gestation for 3-months, 3-weeks, and 3-days (about 15 weeks). Each group of 16 sows.

Sows are moved to the maternity stalls after 15 weeks or when they display signs of labor. They will be kept in the maternity ward for two weeks before being transferred to the recovery stalls where they will spend another 2 weeks. Each sow is expected to give birth to an average of 8 piglets, however there are cases where they have had more and at times less. Therefore, the model assumes 8 piglets as the base case, 10 as the bull case, and 6 as the bear case. The production process assumes 8 piglets from each sow, thus 128 piglets per group of 16 sows. Therefore, there will be a total of approximately 384 piglets by the end of the birthing cycle. After two weeks in recovery, the sows are moved back to the initial mating stalls where they are given more time to recover and are fattened with a specific diet. While the piglets are moved to build block B, where they are sorted

into feeder stock or breeding stock. They stay here for two complete weeks before boars are placed in the stalls of the newly fattened sows for mating, and the process repeats itself again. Each sow only participates in two birth cycles before it is moved out of production to be slaughtered.

A new batch of 48 of the best breed piglets are selected from the first cycle of piglets each year and breed to replace the sows who complete their second cycle of production.

To prevent the spread of disease, particularly from older to younger pigs, the pigs will be separated into different homes based on their growth stage. By separating pigs at their different stages of growth, it will be easier for the farmer to disinfect breeding facilities once all the stock has moved on to the next facility. The feeding and management requirements will be made simpler with this batch system

3. PURPOSE OF THE EMP

The Environmental Management Plan (EMP) is the tool that can provide the assurance that the proponent has made suitable provisions for mitigation. The EMP describes the methods and procedures for mitigation and monitoring the impacts identified in the EIA report. The overall aims of this EMP are to:

Ensure that the project complies with the goals of the Namibian Environmental Management Act 2007, (No. 7 of 2007), and;

- To describe action plans for achieving the mitigation measures described in the EIA for construction, operational and decommissioning phases of the activities associated with the development of the proposed Okalago Piggery facility and its associated facilities.
- To indicate responsibilities of staff regarding the implementation of the described action plans. That is to allow employees and contractors to become familiar with the environmental procedures to be followed and facilitate their compliance with the recommendations made within this document.

This EMP is to be submitted to the Environmental Commissioner in the Ministry of Environment, Forestry and Tourism as part of the application to receive an environmental clearance certificate for the proposed project. The EMP covers the same project scope as included in the EIA report. The detailed description of the proposed project is contained in (**Section 7**) of the EIA report. The detailed description of the affected environment is also included in the EIA report (**see section 9**).

The overall purpose of this document is mainly focussing on reducing the negative impacts and maximizing the positive impacts associated with the project activities through a programme of continuous improvement.

4. POLICY AND OTHER RELEVANT LEGISLATIONS

The following are the legal instruments that govern or advocate the construction and operation of a Service Station:

- The Namibian Constitution
- Environmental Assessment Policy (1994)
  - Cradle to Grave Responsibility
  - Precautionary Principle
  - The Polluter Pays Principle
  - Public Participation and Access to Information
- Environmental Management Act of Namibia (2007)
- Environmental Management Act Regulations (2012)
- National Heritage Act No. 27 of 2004
- Water Resource Management Act on Namibia (2004)
- Pollution Control and Waste Management Bill (guideline only)
- Atmospheric Pollution Prevention Ordinance of Namibia (No. 11 of 1976)
  - Hazardous Substances Ordinance (No. 14 of 1974)
  - Public Health Act (Act 36 of 1919)

5. MANAGEMENT PRINCIPLES

These guideline principles will form the basis for environmental management on site. Should these principles require modification or additions during the project this should be done at the discretion of the responsible person, who will ensure that any modifications are communicated, explained to and discussed with all affected parties (i.e. the Ministry of Environment, Forestry and Tourism, Okalago Piggery, the Ouholamo Trading & Environmental Solution, the contractors, service providers, and any affected party who may requests this information).

The environmental operational procedures and environmental issues are identified and managed, under different phases of the project. The different phases are:

- Pre-construction (including design);
- Construction Phase;
- Operational Phase; and
- Decommissioning Phase

6. ENVIRONMENTAL ISSUES TO BE MANAGED

6.1. Pre-Construction Phase

The Ministry of Environment, Tourism and Tourism (MEFT) Depart of Environmental Affairs must be notified:

- Within 30 days, of change of ownership / developer.
- Of any change of address of the owner / developer.
- One month prior to commencement of construction activities.
- One month prior to commencement of operation.

6.2. Construction, Operational and Decommissioning Phases

Unless otherwise indicated, the responsibilities of the construction contractor(s) and service providers will adhere to specified EMP actions for the construction phase. During the operational phase, Okalago Piggery will ensure that the following actions are implemented by establishing accountability and responsibility between the different role players.

6.3. Consultation with Interested and Affected parties (IAPs)

During all phases of the project, namely the Construction Phase, Operational Phase and the Decommissioning Phase, it is of great value to establish an open communication channel between the developers (Okalago Piggery), the contractors and IAPs such that any queries, complaints or suggestions can be dealt with quickly and by the appropriate person(s).

6.4. Record Keeping

It is recommended to keep records for all incidents or records for all environmental issues that might occur during all the phases of the project. Therefore, all records related to the implementation of this EMP (e.g. audit reports, incident reports, etc.) must be filed by Okalago Piggery in a safe place where they can be easily retrieved. Those records should be kept for three years and should, at any time, be available for scrutiny by relevant authorities such as Ministry of Urban and Rural Development or Ministry of Environment, Forestry and Tourism (etc).

6.5. Photographs

It is recommended that the appointed Contractor's Project Manager/ Environmental Consultant or Environmental Liaison Officer to have the responsibilities of taking photographs prior to, during and immediately after construction, as a visual reference. These photographs should be stored with other records related to this EMP.

7. ROLES AND RESPONSIBILITIES

This section describes the roles and responsibilities of the key stakeholders involved in the development, implementation and review of the EMP. The contractor in this report refers to the Okalago Piggery (proponent) and its appointed contractors.

7.1. Competent Authority

The Department of Environmental Affairs: Ministry of Environment, Forestry and Tourism is responsible for the review of the EMP documents, it is the competent authority.

7.2. Okalago Piggery (Applicant)

The role of the applicant is as follows:

Okalago Piggery as it is the applicant, should hire suitably qualified person(s) and assign them with the responsibility to ensure implementation of the EMP, and should:

- Know the contents and implications of the EIA and monitor the implementation of EIA findings using the EMP.
- Revise the EMP as required and inform the relevant parties of the changes.
- The applicant should Review report regarding the implementation of the EMP and make payments to the Contractor if the EMP is being implemented in a satisfactory manner.
- Give warnings and impose fines and penalties on the Contractor if the Contractor neglects to implement the EMP satisfactorily**.**
- Protect the environment and rehabilitate the environment as prescribed in the EIA.

7.3. Okalago Piggery (Project Manager)

The Applicant will appoint the Project Manager. The role of the project manager will be:

- Liaising directly with the relevant authorities with respect to the preparation and implementation of the EMP and meeting the conditions documented in the environmental clearance certificate.
- Bear the overall responsibility for managing the project contractors and ensuring that the environmental management requirements are met.
- Inform the contractors of the EMP and Environmental clearance certificate obligations.
- Approve all decisions regarding environmental procedures and protocols that must be followed.
- Have the authority to stop any construction in contravention with the EMP and Record of Decision.
- In consultation with the Environmental Control Officer (ECO), has the authority to issue fines for transgressions of basic conduct rules and/or contravention of the EMP.
- Maintain open and direct lines of communication between the Proponent, Contractor and Interested and Affected Parties (I&APs) with regards to environmental matters.
- Attend regular site meetings and inspections where required.

7.4. Okalago Piggery (Environmental Control Officer)

An Environmental Control Officer (ECO) should be employed by the Contractor. This person should be available for the duration of the construction period and should have appropriate training and experience in the implementation of the EMP and overseeing construction process. This ECO will implement EMP at all levels and sections (sub-contractors) during the construction of the Okalago Piggery. The responsibilities of the ECO include the following:

- Assist the Project Manager and Contractor in finding environmentally responsible solutions to challenges that may arise.
- Monitor performance of the contractors and ensure compliance with the EMP and associated method statements.
- Liaison between the contractors, authorities and other key stakeholders on all environmental concerns as well as to communicate all amendments of the EMP to the relevant stakeholders.

- Validating regular site inspection reports which are prepared by the Contractor's Environmental Officer (EO).
- Checking the EO's record of environmental incidents as well as corrective and preventative actions taken.
- Checking the EO's public complaints register in which all complaints are registered and actions taken thereof.
- Issuing site instructions to the contractors ECO for corrective actions required.
- Conduct monthly audits to ensure that the system for implementing the EMP is effective.

7.5. Contractor's Safety Officer

Implement the recommendations in the EIA and satisfy the conditions in the Record of Decision.

- Ensure that safety is practiced for all activities on site.
- Prepare and implement safety procedures.
- Communicate all safety related issues.

7.6. Contractors

The contractor should appoint the Contactor's representative who is suitably qualified to implement the EMP. The responsibilities of the Contractor include:

- Compliance with the relevant legislation and the EMP.
- Preparation and submission to the proponent through Project Manager the following Management Plans prior to commencing work:

    - Environmental Awareness Training and Inductions;
    - Emergency Preparedness and Response;
    - Waste Management; and
    - Health and Safety.

7.7. Resident Engineer (RE)

The Resident Engineer (RE) will be appointed by the 'Proponent' and will be required to oversee the construction programme and construction activities performed by the Contractor. The RE is expected to liaise with the Contractor and ECO on environmental matters, as well as any relevant engineering matters where these may have environmental consequences.

8. PHASES OF THE PROJECT

8.1. The Construction Phase

The bulk of the impacts during this phase will have immediate effects (e.g. noise, dust and water demand). If the site is monitored on a continual basis during the construction phase, it is possible to identify these impacts as they occur. These impacts can then be mitigated through the contingency plans identified in the planning phase, together with a commitment to sound environmental management from the developer.

EMP Training:

Impacts	Description	Mitigation	Monitoring	Responsible Body
EMP Training	Contravention of EMP is attributed to a lack of EMP awareness and the implications thereof.	All construction workers are to undergo EMP training that should include as a minimum the following: Explanation of the importance of complying with the EMP. Discussion of the potential environmental impacts of construction activities. Employees' roles and responsibilities, including emergency preparedness. Explanation of the mitigation measures that must be implemented when particular work groups carry out their respective activities.	ECO	Okalago Piggery Project Manager & Contractor

Monitoring-

Impacts	Description	Mitigation	Monitoring	Responsible Body
Monitoring	EMP compliance/non-compliance	Daily monitoring of EMP compliance is to be undertaken by the ECO during construction. Bi-annual audits are to be undertaken by an independent, suitably qualified consultant to audit the implementation of the EMP. Audit reports to be submitted to MEFT bi-annually for auditing.	ECO	Okalago Piggery Project Manager/ ECO & EAP

Generation of Waste- Illegal dumping of construction wastes attracts vagrants.

Impacts	Description	Mitigation	Monitoring	Responsible Body
Generation of waste	This can be in a form of contaminated soil and building rubble. Excavated soil from the installation of the bulk infrastructure. Littering	To avoid contaminating the soil and underground ecosystem, no wastewater should be disposed on soil. Ensure that no excavated soil, refuse or building rubble generated on site are placed or dumped on surrounding properties or land. The contractor should provide an adequate number of waste receptacles for general waste at points around the construction site, and a single collection point for hazardous waste; Bins/skips shall not be used for any purpose other than waste collection and shall be emptied on a regular basis. The Contractor shall ensure that all litter is collected from the work and camp areas daily. Soil from excavation activities must be reused as fill elsewhere on the site Ensure all hazardous materials are transported to a hazardous waste site for disposal by a licensed removal contractor. Strictly, no burning of waste on the site or at the disposal site is allowed as it possess environmental and public health impacts;	Bins and / or skips should be emptied regularly and waste should be disposed of at a registered landfill site/disposal site. Engineer / ECO.	Okalago Piggery / Appointed Contractor/ECO/Engineer

		Waste handling procedures must be cleared with the Okahao Settlement Council/Omusati Regional Council and the construction contractor should be informed about this. Contaminated wastes in the form of soil, litter, building rubble and other material must be disposed off at an appropriate disposal site. The contractor and developer should ensure that all the waste generated by the development is appropriately disposed of at the recommended waste disposal sites close to the area.		

Air Quality Impacts-

Impacts	Description	Mitigation	Monitoring	Responsible Body
Air Quality Impacts	Dust may be generated during the construction/decommissioning phase and might be aggravated when strong winds occur. These are expected to be site specific, short-termed and will most probably pose a negligible nuisance and health threat to those residing nearby. The construction of the proposed development will have impact on the surrounding air quality as construction vehicle will be frequenting the site and surrounding Particulate Matter is contributing to respiratory tract infections. The clearing of vegetation in preparation for construction exposes the soil to dust which increases the Particulate Matter concentration in the atmosphere.	Dust may be generated during the construction/decommissioning phase and might be aggravated when strong winds occur therefore; dust suppression during the construction process is advised if dust becomes an issue. Vehicles travelling to and from the construction site must adhere to the speed limits so as to avoid producing excessive dust. A speed limit of 40 km/hr should be set for all vehicles travelling over exposed areas. Loads could be covered to avoid loss of material in transport, especially if material is transported off site.	Regular visual inspection by Project Manager	Okalago Piggery / Appointed Contractor/ECO/Engineer

Noise caused by construction activities

Impacts	Description	Mitigation	Monitoring	Responsible Body
Noise	Noise levels are expected to rise during the construction phase of the development. Construction activities that cause noise include vehicle trafficking, generator noise, pressure hammers and construction worker's voices, including earthmoving equipment which will be utilized during the construction phase.	Construction should be limited to normal working days and office hours from 08h00 to 17h00 and 7:30 – 13:00 on Saturdays. Provide ear plugs and ear muffs to staff undertaking the noisy activity or working within close proximity thereof or alternatively, all construction workers should be equipped with ear protection equipment. Noise pollution should be addressed and mitigated at an early stage of construction phase.	Strict operational times. Regular inspection. By Safety Officer	Appointed Contractor /Safety Officer

Soil Loss and Erosion-

Impacts	Description	Mitigation	Monitoring	Responsible Body
Soil Loss and Erosion-	Loss of topsoil during the construction period caused by the clearing and removal of vegetation. The digging of structure foundations, and earthworks may expose soils to wind and rain and could result in localized erosion.	Removal of vegetation to take place only within demarcated construction site. No work is to be conducted within 30 meters of all drainage lines; Topsoil should only be exposed for minimal periods of time and adequately stockpiled to prevent the topsoil loss and run-off. Planting more indigenous trees on some open spaces within the subject area should be done. Reuse topsoil to rehabilitate disturbed areas.	Project Manager/ Safety Officer	Okalago Piggery Project Manager/ Appointed Contractor/ Safety Officer

Groundwater Contamination

Impacts	Description	Mitigation	Monitoring	Responsible Body
Groundwater Contamination	Leakages from equipment and machinery might occur during the construction phase or mixing of cement and the use of toilets all will lead to the contamination of the groundwater.	Chemicals used during construction e.g. paint and paint remover is also posing a risk. Care must be taken to avoid contamination of soil and groundwater. Ensure no cement or cement containers should be left lying around. Mixing of cement should be done at specifically selected areas on mortar boards or similar structures to contain surface run-off. Proper toilet facilities should be installed at the construction site. The contractor shall ensure that there is no spillage when the toilets are cleaned and that the contents are properly removed from site. Cleaning of cement mixing equipment should be done on proper cleaning trays. Prevent spillage of contaminants or of water potentially contaminated by cement, chemicals, sewage	Regular inspection By EO/Safety Officer	EO/Safety Officer

Sewage

Impacts	Description	Mitigation	Monitoring	Responsible Body
Sewage	Pollution of environment with waste materials	Adequate sanitation facilities e.g. chemical toilets must be provided at the camp depot and construction site. Adequate sanitation facilities i.e. 15 employees per facility should be provided. The toilets should be located at least 50m from the construction site. They should be kept clean and hygienic regularly to ensure that they are usable. Effluent must not be discharged into natural environment and bush-toileting is prohibited. Letter of consent from a registered waste facility to allow contractor to empty the toilet facility at their sewer system should be provided. Grey water should be recycled: o Used for dust suppression; o Used to water a vegetable garden, or to support a small nursery;	EO/Safety Officer	Okalago Piggery Project Manager/ Appointed Contractor /EO/Safety Officer

Ecological Impacts

Impacts	Description	Mitigation	Monitoring	Responsible Body
Ecological	Protected species/vegetation to be conserved	The proposed development is in the business industrial zone, therefore there are no known conservation worthy vegetation located on the proposed development. If trees with stem diameter > 20mm be found within the development site, it should be conserved and be made part of the development.	Project Manager/ EO/Safety Officer	Okalago Piggery Project Manager/EO/Safety Officer

Heritage Impacts

Impacts	Description	Mitigation	Monitoring	Responsible Body
Heritage Impacts	There are no known heritage areas or artefacts were identified at the project site during the site visit. However, there is a potential damage or destruction to undiscovered heritage sites in the area	There were no sites or objects of archaeological finds, Graves, historical and cultural significance identified, however, if during construction any possible finds are made (e.g. Pottery, bones, shells, ancient clothing or weapons, ancient cutlery, graves etc), it should be barricaded off and the operations must be stopped and the relevant authorities should be contacted immediately for the qualified archaeologist to come and do the assessment of the findings. Work may only commence once approval is given from the heritage agency.	EO/Safety Officer	Okalago Piggery Project Manager/ Appointed Contractor/ EO/Safety Officer

Employment Creation

Impacts	Description	Mitigation	Monitoring	Responsible Body
Employment Creation	(Positive Impact) this is a job creation and economic benefit to local community since the construction activities associates with the installation of services infrastructure which will require labourers from the surrounding.	Various employment opportunities will be created during all phases of the development, ranging from highly skilled to unskilled. When recruiting, the responsible contractor should ensure gender equality is taken into consideration that both men and women are employed equally and treated equally. The contractor must make use of local laborers where possible in order to stimulate the local economy. In terms of human resource development and capacity building, the contractor must enforce training programs that skilled workers should always train unskilled workers when necessary, in order for them to enhance their performances and to gain more knowledge that they might demonstrate at other levels in future.	Monitored once off by the Project Manager	Okalago Piggery Project Manager/ Appointed Contractor/

Safety and Security-

Impacts	Description	Mitigation	Monitoring	Responsible Body
Safety and Security	During the construction and decommissioning phase, earthmoving equipment will be used on site. This increases the possibility of injuries. Presence of equipment may encourage criminal activities (theft).	The site must be fenced off to prevent unauthorized access during construction. All visitors must report to the site office and sign on the visitors' register book. Ensure that the contact details of the police or security company and ambulance services are available on site. Strictly, no burning of waste on the site or at the disposal site is allowed as it possess environmental and public health impacts;	Security System Monitoring. Safety Procedures. First Aid Training by Safety Officer/ Project Manager.	Okalago Piggery Project Manager / Appointed Contractor/Safety Officer

Health and Safety

Impacts	Description	Mitigation	Monitoring	Responsible Body
Health and Safety	Health and Safety Regulations pertaining to personal protective clothing, first aid kits being available on site, warning signs, etc. is very important and should be adhered to. During construction phase, there is a possibility of injuries to occur if no measures are taken into consideration.	A health and safety plan is to be developed and implemented as soon as land clearing commences. During construction, earthmoving equipment will be used on site. This increases the possibility of injuries, and the responsible contractor must ensure that all staff members are briefed about the potential risks of injuries on site. Ensure the appointment of a Safety Officer to continuously monitor the safety conditions during construction. The contractor is further advised to ensure that adequate emergency facilities are available on site. Official training in the correct fit, use, care, storage and limitations of all Personal Protective Clothing, Respiratory and Hearing Equipment must be given to the employees. The construction staff handling chemicals or hazardous materials must be trained in the use of the substances and the environmental, health and safety consequences of incidents. All construction staff must have the appropriate PPE.	Regular visual inspection by Safety Officer	Okalago Piggery Project Manager / Appointed Contractor

Traffic

Impacts	Description	Mitigation	Monitoring	Responsible Body
Traffic	Congestion in traffic	Flag mans and traffic controllers should be appointed to regulate traffic flow of vehicle construction. The responsible contractor must ensure that all drivers employed have valid driver's licenses of vehicle types they employed for, and that they have experience in driving those vehicles. The contractor must ensure that there is always a supervisor on site to ensure that no driver under the influence of alcohol or narcotics to be authorized to drive company's vehicles. The vehicle construction should limit speed to 40km/h and also be considerate of the surrounding land users.	Strict operational times. Regular inspection. By Project Manager/ Safety Officer	Okalago Piggery Project Manager / Appointed Contractor

Increased Spread of HIV/ AIDS

Impacts	Description	Mitigation	Monitoring	Responsible Body
Increased Spread of HIV/ AIDS	Migrant workers with HIV/AIDS may affect local people leading to a high rate of HIV/AID in Okahao Constituency.	The spending power of locals and expatriates working for the developer and/or its contractors are likely to increase, and this might be a perfect opportunity for sex workers to explore. Migrant labourers from other regions and expatriates are normally vulnerable and may use the services rendered by the sex workers. External construction workers should be housed in secure camp and are to abide by rules of the EMP to prevent public disruption (ie. Spread of HIV/AIDS, crime, public disturbance). Contractors should be encouraged to source labour from surrounding areas to prevent the spread of HIV/AIDs from external workers who will be sourced from other areas out of Okahao because sourcing labour from the surrounding will prevents the spread of the HIV/AID as the residents will not be vulnerable to new workers in the area. Condoms as a contraceptive should be distributed to construction employees.	By Project Manager/ Safety Officer	Okalago Piggery Project Manager / Appointed Contractor/Safety Officer

8.2. The Operational Phase

By taking pro-active measures during the planning and construction phases, potential environmental impacts emanating during the operational phase will be minimised. This, in turn, will minimise the risk and reduce the monitoring effort, but it does not make monitoring obsolete.

EMP Training:

Impacts	Description	Mitigation	Monitoring	Responsible Body
EMP Training	Contravention of EMP is attributed to a lack of EMP awareness and the implications thereof.	All contractors appointed for maintenance work must ensure that all personnel are aware of necessary health, safety and environmental considerations applicable to their respective work.	Okalago Piggery Project Manager	Contractor

Employment creation

Impacts	Description	Mitigation	Monitoring	Responsible Body
Employment creation *Equity, transparency, should be put into account when hiring and recruiting and that committees should also take part in the recruiting process for decision makings.*	Employment opportunities are one of the long-term major impacts of the proposed development that will be realized after construction and during the operation and maintenance of the facility. This is a generation of local employment opportunities and skills transfer.	When recruiting, the responsible contractor should ensure gender equality is taken into consideration that both men and women are employed equally and treated equally. All qualified professionals hired to work for the development should be Namibians. Notify the local community of employment opportunities prior to broader (public) advertisement. Other Labor or services (e.g. security guards) should be sourced from the local supplies or Security Companies within Okahao area or Omusati Region.	Monitored once off by the Project Manager/Okalago Piggery	Okalago Piggery

Increased water utilization

Impacts	Description	Mitigation	Monitoring	Responsible Body
Increased water utilization	Namibia is a water scarcity country, therefore, the additional development like this one will increase the water demand.	The proponent will install water-conserving automatic taps or push type taps. Any water leaks resulting from damaged pipes and/or faulty taps, should be fixed by qualified staff. Water saving awareness programme should be in place to inform people/staff on the importance of saving water to reduce water consumption. High-pressure hoses should be used in the washing of the piggery house, Piggery facilities, and equipment, to minimise the amount of water used.	Monitored once off by the EO	Okalago Piggery

Improved aesthetic look of the area

Impacts	Description	Mitigation	Monitoring	Responsible Body
Improved aesthetic look of the area	The development of this project at this site is essential to improve the visual and aesthetics view of the area. This potential impact of the infrastructure on the economic structure is positive impact.	No mitigation required because it's a positive impact. However, the developer should create awareness among the personnel working on the development about energy conservation and other resources as well as to implement measures to prevent or minimize any adverse effects on the environment. Lighting must be carefully planned and kept to a minimum to enable work to continue. Consideration is to be given to the fact that light at night travels great distances. Parking areas will be provided with 1 parking bay per 25m^2. Ensure proper and regular maintenance of the area. Good housekeeping and management of the piggery will be critical to prevent waste being strewn across the site and entering adjacent land. Planting of communities of indigenous plants will enhance biodiversity and improve aesthetics.	Regular visual inspection by Project Manager	Okalago Piggery

Geology and Soils- Unregistered fertilizer use of organic wastes on agricultural land can result in contamination build up within soils and water resources.

Impacts	Description	Mitigation	Monitoring	Responsible Body
Geology and Soils	The operational phase of the proposed piggery will increase the degradation and loss of topsoil resource (topsoil) due to exposure of topsoil to various elements (vehicular, pedestrians and livestock). The use of manure on agricultural lands has both positive and negative impacts on soils. A positive impact is that it will increase the organic content of the soils which would be beneficial to site as soils are likely to have a low in organic matter. The use of manure has the potential to result in the contamination of soils which can have indirect impacts on water quality. This impact will be of high significance without the implementation of mitigation measures. The manure needs to be analyzed (heavy metals and moisture content) to test suitability before being applied onto soils. A fertilizer registration needs to be submitted to the Ministry of Agriculture, Water and Land Reform before the manure is applied onto the fields.	Re-use of the liquid and solid fractions of the wastewater must take cognizance of Precautionary Practices Sludge may only be stored in suitable facilities that are designed to ensure minimal impact on the environment. All organic compost must be registered with the Ministry of Agriculture, Water and Land Reform and meet all the necessary requirements as per the Regulations on the Registration of Fertilizers, Farm Feeds, Sterilising Plants and Agricultural Remedies (GN 112 of 2007).	Monitored once off by the EO	Okalago Piggery

Hazardous Substances and Waste management- Improper handling and storage of hazardous waste (rags and empty containers of fuel and oil) during the operational phase has the potential to lead to soil, surface and groundwater contamination (and secondary impact to human health and ecosystems) if not managed properly.

Impacts	Description	Mitigation	Monitoring	Responsible Body
Hazardous Substances and Waste management	The project is expected to generate solid waste during its operation phase. The bulk of the solid waste generated during the operation of the project will consist mainly of organic wastes, packaging wastes amongst others. Such wastes can be injurious to the environment through blockage of drainage systems, choking of water bodies. Wastewater from the piggery to be stored in an effluent dam. Failure to contain effluents has the potential to lead to contamination of soils, surface water and groundwater with nutrients, ammonia, sediment, pesticides, pathogens and feed additives (heavy metals, hormones) – leading to secondary impacts to water quality, human health, and ecosystems	The wastewater management system must regularly be maintained and inspected to ensure that it is in working condition. This will prevent the development of leaks The Pollutant, Microbial and Stability Classes of the wastewater sludge must be established. The nutrient content of the wastewater sludge must be confirmed before each major planting season by determining The phosphorous, nitrogen and potassium concentration on at least four composite samples Each mortality must be placed in the pit and covered with sawdust or straw. Solid animal waste may only be temporarily stored in designated areas, on impermeable surfaces. Animal carcasses must be properly managed and quickly disposed of in order to prevent the spread of disease, odours and the attraction of vectors.	Regular inspection by EO	Okalago Piggery & Okahao Settlement Council/Omusati Regional Council/ Private Service Provider

		Illegal dumping should be prohibited. Preparation and Implementation of Waste Management Plan. The Waste Management Plan should consider the type of waste, description, source, storage, disposal method, disposal facility and responsible person. **<u>The implementation of the Waste Management Plan should ensure:</u>** o Installation of sufficient waste bins skips or bulk containers, where necessary. o All containers (bins, skips or bulk containers) shall be kept in a clean and hygienic manner. o Containers (bins, skips or bulk containers) utilized for the disposal of general and hazardous waste must be demarcated accordingly. **The management of pigs' mortalities should be included in the Waste Management Plan. (refer to Biosecurity)** Safe disposal certificates should be requested from general and hazardous landfill sites with every waste disposal.		

Storm water, Surface and Groundwater-

Impacts	Description	Mitigation	Monitoring	Responsible Body
Storm water, Surface and Groundwater	Storm water usually runs off the areas and flow into the water bodies without any kind of treatment. This can pollute the water bodies like creeks, lakes and rivers and have adverse effects on their chemical as well as biological nature. In this project, the building roofs and pavements will lead to increased volume and velocity of storm water or run-off flowing across the area covered. This will lead to increased amounts of storm water entering the drainage systems, resulting in overflow and possible damage to such systems in addition to increased erosion or water logging in the neighboring. Poor slurry and effluent management lead to potential soil, surface water and groundwater contamination. To ensure that there are no adverse effects on the quality of surface and groundwater, the	The SWMP must be designed to ensure that run-off arising from operational actions, for example, the washing of vehicles and containers must be regarded as contaminated run-off and shall be treated according to wastewater management requirements. Ensure that surface run-off water accumulating on-site are channeled and captured through a proper storm water management system to be treated in an appropriate manner before disposal into the environment. Ensure High-density polyethylene (HDPE) membranes installed on the effluent dam to confine or prevent waste components and leachate from escaping the proposed waste management facility. Do not dispose the wash water from cleaning the Piggery facilities into the environment. Runoff and stormwater must be diverted using berms and trenches.	Regular inspection by EO and Project Manager	Okalago Piggery Project Manager

	effluent dam must be positioned in accordance with the engineer's specifications. To reduce the possible detrimental effects on surface and groundwater quality, the piggery's wastewater management system, mortality management system, and other management practices must be appropriately implemented. During the operational phase the potential exists for the pig effluent to pollute surface and groundwater resources on the site if the effluent dam is positioned, designed and maintained irresponsibly	Wash and sanitize Piggery facilities and equipment with biodegradable soaps and disinfectants. Use biodegradable soaps and disinfectants in the footbath and showers. Use biodegradable soaps and disinfectants for washing of vehicles. Surface water quality monitoring network must include monitoring for the quality of uncontaminated run-off water in stormwater drains on and adjacent to the Site Surface water and groundwater monitoring must be undertaken throughout the piggery operations		

Air Quality-

Impacts	Description	Mitigation	Monitoring	Responsible Body
Air Quality	Degradation of ambient air quality and nuisance due to odour generation. The operational phase of the piggery will decrease the ambient air quality of the site, thereby potentially affecting the surrounding houses located in proximity to the site. Air emissions from the piggery will include ammonia, methane, nitrous oxide, odours, bioaerosols, and dust. The main sources of odour at piggery operations are poorly maintained pig houses, inadequate housekeeping, and poor management and storage of wastewater (effluent).	Effective housekeeping and best management practices must be implemented. Houses should be cleaned and maintained on a regular basis. Ventilation points on the piggery houses must be as high as possible to ensure exiting gases enter the air column as high as possible. Covering the wastewater collection pond can reduce odorous emissions. Waste spillages should be prevented at all times. Drains and treatment systems should be well maintained	Regular inspection by EO and Project Manager	Okalago Piggery Project Manager

Noise Impact-

Impacts	Description	Mitigation	Monitoring	Responsible Body
Noise Impact	During the operational phase, noise will be generated by pigs, equipment, and transport vehicles. Increased noise levels during the operational phase will potentially result from disturbed or excited animals (eg. pigs that are fed at designated times during the day become excited when the feed wagon approaches). The piggery houses will be solidly constructed and will largely contain noise generated by the pigs.	Maintain vehicles and machinery in good working order Unnecessary disturbance of the pigs should be avoided A complaints register should be kept onsite. Although the facility is in a village, vehicles travelling to and from the site during night-time hours must be kept to a minimum	Regular inspection by EO and Project Manager	Okalago Piggery Project Manager

Biosecurity- An increase in the death of pigs at the piggery has the potential to spread diseases to other nearby farms.

Impacts	Description	Mitigation	Monitoring	Responsible Body
Biosecurity	The operational phase of the proposed piggery has the potential to increase pests such as flies, weavils, ants, termites, cockroaches, fleas, lice, mites, ticks, etc. These can be a serious problem as pets carry infectious vectors which can be detrimental to the health of pigs. Increased pests and spread of vectors associated with poor mortality management has the potential to spread disease leading to secondary impact on adjacent farms. There is also the potential for employees working with biological waste to injure themselves during the operation of the facility (syringes for animal vaccines)	The feed storage and distribution systems must be designed and maintained in a manner that prevents the presence and breeding of pests Effective sanitation and housekeeping at the piggery will minimise the area where flies can rest and breed. Regular flushing of the wastewater from the houses will minimize fly breeding. Regularly clean the feeding areas and collect wasted feed. This will prevent the attraction of flies to the piggery. Electrocution devices are available to kill flies, while other mechanical devices include traps, sticky tapes or baited traps Mortalities must be inspected on a daily and re-covered where necessary Mortalities must be removed from the pig houses daily. Mortalities must be stored in enclosed areas prior to being taken to the carcass pit.	Regular inspection by EO and Project Manager	Okalago Piggery Project Manager

		Animal carcasses should be properly managed and quickly disposed of in order to prevent the spread of disease and odours and avoid the attraction of vectors. Each mortality must be placed in the pit and covered with sawdust or straw.		

Outbreak of piggery diseases-

Impacts	Description	Mitigation	Monitoring	Responsible Body
EMP Training	Pigs' health.	All pigs should originate from a closed bio-security compartment. All pigs should originate from disease free sources. Pigs from another farm should not be mixed with pigs in the flock.	Okalago Piggery Project Manager & ECO	Okalago Piggery Project Manager

		Access control to and from the premises and access to the premises should only be by prior arrangement. Never allow contaminated equipment from other farms to enter the building. Keep predators away from the piggery facility. **<u>Disposal of mass mortalities in the event of a disease outbreak</u>** o Notify the state vet. o The state vet must visit the site. o The state vet will place the property, or the specific piggery site or house that is infected, under quarantine. o Depending on the disease and severity, the pigs can be slaughtered on site or transported to an abattoir with a permit. Alternatively, mortalities can be covered with lime and buried.		

8.3. Impacts Associated with Decommissioning Phase

The decommissioning phase of this development is very difficult to visualise at this point in time. However, impacts associated with this phase will be similar to that of the construction phase.

During the decommissioning phase, rubble and waste will be created, as buildings and other structures are being demolished. These should be contained and disposed of at an approved waste facility and not dumped in the surrounding areas. These should be done in recognition with the Okahao Settlement Council/Omusati Regional Councils' waste management regulations and guidelines.

An environmental assessment should be made, and an Environmental Impact Assessment (EIA) may be required. Special disposal of decommissioned equipment and hazardous and contaminated materials will be required.

9. ENVIRONMENTAL MONITORING PLAN

Environmental monitoring plan is part of the EMP performance assessment and will need to be compiled and submitted as determined by the Environmental Commissioner. The process of monitoring performances against the objectives and documenting all environmental activities is part of internal and external auditing. This will be coordinated by the Environmental Control Officer (ECO) / External Consultant / Suitable qualified in-house resource person. The Tables below outline the type of information that shall need to be recorded on a regular basis by the Environmental Control Officer (ECO) as part of the monitoring process of the activities and the effects.

Mitigation	Compliance	Follow-up action required	By whom	By When	Completed
Is there an Environmental awareness training programme?					
How many people have been given environmental awareness training?					
Is a copy of the EMP on site?					
How effective is the awareness training?					
Do people understand the contents of the EMP?					
If not, where are the weaknesses?					
Ask 3 people at random various questions about the EMP.					

10. CONCLUSION

This Environmental Management Plan is to be implemented at all the phases of this project. If this EMP is implemented properly, it will help to minimise the adverse impacts on the environment. In order to achieve that, this Environmental Management Plan should be used as an on-site reference document during all the phases of the proposed project, and auditing should take place in order to determine compliance with the EMP for the proposed site. It is the proponent's responsibility to ensure that this EMP is made binding on the contractor by including the EMP in the contract documentation. It is advised that contractors should thoroughly familiarise themselves with the requirements of the EMP and appoint an environmental officer/s to oversee the implementation of the EMP on a day-to-day basis. By law, all parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken (Refer to Polluter Pays Principle under the Environmental Assessment Policy (1994). If this project is mitigated, as per the above EMP, then the project will result in limited negative environmental impacts that can be mitigated through implementation of this EMP.

11. RECOMMENDATIONS

All Contractors and Sub-Contractors taking part in any of the phases should be made aware of the contents of the EMP and of the Environmental Impact Assessment (EIA), so as to plan their activities accordingly in an environmental sound manner. It is unanimously concluded that the project/development go ahead without any objections.

In terms of waste management, an integrated solid waste management system is recommended. First, the proponent should give priority to reduction at Source of the materials. This option will demand a solid waste management awareness programme in the management and the staff. Secondly, Recycling, Reuse and compositing of the waste should be the second alternative in priority.