Hara Peak
Ecology, Natural and Organic

EIA REPORT

Proposed Establishment of an Organic Fertiliser Plant on Portion 59 (a Portion of Portion 8) of the Consolidated Farm Okahandja Townlands No. 277, Okahandja, Otjozondjupa Region

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Signature

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LIST OF ACRONYMS

AIDS	Acquired immune deficiency syndrome
CRR	Comments and response report
dB	Decibels
DESR	Draft Environmental Scoping Report
EA	Environmental Assessment
EAP	Environmental Assessment Practitioner
EAR	Environmental Assessment Report
ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
FESR	Final Environmental Scoping Report
ESR	Environmental Scoping Report
GTZ	Gesellschaft für Technische Zusammenarbeit
HIV	Human immunodeficiency virus
I&AP	Interested and Affected Party
IUCN	International Union for Conservation of Nature
MET	Ministry of Environment and Tourism
MEFT: DEA	Ministry of Environment, Forestry and Tourism: Department of Environmental Affairs
MURD	Ministry of Urban and Rural Development
MWTC	Ministry of Works Transport and Communication
PPP	Public participation process
p/km^2	People per square kilometre
SADC	Southern African Development Community
USAID	United States Agency for International Development

1. INTRODUCTION

1.1 Project Background

Namibia is heavily reliant on imports of fertiliser for agricultural purposes. This leads to increased prices of fertilisers for local farmers, given the high costs of imported blended fertilisers. The lead time of fertiliser transportation and delivery to end consumers is another challenge.

HAFA PEAK INVESTMENTS CC has identified an opportunity to establish a fertiliser factory that will enable the reduction in price and lead time for this critical product, it also opens up the market for supplying the rest of the SADC regional countries such as Angola, Zambia, Zimbabwe, DRC, Botswana etc. with more a more affordable product in a shorter time. Feedstock for this activity will be obtained from Namibia Poultry Industry (NPI).

The project site is located north of Okahandja Town Proper, south of the C31 Road to Hochfeld. It is approximately 9 km from the Okahandja Shopping Centre. The above activity is discussed in more detail in Chapter 4. The proponent appointed Environam Consultants Trading cc (ECT) to undertake the Environmental Assessment (EA) in order to obtain an Environmental Clearance Certificate (ECC) for the activity from the Office of the Environmental Commissioner in the Ministry of Environment, Forestry and Tourism (MEFT).

The process will be undertaken in terms of the gazetted Namibian Government Notice No. 30 Environmental Impact Assessment Regulations (herein referred to as EIA Regulations) of the Environmental Management Act (No 7 of 2007) (herein referred to as the EMA). The EIA process will investigate if there are any potential significant bio-physical and socio-economic impacts associated with the proposed development and related infrastructure and services.

The EIA process would also provide an opportunity for the public and key stakeholders to provide comments and participate in the process. It will also serve the purpose of informing the proponent's decision-making, and that of MEFT.

1.2 Project Location

The project site is located north of Okahandja Town Proper, and south of the C31 Road to Hochfeld. The site lies at coordinates lat: -21.905421 long: 16.904022. Ingress will be obtained from the existing road to the western border of Portion 59. See **Figures 1 and 2** below for the locality maps of Okahandja and the site.

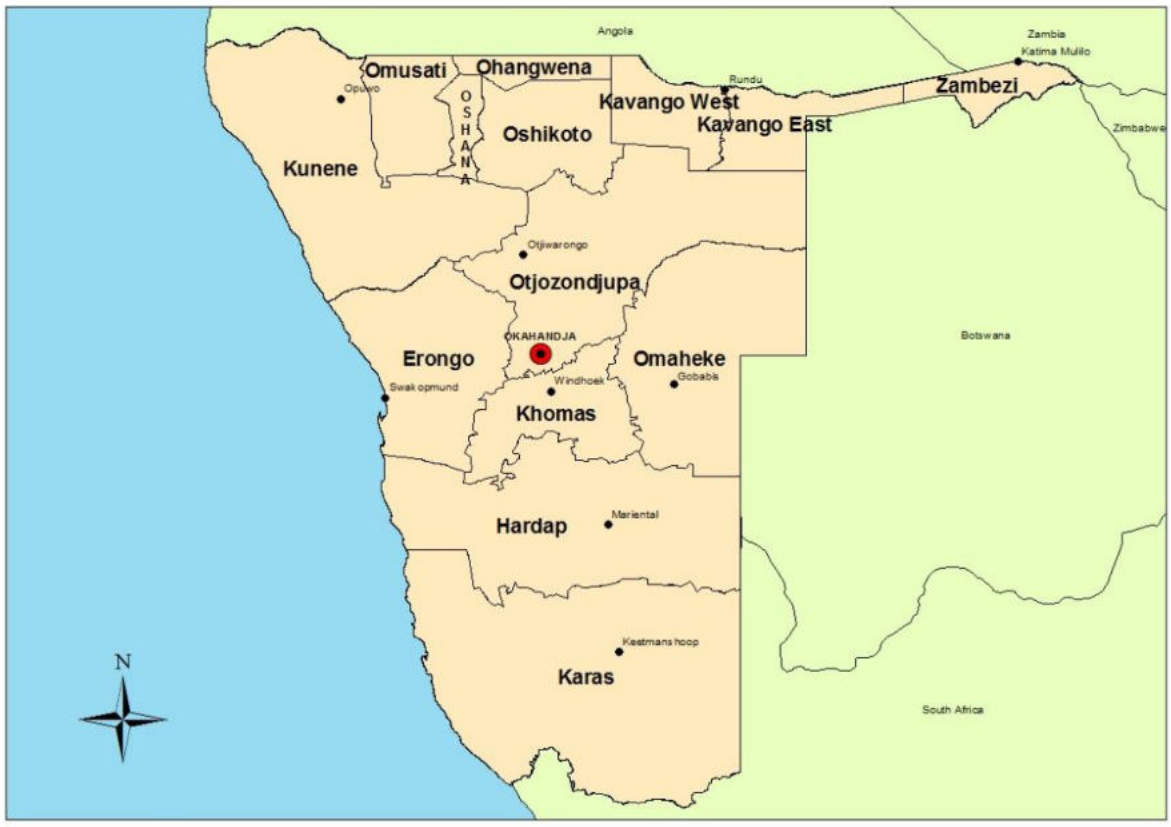


Figure 1: Locality map of Okahandja

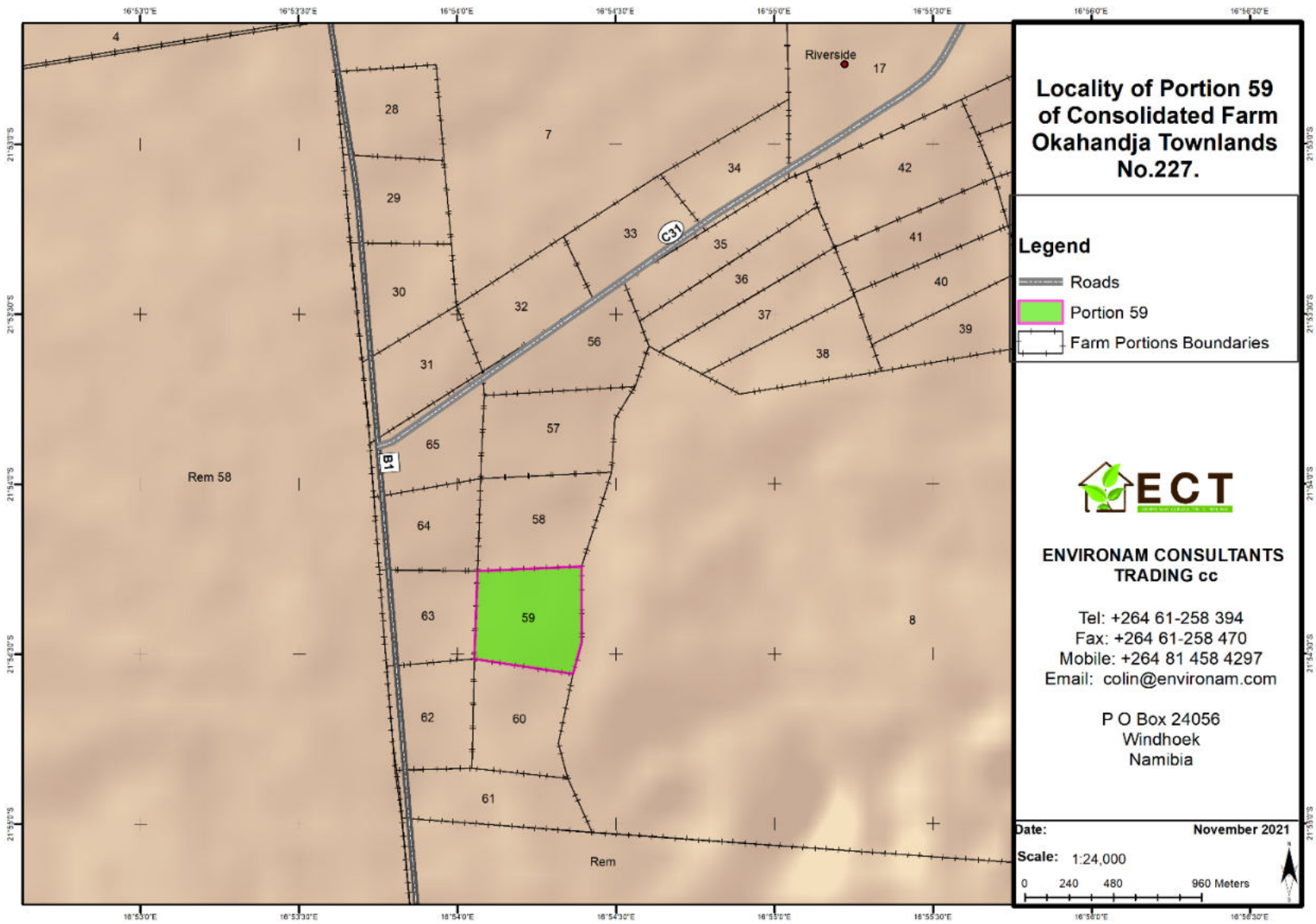


Figure 2: Locality map of the proposed development

1.3 Terms of Reference and Scope of Project

The scope of this project is limited to conducting an environmental impact assessment and applying for an Environmental Clearance Certificate for the Proposed Establishment of an Organic Fertiliser Plant on Portion 59 (a Portion of Portion 8) of the Consolidated Farm Okahandja Townlands No. 277, Okahandja, Otjozondjupa Region and associated infrastructure as indicated in section 1.1 above. This includes consultations with client; site investigations and analysis; stakeholder consultations; impact analysis; mitigation formulation; report writing; and draft Environmental Management Plan.

1.4 Assumptions and Limitations

In undertaking this investigation and compiling the Environmental Assessment, the following assumptions and limitations apply:

- Assumes the information provided by the proponent is accurate and discloses all information available to Hafa Peak Investments.
- All relevant permits will be obtained by the proponent.
- Various layout and siting alternatives were initially considered by the proponent, having taken due regard of the natural and environmental constraints. The current designs and site thus present the most feasible results. See **Figure 3** below for the site options that were considered for the siting of the plant.

Figure 3: Options for the siting of the organic fertiliser plant

In order of preference the above image depicts the sites that where considered for the construction of the organic fertilizer production facilities. Option 1 was considered as the most preferred option due to a number of factors, including easy access from the road. It offers an opportunity for the optimal infrastructure design because there are no existing structures, it also offers minimal impediments for future expansion. Its close proximity to the living area of adjacent Plot 58 can provide a potential for visual intrusion and odour impacts.

Option 2 involves using the existing structures found to the north-east of Plot 59 (See **Figure 4** below).

Figure 4: Existing Structures on Option 2

The structures will be retrofitted to conform to the design and use of the fertliser production plant. The advantage of this site is that it will be less costly and faster to put up the facilities. It is also a reasonable distance from the neighbouring properties and therefore, it provides less potential for nuisance. The disadvantages are that there is limited expansion north and east wards, as well as design constraints.

Option 3 offers a more constrained space for infrastructures construction and also for movement of vehicles for loading and offloading.

Having considered the above as well as input from the consultation process, the proponent has opted to select Option 2 as the most appropriate for the construction of the proposed organic fertiliser plant. The proponent has also decided to scale down the project and to abandon the cattle, poultry and fish farming as well as the guest house from the scope of this exercise and to solely focus on the construction of the fertiliser production facilities.

1.5 Content of Environmental Scoping Report

In terms of Section 8 of the gazetted EIA Regulations certain aspects must be included in a Scoping Report. **Table 1** below delineate, for ease reference, where this content is found in the Environmental Scoping Report.

Table 1: Contents of the Scoping / Environmental Assessment Report

Section	Description	Section of ESR/ Annexure
8 (a)	The curriculum vitae of the EAPs who prepared the report;	Refer to **Annexure E**
8 (b)	A description of the proposed activity;	Refer to Chapter 4
8 (c)	A description of the site on which the activity is to be undertaken and the location of the activity on the site;	Refer to Chapter 3
8 (d)	A description of the environment that may be affected by the proposed activity and the manner in which the geographical, physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed listed activity;	Refer to Chapter 3
8 (e)	An identification of laws and guidelines that have been considered in the preparation of the scoping report;	Refer to Chapter 2
8 (f)	Details of the public consultation process conducted in terms of regulation 7(1) in connection with the application, including	Refer to Chapter 5
	(i) the steps that were taken to notify potentially interested and affected parties of the proposed application	Refer to Chapter 5
	(ii) proof that notice boards, advertisements and notices notifying potentially interested and affected parties of the proposed application have been displayed, placed or given;	Refer to **Annexures A** and **B** for site notices and advertisements respectively.
	(iii) a list of all persons, organisations and organs of state that were registered in terms of regulation 22 as interested and affected parties in relation to the application;	Refer to **Annexure D**
	(iv) a summary of the issues raised by interested and affected parties, the date of receipt of and the response of the EAP to those issues;	Refer to **Annexure D**
8 (g)	A description of the need and desirability of the proposed listed activity and any identified alternatives to the proposed	Refer to Chapter 4

Section	Description	Section of ESR/ Annexure
	activity that are feasible and reasonable, including the advantages and disadvantages that the proposed activity or alternatives have on the environment and on the community that may be affected by the activity;	
8 (h)	A description and assessment of the significance of any significant effects, including cumulative effects, that may occur as a result of the undertaking of the activity or identified alternatives or as a result of any construction, erection or decommissioning associated with the undertaking of the proposed listed activity;	Refer to Chapter 7
8 (i)	terms of reference for the detailed assessment;	Refer to Chapter 1
8 (j)	An environmental management plan	Refer to **Annexure F**

2. LEGAL, POLICY AND INSTITUTIONAL FRAMEWORK

The principle environmental regulatory agency in Namibia is the Office of the Environmental Commissioner within the Directorate of Environmental Affairs of the Ministry of Environment, Forestry and Tourism. Most of the policies and legislative instruments have their basis in two clauses of the Namibian Constitution, i.e. Article 91 (c) and Article 95 (l); however, good environmental management finds recourse in multiple legal instruments. **Table 2** below provides a summary of the legal framework considered to be relevant to this development and the environmental assessment process.

Table 2: Legislation applicable to the proposed development

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
The Constitution of the Republic of Namibia as Amended	Article 91 (c) provides for duty to guard against "the degradation and destruction of ecosystems and failure to protect the beauty and character of Namibia." Article 95(l) deals with the "maintenance of ecosystems, essential ecological processes and biological diversity" and sustainable use of the country's natural resources.	Sustainable development should be at the forefront of this development.
Environmental Management Act No. 7 of 2007 (EMA)	Section 2 outlines the objective of the Act and the means to achieve that. Section 3 details the principle of	The development should be informed by the EMA.

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
	Environmental Management	
EIA Regulations GN 28, 29, and 30 of EMA (2012)	GN 29 Identifies and lists certain activities that cannot be undertaken without an environmental clearance certificate. GN 30 provides the regulations governing the environmental assessment (EA) process.	**Activity 9.2** Any process or activity which requires a permit, license or other form of authorisation, or the modification of or changes to existing facilities for any process or activity which requires an amendment of an existing permit, licence or authorisation or which requires a new permit, licence or authorisation in terms of a law governing the generation or release of emissions, pollution, effluent or waste.
Convention on Biological Diversity (1992)	Article 1 lists the conservation of biological diversity amongst the objectives of the convention.	The project should consider the impact it will have on the biodiversity of the area.
Draft Procedures and Guidelines for conducting EIAs and compiling EMPs (2008)	Part 1, Stage 8 of the guidelines states that if a proposal is likely to affect people, certain guidelines should be considered by the proponent in the scoping process.	The EA process should incorporate the aspects outlined in the guidelines.
Namibia Vision 2030	Vision 2030 states that the solitude, silence and natural beauty that many areas in Namibia provide are becoming sought after commodities and must be regarded as valuable natural assets.	Care should be taken that the development does not lead to the degradation of the natural beauty of the area.
Water Act No. 54 of 1956	Section 23(1) deals with the prohibition of pollution of underground and surface water bodies.	The pollution of water resources should be avoided during construction and operation of the development.
The Ministry of Environment, Forestry and Tourism (MEFT) Policy on HIV & AIDS	MEFT has developed a policy on HIV and AIDS. In addition, it has also initiated a programme aimed at mainstreaming HIV and gender issues into environmental impact assessments.	The proponent and its contractor/s have to adhere to the guidelines provided to manage the aspects of HIV/AIDS. Experience with construction projects has shown that a significant risk is created when construction workers interact with local communities.
Urban and Regional Planning Act (Act of 2018).	Urban and Regional Planning Act (Act of 2018) regulates subdivisions of portions of land falling within a proclaimed Local Authority area.	Section 16 of Chapter 3 deals with the Ministers' declaration of authorised planning authorities and establishment of joint committees.
Local Authorities Act No. 23 of 1992	The Local Authorities Act prescribes the manner in which a town or municipality should be managed by the Town or Municipal Council. Sections 34-47 make provision for the aspects of water and sewerage.	The development has to be comply with the provisions of the Local Authorities Act
Labour Act no 11 of 2007	Chapter 2 details the fundamental	Given the employment opportunities

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
	rights and protections. Chapter 3 deals with the basic conditions of employment.	presented by the development, compliance with the labour law is essential.
Public Health Act no 36 of 1919	Section 119 prohibits persons from causing nuisance.	The developer and contractors are to comply with these legal requirements.
Nature Conservation Ordinance no 4 of 1975	Chapter 6 provides for legislation regarding the protection of indigenous plants	Indigenous and protected plants have to be managed within the legal confines.
Atmospheric Pollution Prevention Ordinance (No. 11 of 1976).	The Ordinance objective is to provide for the prevention of the pollution of the atmosphere, and for matters incidental thereto.	All activities on the site will have to take due consideration of the provisions of this legislation.
Roads Ordinance 17 of 1972	This Ordinance consolidates the laws relating to roads.	The provisions of this legislation have to be taken into consideration in as far as access to the development site is concerned.
Roads Authority Act, 1999	Section 16(5) of this Act places a duty on the Roads Authority to ensure a safe road system.	Some functions of the Roads Ordinance 17 of 1972 have been assigned to the Roads Authority.
Okahandja Town Planning Scheme.	The town planning scheme has as its general purpose the co-ordinated and harmonious development of the local authority area, or the area or areas situate therein.	Portion 59 is zoned as "Special" in terms of the Okahandja Town Planning Scheme.

This EIA process will be undertaken in accordance with the EIA Regulations. A Flow Diagram (refer to **Figure 5** below) provides an outline of the EIA process to be followed.

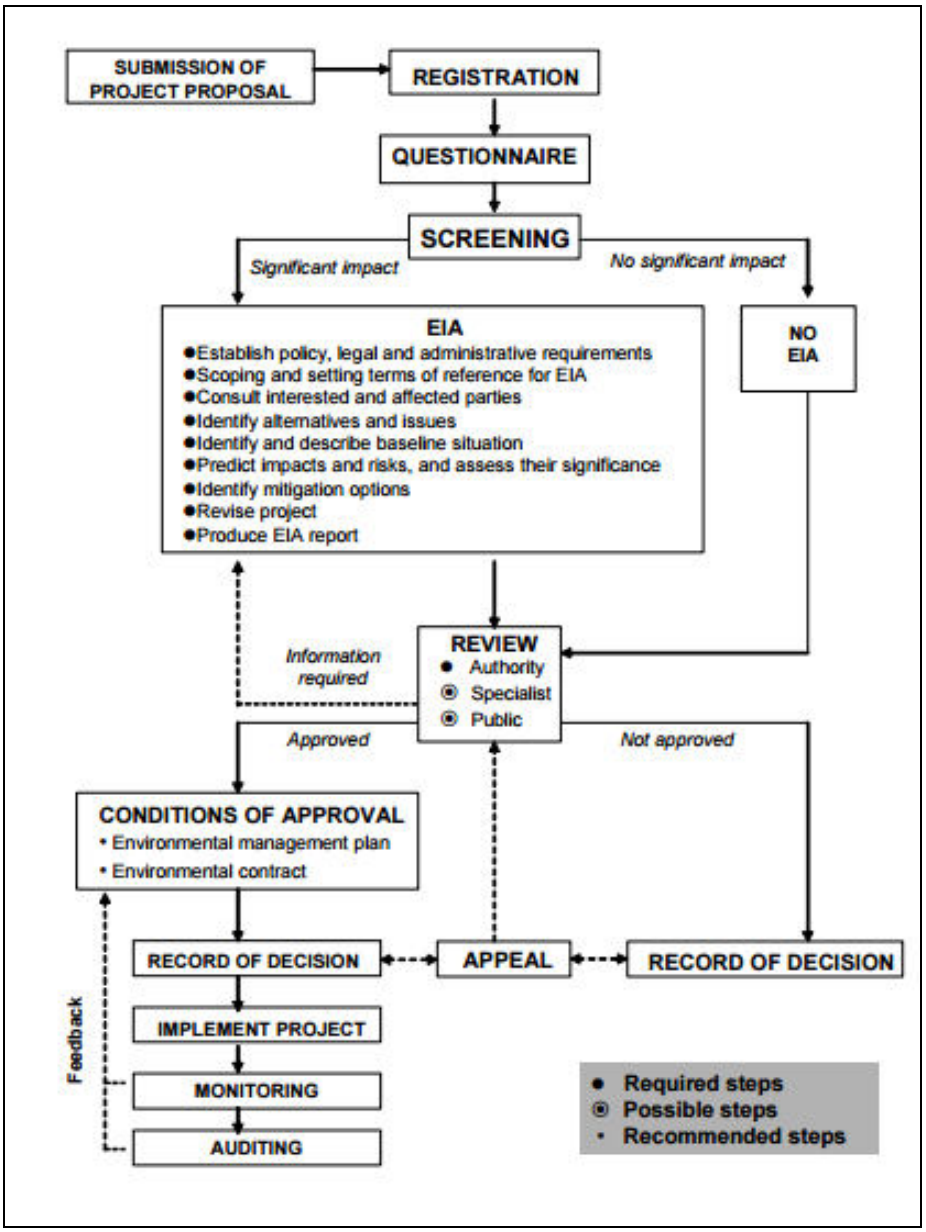


Figure 5: EIA Flowchart for Namibia (SELH, 2012)

3. ENVIRONMENTAL BASELINE DESCRIPTION

3.1. Social Environment

3.1.1. Socio-Economic Context

The statistics shown in **Table 3** below are derived from the 2011 Namibia Population and Housing Census (NSA, 2011):

Table 3: Statistics of Okahandja Urban Constituency

OKAHANDJA URBAN CONSTITUENCY	
Population	24,451
Females	12,352
Males	12,099
Private Households	5,627
Population under 5 years	13%
Population aged 5 to 14 years	20%
Population aged 15 to 59 years	61%
Population aged 60 years and above	5%
Female: male ratio	100:103
Literacy rate of 15 years old and above	91%
Head of household - Females	39%
Head of household - Males	61%
People above 15 years who have never attended school	9%
People above 15 years who are currently attending school	26%
People above 15 years who have left school	59%
People with disability	3%
People aged 15 years and up who belong to the labour force	74%
Population employed	60%
Homemakers	13%
Students	49%
Retired, too old etc.	37%
Income from pension	8%
Income from business and non-farming activities	12%
Income from farming	2%
Income from cash remittance	5%
Wages and salaries	68%

3.1.2. Archaeological and Heritage Context

There are a few sites of heritage importance within the Okahandja area which are declared as national monuments. They are listed in **Table 4** below:

Table 4: Declared Heritage Sites (Vogt, 2010)

Site Name	Site Type	General Information
Grave of Jonker Afrikaner	Historical Graves	• Leader of Oorlam people. • Died on 18 August 1861. • Grave is situated on the grounds of the German Evangelical Lutheran Friedenskirche. • Grave was proclaimed on 16 January 1950.
Grave of Kahimemua Nguvauva	Historical Graves	• Prominent headman/Chief of the Mbanderus until 1896. • Taken prisoner by German colonisers. • Executed by Germans on 11 June 1896. • Grave was proclaimed on 7 February 1980.
Herero Grave Complex	Historical Cemeteries	• Last resting place of the former Herero leaders Tjamuaha, Maharero, Samuel Maharero and Friedrich Maharero. • Tjamuaha died at the entrance of his cattle kraal, current site of the graves • Situated near the municipal swimming pool in Okahandja. • Proclaimed on 20 March 1990.
Rhenish Mission Church	Historical Cemeteries	• Oldest building in Okahandja. • Proclaimed on 20 December 1975.
Moordkoppie	Historical Sites	• Sanguinary battle took place on 23 August 1850. • 700 followers of Herero Chief Kahitjene were murdered. • Proclaimed on 28 July 1972.
Ovikokorero War Memorial	Military Monuments	• Erected in memory of 26 German soldiers who died on 13 March 1904 in battle with Hereros. • Proclaimed on 19 March 1979.
Okaharui War Memorial	Military Monuments	• Erected in honour of 32 German Soldiers who died on 3 April 1904 in battle against Hereros. • Proclaimed on 1 may 1978.
Rhenish Mission Church and Cemetery	Churches	• Missionaries and ordinary civilians buried in the graveyard, as well as a number of German officers and soldiers. • Proclaimed on 20 December 1975.

No archaeological and heritage sites are however known to be located within the proposed development area.

3.2. Bio-Physical Environment

3.2.1. Climate

Higher altitudes make the central highlands in the interior of Namibia cooler than would otherwise be expected, thus the average high temperature for Okahandja ranges between 22°C to 32°C while the average low temperature range from 4°C to 18°C (See **Figure 6** for Okahandja average temperature graph).

The average annual rainfall for the Okahandja area is between 300mm and 400mm and the median annual rainfall is between 300mm to 350mm. The rainiest months in this area are December, January, February and March (See **Figure 7** for Okahandja average rainfall graph).

The average evaporation rate in the project area exceeds 2000mm per annum. This rate is based on water loss from standard sized evaporation ponds, but the rate of water loss from open dams, pans and rivers are generally about 30 % lower than those from small evaporation ponds. This is because the rate of evaporation decreases as the air moving across large expanses of open water picks up moisture (Keystone, 2013.

The project area receives between 10 to 20 days of frost per annum.

Data indicates a relative humidity of 10% to 20% during the least humid months, these ranging from June to November. The reasons for the low humidity are high levels of radiation, high temperatures, absence of moisture and the parched ground as a result of the long, dry winter. The water deficit of the area indicates a value exceeding 1800mm (Keystone, 2013).

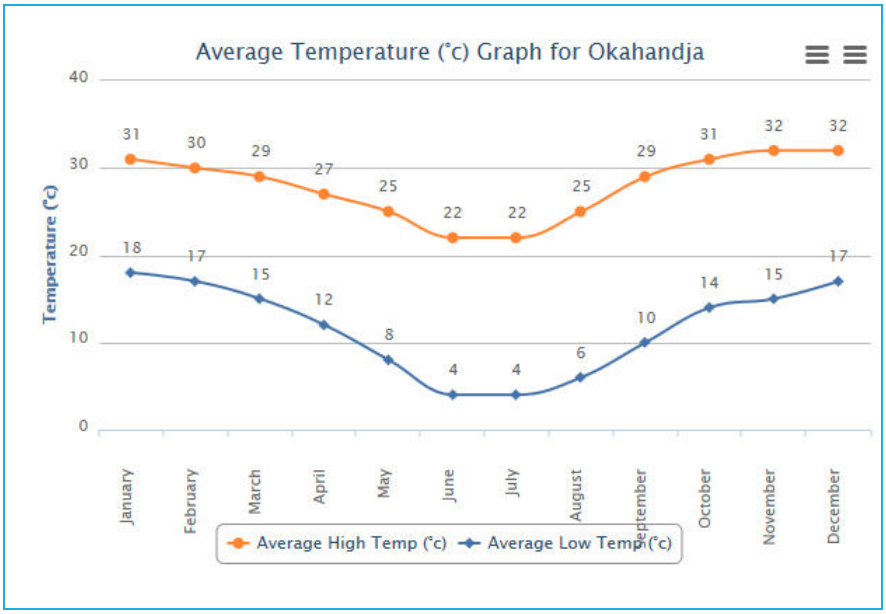


Figure 6: Average monthly temperature for Okahandja (Worldweatheronline, 2022)

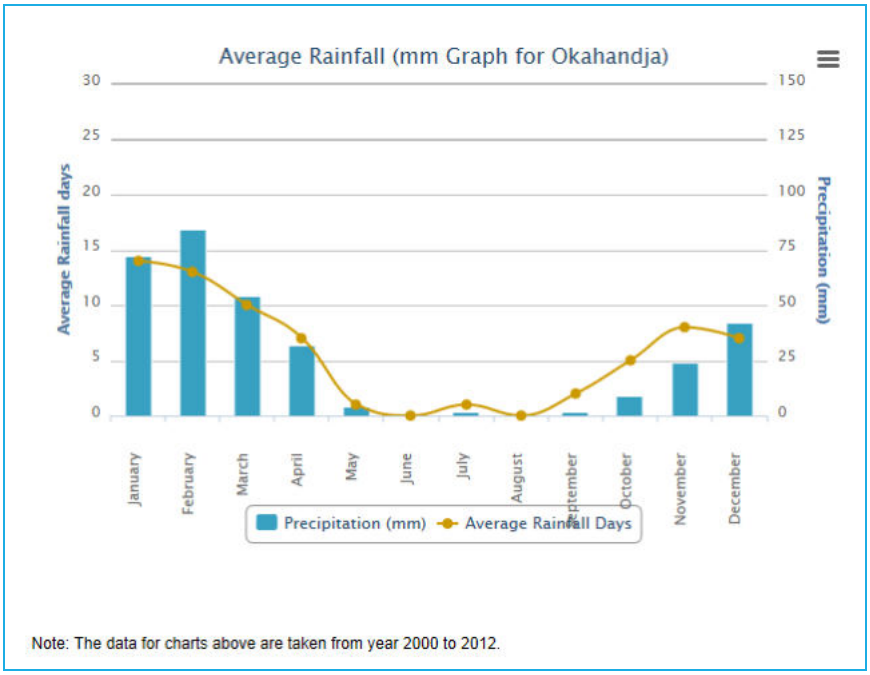


Figure 7*:* Average monthly rainfall for Okahandja (worldweatheronline, 2022)

3.2.2. Topography, Geology and Hydrogeology

The Swakop River rises in the mountains to the east of Okahandja, and north-east of Windhoek, where mean annual precipitation is over 400mm with the unit runoff in this area estimated as 7mm, which is lower than what would be expected for a terrain of this type. This low value is suspected to be influenced by the large number of dams that are found in the Swakop catchment. Okahandja falls within this catchment, together with other towns such as Windhoek, Karibib, Usakos, Otjimbingwe, and Swakopmund (NWRMR, 2000).

The Osona alluvial aquifer is found in the environs of the confluence of the Swakop and Okahandja Rivers. It is in this area that farmers who own small plots abstract water from boreholes and wells in the Swakop River for domestic and gardening use. Part of Okahandja town's water supply is abstracted from a wellfield on the Okahandja River (NWRMR, 2000; IIASA, 2000), augmenting the von Bach dam.

The Swakop River that runs further to the east of Portion 59 is dry throughout the year and only carries water during the rainy season. There are numerous groundwater abstraction points in the project area. A permit for the drilling of boreholes in the general area for water consumption has been issued previously by the Ministry of Agriculture, Water and land Reform for the project area, as the area is not considered to be part of the subterranean water control area in terms of the Water Act, 1956 (Act 54 of 1956).

3.2.3. Terrestrial Ecology

Okahandja lies within the Tree-and-shrub Savanna biome. The Acacia Tree-and-shrub Savanna is characterised by large, open expanses of grassland dotted with Acacia trees (Mendelson et al, 2003). No fauna could be observed on site, save for the domesticated livestock on the

various plots; however, it could be expected to find smaller animals and birds in the general area. Care should therefore be taken to maintain the existing ecosystem, in particular the native vegetation.

It is worth noting that various anthropogenic activities have been taking place on the development site and surrounding properties. The area is largely covered with Acacia trees, the proponent will be advised to maintain these trees and avoid removing them. Where it becomes necessary to remove such it will be advised to either transplant these trees elsewhere or plant new trees at suitable locations in lieu. **Figure 8** below provides a view of the general area and surrounds of the proposed development site.

3.2.4. Air Quality

Air quality in Okahandja is characterised to be comparatively good. The operation of various types of activities within the fertiliser plant operations will result in associated dust and emission impacts, if not managed correctly. Emissions associated with the proposed fertiliser plant will mostly be generated by raw material and vehicle movement as the trucks enter and exit the premises for delivery and collection.

Figure 8: General area of the proposed development site.

3.3. Surrounding Land Use

The proposed site is mostly surrounded by similar sized plots zoned predominantly as "Agriculture" and "Special" (See **Figure 9** below). While the owners use the plots as their primary residence, various income-generating activities are taking place on the properties. This includes the keeping of small stock, mini lodge, mushroom production, antique dealership etc. An Environmental Impact Assessment is currently underway for the construction of and operation of an Aquaculture Project (Fish Farm) on adjacent Portion 62, with an existing fertiliser production activity already taking place (GreenEarth, 2021), we have attached the Background Information Document as **Annexure I**. The larger Portion 8 to the east accommodates a game farm.

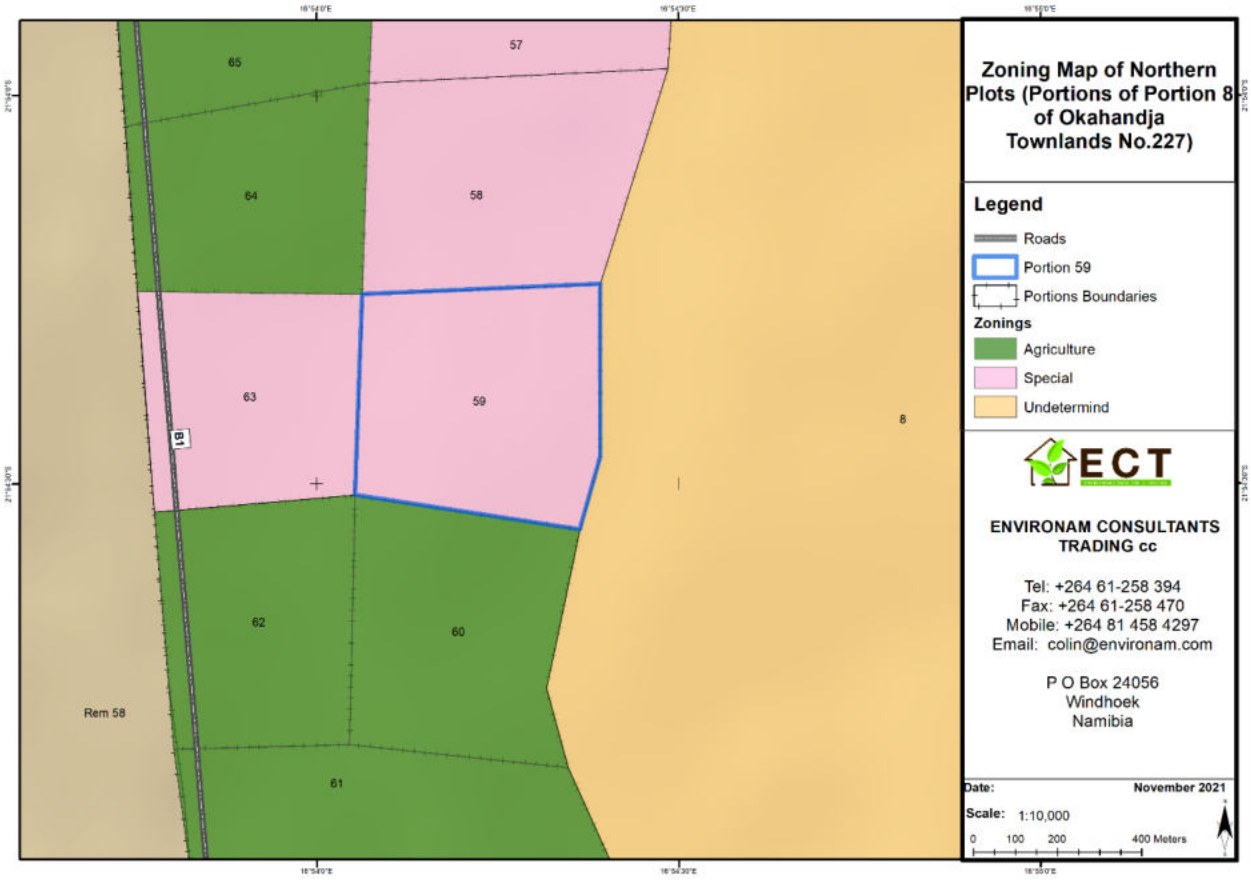


Figure 9: Zoning map of the site and surrounds

3.4. Physical Environment

The infrastructure needs of the proposed project can be categorised into two broad classifications namely:

- Basic infrastructure that includes electricity and roads.
- Environmental infrastructure that consist of water supply, sewage and drainage systems, solid waste management and landscaping.

Water is supplied by means of 1 borehole on site located on the north-eastern corner of the property, with water reservoirs available for storage purposes. Water abstraction permits for an additional borehole on the southern side of the plot 59 will be applied for from the Ministry of Agriculture, Water and Land Reform when necessary. Sewer will be managed through a French drain system, which is in existence but will also be upgraded to accommodate additional infrastructure and staff. Equally a wastewater discharge permit is obtainable from the Ministry of Agriculture, Water and Land Reform for this activity. Electricity is currently supplied by CENORED and any additions or alterations of the existing electrical networks should be approved by CENORED prior to construction. Ingress will be obtained from the existing road to the western border of Portion 59 off the C31 Main Road to Hochfeld.

3.5.

4. PROJECT DESCRIPTION

4.1. Technology Description

As previously outlined in Section 1.1, the proponent has identified an opportunity to establish a fertiliser factory that will enable the reduction in price and lead time for this critical product, it also opens up the market for supplying the rest of the SADC regional countries such as Angola, Zambia, Zimbabwe, DRC, Botswana etc. with a more affordable product in a shorter time.

Hafa Peak Investments CC's (HP) main objective is to produce organic fertiliser for use at communal, small scale, commercial and green scheme farms. The fertiliser can also be used by landscaping companies and municipalities. The organic fertiliser will be called HAFA PEAK FERTILZER. The Company's key focus is on providing quality organic input supplies and support for Namibia booming organic fertiliser market. HAFA PEAK INVESTMENTS will use local chicken manure supplied by Namibia Poultry Industries (NPI) and wood chips as the main feedstock to manufacture organic fertiliser, thus turning the environmentally harmful waste materials to harmless organic fertiliser. HP will provide affordable harmless, high quality fertiliser to the end user and distribute the fertiliser through retailers and wholesalers like Agra, Kaap Agri, Pupkewitz, Build it, and all other related markets.

HAFA PEAK will use newest technology known as Tetanti Agribiotech (TTT) to manufacture the fertiliser. This technology is the world's only destructive and innovative concept that revolutionises the traditional microbial composting process with the use of enzymes to stabilize and mature organic wastes. The technology is based on targeted enzyme products, and with the combined use of machinery, organic wastes can be turned into organic fertilisers within 3 hours.

TTT technology is efficient and cost effective, it greatly improves the maturation process of organic matter over 100 folds and can reduce pollution and increase product safety. The production process solves the odour, waste water, large area demand and time-consuming problems that are normally associated with traditional composting.

Toxic matters in organic wastes are also detoxified and/or deodorised through the degradation, synthesis, transformation and/or polymerisation reactions by the enzymes. At the same time, pathogens, insect eggs and grass seeds are mostly exterminated at 80°C (at least 30 minutes). TTT Technology produces stable and high-quality organic fertiliser within three hours. **Figure 10** below shows the advantages of the TTT technology that will be used.

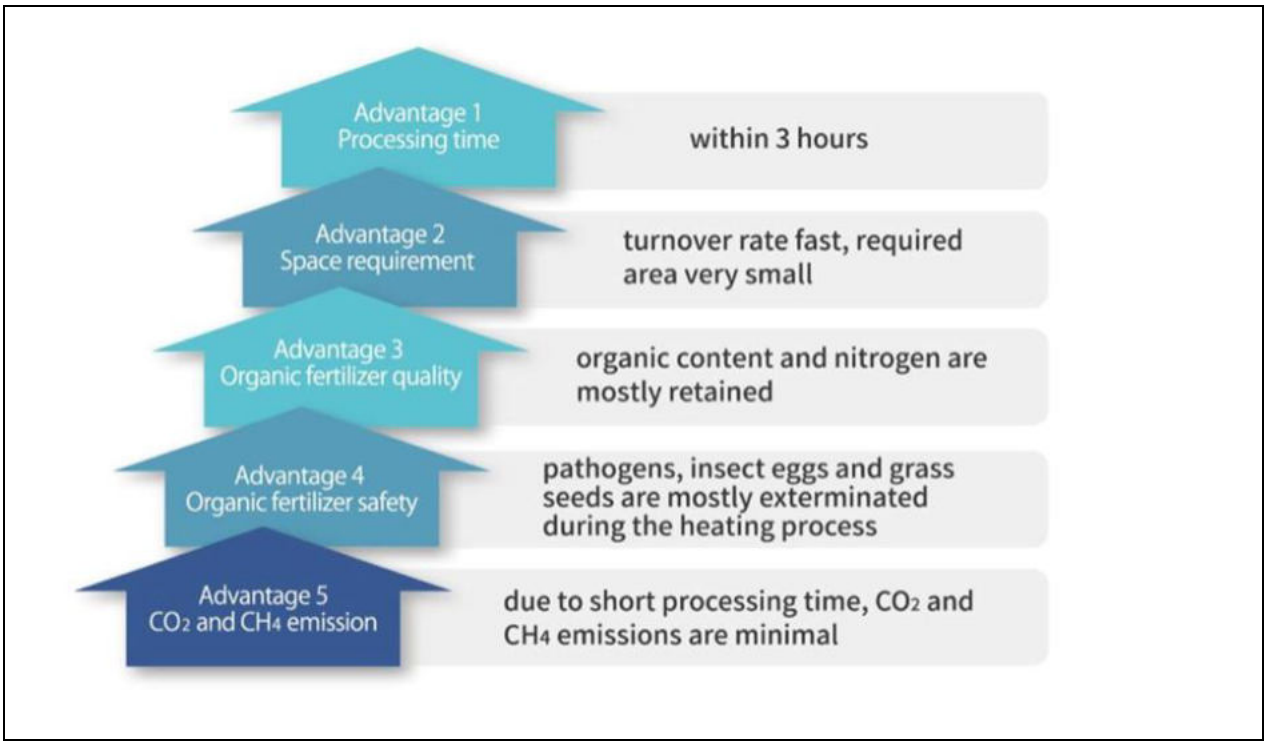


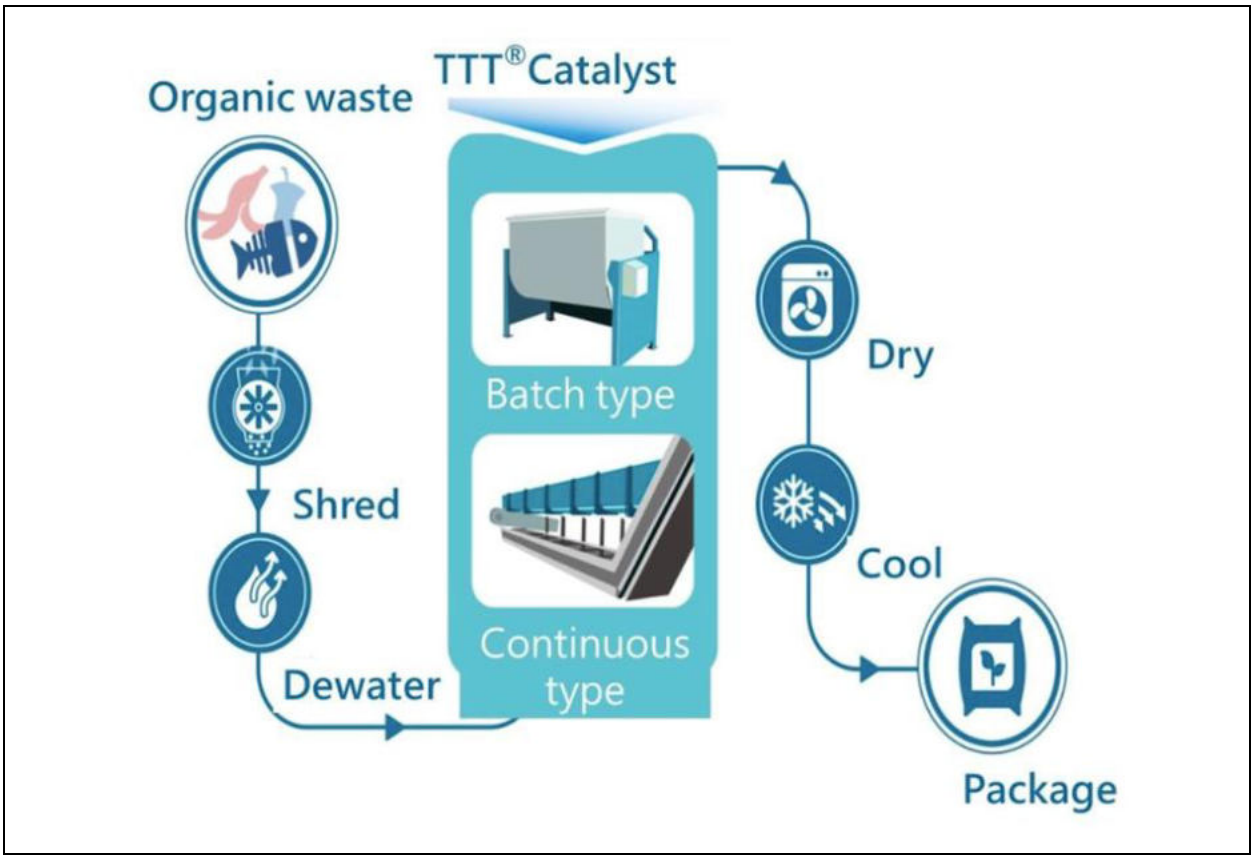
Figure 10: TTT Technology Advantages

4.2. Process description

Feeding: Use a bucket truck to put the feedstock (chicken manure, wood chips and water) into the hopper, and automatically load the materials into the fermentation tank with one button.

High-temperature fermentation and decomposing: The organic fertiliser fermentation tank has a whirlpool air pump to deliver oxygen through the aeration hole on the stirring shaft, and the stirring shaft is stirred at the same time. Under the action of aerobic bacteria, the temperature will gradually rise to 50-150 degree celsius. It effectively kills insect eggs, pathogenic bacteria and weed seeds, and reaches the harmless and reduced treatment standard.

Discharging: The materials in the fermentation chamber fall down layer by layer under the action of the spindle and gravity. After the fermentation is completed, the finished materials are discharged from the discharge port. **Figure 11** illustrates the flow of the process.



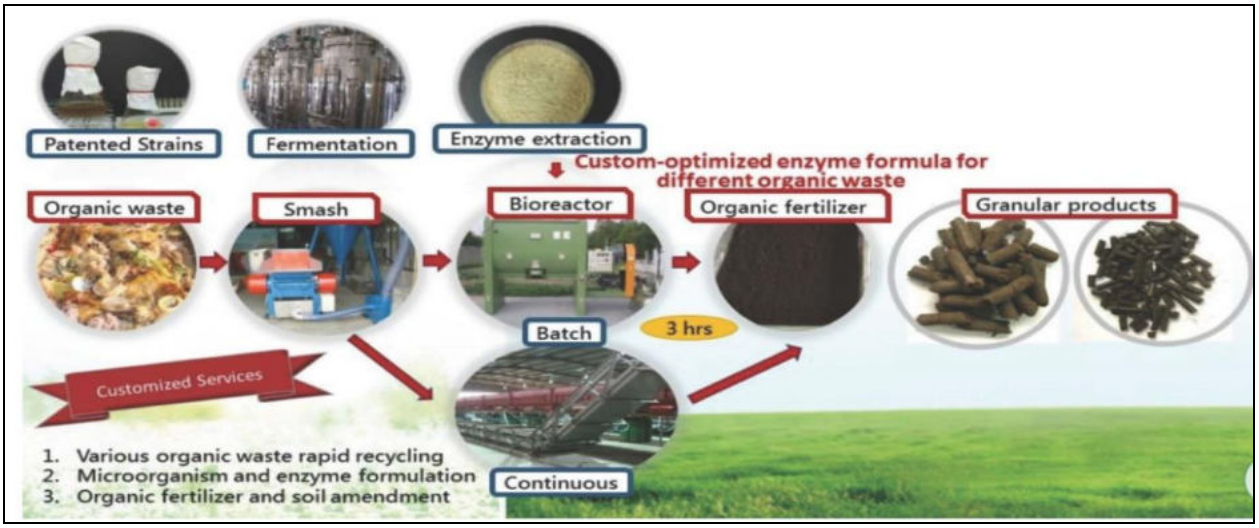


Figure 11: Process Flow

4.3. Draft Design Concepts

For containment, the operations will be housed in enclosed buildings to minimize dispersal into the environment. The buildings consist of two main structures adjacent to each other. With one structure accommodating the main office as well as the process and packaging warehouse. The other building will house the canteen and raw material warehouse. See below **Figures 12-15** for the 3D draft design impressions.

Figure 12: Aerial View of the Buildings

Figure 13: View in between the Buildings

Figure 14: The Canteen

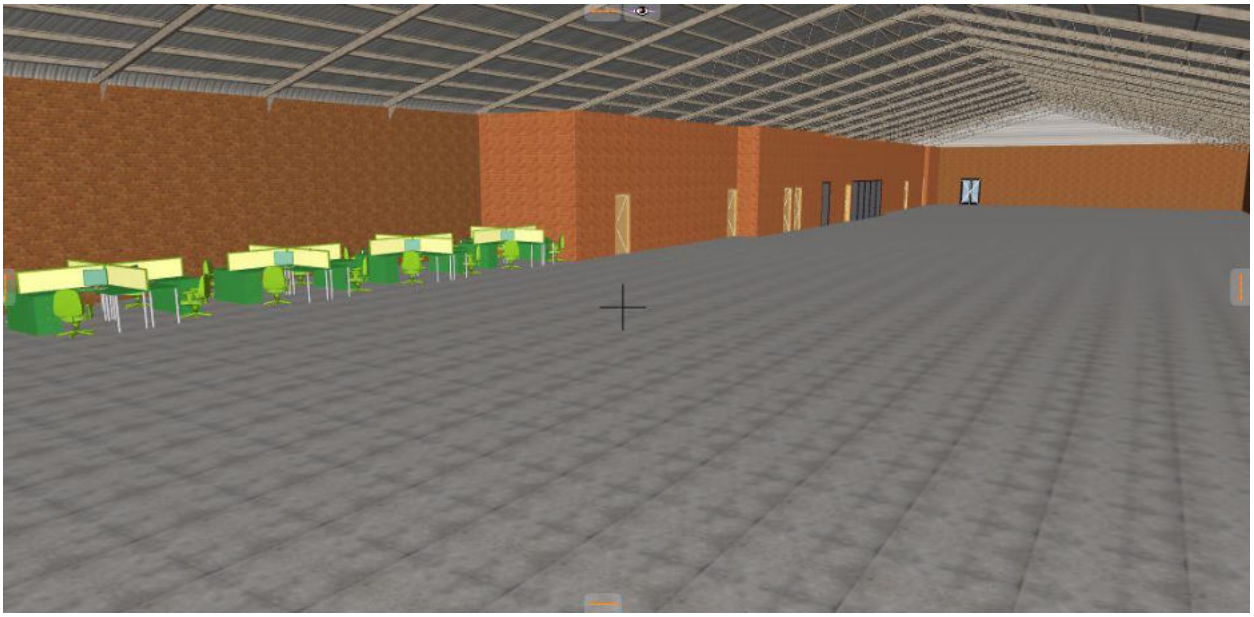


Figure 15: Office Space

4.4. Decision Factors

The following factors served as informants and were considered when developing the ideas for the proposed development:

- Okahandja Town Planning Scheme.
- Character of the general area.
- Sustainable long-term employment opportunities for locals, thus increasing the living standards and livelihood of Okahandja and surrounding communities;
- Increased revenue for the municipality from rates and taxes;
- The plant would meet the demand for fertilisers that would replace imports from South Africa and other countries;
- The fertilisers are suitable for local crops and match the local soil characteristics and those of the sub-region;
- Plant products help increase yield productivity and soil quality;
- The plant would provide more business opportunities to other industries such as raw material suppliers, transporters etc. thereby significantly contributing to the national industrial and economic developments;
- The establishment and strengthening of the local fertiliser industry;
- Technology transfer to Namibia;
- Reduce the cost price of fertilisers for local farmers, given the high costs of imported blended fertilisers.
- Reduce the lead time of fertiliser transportation and delivery to end consumers;
- Encourage emerging small farmers by availing affordable fertilisers with proven yields improvement quality at their doorstep.

4.4. No – Go Alternative

The no-go alternative would essentially entail maintaining the current situation, whereby the country will continue to be reliant on exports from other countries. In addition, no construction or operational jobs that come with the envisaged project will be created.

5. PUBLIC PARTICIPATION PROCESS

5.1. Public Consultation Process Phase 1

In terms of Section 21 of the EIA Regulations a call for public consultation with all I&APs during the EIA process is required. This entails consultation with members of the public and providing them an opportunity to comment on the proposed project. The Public Consultation Process does not only incorporate the requirements of Namibia's legislation, but also takes account of national and international best practises. Please see **Table 5** below for the activities undertaken as part of the public participation process.

Table 5: Table of Public Consultation Activities

ACTIVITY	REMARKS
Placement of site notice at the site boundary and C31 Main Road	See **Annexure A**
Placement of notices in Okahandja Town	See **Annexure A**
Placing advertisements in two newspapers for two consecutive weeks, namely Confidente and Windhoek Observer	See **Annexure B**
Written notice to Interested and Affected Parties via Email	See **Annexure D**
Public consultation meeting	24 November 2021
Consultation with Okahandja Constituency Councillor, Hon. Bethuel Tjaveondja	13 December 2021

A public meeting was arranged for 24 November 2021 at Plot 59, and was well attended by the adjacent property owners (see **Figure 16** below). The comment period of the initial public participation process commenced on **18 November 2021** and ended on **03 December 2021.** All comments received during this period have been incorporated in the assessment to the extent possible. Records of all communication are attached to this report under **Annexure D**.

Figure 16: Public Consultation Meeting

5.2. Public Consultation Process Phase 2

The second phase of the Public Consultation Process involved the lodging of the Draft Environmental Scoping Report (DESR) to all registered I&AP for comment. Registered and potential I&APs were informed of the availability of the DESR for public comment. An Executive Summary of the DESR was included in the communication going out to the registered I&APs. I&APs were given time until **14 April 2022** to submit comments or raise any issues or concerns they may have with regard to the proposed project. There were objections raised on the end of comment period above with proposals of extension to various dates received ranging from weeks to several months. It was eventually agreed to extend this date to **13 May 2022.** All comments received during this period have been incorporated in the assessment to the extent possible. Records of all communication are attached to this report under **Annexure D**.

6. ASSSESSMENT METHODOLGY

Impact assessments depend on the nature and magnitude of the proposed activity, as well as the type of environmental control envisaged for the particular project. Given the nature of the proposed activity, the identification and assessment of the potential impacts will be based on the type and scale of the various activities associated with the project.

Assessment of the predicted significance of impacts for a proposed development is by its nature, inherently uncertain. To deal with such uncertainty in a uniform manner,

standardised and internationally recognised methodologies have been developed. One such accepted methodology is applied in this study to assess the significance of the potential environmental impacts of the proposed development, outlined as follows in **Table 6**.

Table 6: Impact Assessment Criteria

CRITERIA	CATEGORY
Impact	Description of the expected impact
Nature Describe type of effect	**Positive**: The activity will have a social / economical / environmental benefit. **Neutral**: The activity will have no effect **Negative**: The activity will have a social / economical / environmental harmful effect
Extent Describe the scale of the impact	**Site Specific:** Expanding only as far as the activity itself (onsite) **Small:** restricted to the site's immediate environment within 1 km of the site (limited) **Medium:** Within 5 km of the site (local) **Large:** Beyond 5 km of the site (regional)
Duration Predicts the lifetime of the impact.	**Temporary:** < 1 year (not including construction) **Short-term:** 1 – 5 years **Medium term:** 5 – 15 years **Long-term:** >15 years (Impact will stop after the operational or running life of the activity, either due to natural course or by human interference) **Permanent:** Impact will be where mitigation or moderation by natural course or by human interference will not occur in a particular means or in a particular time period that the impact can be considered temporary
Intensity Describe the magnitude (scale/size) of the Impact	**Zero:** Social and/or natural functions and/ or processes remain unaltered **Very low:** Affects the environment in such a way that natural and/or social functions/processes are not affected **Low:** Natural and/or social functions/processes are slightly altered **Medium:** Natural and/or social functions/processes are notably altered in a modified way **High:** Natural and/or social functions/processes are severely altered and may temporarily or permanently cease
Probability of occurrence Describe the probability of the Impact actually occurring	**Improbable:** Not at all likely **Probable:** Distinctive possibility **Highly probable:** Most likely to happen **Definite:** Impact will occur regardless of any prevention measures
Degree of Confidence in predictions State the degree of confidence in predictions based on availability of information and specialist knowledge	**Unsure/Low:** Little confidence regarding information available (<40%) **Probable/Med:** Moderate confidence regarding information available (40-80%) **Definite/High:** Great confidence regarding information available (>80%)

CRITERIA	CATEGORY
Significance Rating The impact on each component is determined by a combination of the above criteria.	**Neutral:** A potential concern which was found to have no impact when evaluated **Very low:** Impacts will be site specific and temporary with no mitigation necessary. **Low:** The impacts will have a minor influence on the proposed development and/or environment. These impacts require some thought to adjustment of the project design where achievable, or alternative mitigation measures **Medium:** Impacts will be experienced in the local and surrounding areas for the life span of the development and may result in long term changes. The impact can be lessened or improved by an amendment in the project design or implementation of effective mitigation measures. **High:** Impacts have a high magnitude and will be experienced regionally for at least the life span of the development, or will be irreversible. The impacts could have the no-go proposition on portions of the development in spite of any mitigation measures that could be implemented.

*NOTE: Where applicable, the magnitude of the impact has to be related to the relevant standard (threshold value specified and source referenced). The magnitude of impact is based on specialist knowledge of that particular field.

For each impact, the EXTENT (spatial scale), MAGNITUDE (size or degree scale) and DURATION (time scale) are described. These criteria are used to ascertain the SIGNIFICANCE of the impact, firstly in the case of no mitigation and then with the most effective mitigation measure(s) in place. The decision as to which combination of alternatives and mitigation measures to apply lies with the proponent, and their acceptance and approval ultimately with the relevant environmental authority.

The SIGNIFICANCE of an impact is derived by taking into account the temporal and spatial scales and magnitude. Such significance is also informed by the context of the impact, i.e. the character and identity of the receptor of the impact.

7. MITIGATION HIERACHY

The mitigation hierarchy is a tool aimed at helping to manage biodiversity risk, and is commonly applied in Environmental Impact Assessments. The most common reference point for banks providing project finance is mitigation measures; this provides the financial institutions with information on how environmental and social risks will be managed (See **Figure 17** below). These cover avoidance, minimization, restoration and compensation amongst other things. It is possible and considered sought after to enhance the environment by ensuring that positive gains are included in the proposed activity or project. If negative impacts occur, then the hierarchy indicates further steps.

Impact avoidance: This step is most effective when applied at an early stage of project planning. It can be achieved by:

- not undertaking certain projects or elements that could result in adverse impacts;
- avoiding areas that are environmentally sensitive; and
- putting in place preventative measures to stop adverse impacts from occurring.

Impact minimization: This step is usually taken during impact identification and prediction to limit or reduce the degree, extent, magnitude, or duration of adverse impacts. It can be achieved by:

- scaling down or relocating the proposal;

- redesigning elements of the project; and
- taking supplementary measures to manage the impacts

Restoration: This step is taken to improve degraded or removed ecosystems following exposure to impacts that cannot be completely avoided or minimised. Restoration tries to return an area to the original ecosystem that occurred before impacts. Restoration is frequently needed towards the end of a project's life-cycle, but may be possible in some areas during operation.

Impact compensation: This step is usually applied to remedy unavoidable residual adverse impacts. It can be achieved by:

- rehabilitation of the affected site or environment, for example, by habitat enhancement;
- restoration of the affected site or environment to its previous state or better; and
- replacement of the same resource values at another location (off-set), for example, by wetland engineering to provide an equivalent area to that lost to drainage or infill. Offsets are often complex and expensive; it is therefore preferable to pay attention to earlier steps in the mitigation hierarchy.

8. POTENTIAL IMPACTS

This Chapter describes the potential impacts on the biophysical and socio-economic environments, which may occur due to the proposed activities. These include potential impacts, which may arise during the planning and design phase, potential construction related impacts (i.e. short to medium term) as well as the operational impacts of the proposed development (i.e. long-term impacts).

The assessment of potential impacts will help to inform and confirm the selection of the preferred project plan and design to be submitted to MEFT: DEA for consideration. In turn, MEFT: DEA's decision on the environmental acceptability of the proposed project and the setting of conditions of authorisation (should the project be authorised) will be informed by this chapter, amongst other information contained in this Report.

The baseline and potential impacts that could result from the proposed development are described and assessed with mitigation measures recommended. Finally, comment is provided on the potential cumulative impacts which could result should this development, and others like it in the area, be approved.

8.1. Planning and Design Phase Impacts

During the planning and design phase consideration is given to aspects such as increased water extraction from subterranean sources; pollution of subterranean and surface water sources, odour, and traffic.

8.1.1. Increased water extraction from subterranean sources

When the organic fertiliser plant comes into operation, an increase in the consumption of water is expected. Water is to be supplied to the operations via boreholes and pressure may be placed on subterranean water resources.

The water usage will be used mainly for basic consumption as the operation itself is not water intensive, given that it is a relatively dry process. The envisaged water consumption is approximately 25% per tonne of chicken manure feedstock, hence projected volumes are between 2 m^3 to 6 m^3 per day. Therefore, the impact on water resources is not expected to be significant.

8.1.2. Pollution of Subterranean and Surface Water Sources

The Swakop River runs approximately 4 kms to the eastern side of the portion. While this river is dry throughout most part of the year and only flows during rain events; it should nevertheless be protected from any potential pollution. The project site as well as other neighbouring farmsteads also utilise groundwater, through boreholes, for their needs. Leaks and spillage of feedstock and fertilizers have the potential of ending up in the river course or seep underground when they come into contact with water. Emission of dust laden air may also find their way in the water sources. It is thus critical that relevant mitigation measures such as the installation of filters are employed to minimise polluted air emission.

A maintenance program has to be developed to prevent operation with faulty equipment such as compressors or pumps that lead to lower pressures and leaks, and resultantly decrease plant efficiency. Dust and fertilizer spillage should be recovered and recycled to the process.

The proponent intends to make use of a French drain system to manage sewage. If these systems are not properly managed it may result in the pollution of surface and ground water in the area, and care should be taken to ensure that these systems are properly installed and maintained.

A hydrogeological specialist study has been commissioned to assess the above two aspects in more detail and is attached as **Annexure F**.

8.1.3. Odour

The fertilizer production process can cause an odour nuisance for the workforce and environment. The extent to which an individual will consider an odour to be a nuisance is depended on the frequency, duration and offensiveness of the odour as well as the particular individual's sensitivity. Odour is likely to originate from the chicken manure and enzymes used in the production process, as the end product itself emits very low to no odour. The owners of the adjacent plots have identified this as a serious issue of concern and have raised

their opinions around this aspect. The use of relevant technologies such as air extraction and treatment through a baghouse or Anti Odour Carbon Filters (See **Figure 18** below) should be used to minimise the intensity of the odour from the process. Housekeeping is important, as every bit of stray organic matter not incorporated into a pile is a potential odour source. It requires dedication to focus an hour per day on housekeeping patrol, where stray and spillages are cleaned and picked up and put into a pile.

The TTT technology serves as a control to reduce odour during fertilizer production. Some of the activities in the process to mitigate odour include:

1. The process uses special high-energy and high-ozone ultraviolet light beams to irradiate malodorous gases such as ammonia, trimethylamine, hydrogen sulfide, methyl sulfide, methyl mercaptan, dimethyl sulfide, dimethyl disulfide, carbon disulfide and styrene, Sulfides H2S, VOCs, molecular bonds of benzene, toluene, and xylene, cracking them to produce pollutant free molecules. The ozone oxidizes and combine into small molecules that are harmless or low-harm compounds, such as H2O, etc.

2. The process also uses the ultraviolet light beams to decompose oxygen molecules in the air to produce free oxygen, that is, active oxygen. Because of the imbalance of positive and negative electrons carried by free oxygen, it needs to combine with oxygen molecules to produce ozone. UV+O2→O-+O* (active oxygen) O+O2→O3 (ozone), it is well known that ozone has a strong oxidizing effect on organic matter, and has a clearing effect on malodorous gases and other irritating odours.

3. After the malodorous gas is input into the purification equipment by the exhaust equipment, the purification equipment uses high-energy ultraviolet light beam and ozone to synergistically decompose and oxidize the malodorous gas so that they are degraded and converted into low-molecular compounds such as water.

4. The process cracks the molecular bonds of bacteria in the malodorous gas, destroy the nucleic acid (DNA) of the bacteria, and then oxidize through ozone to completely achieve the purpose of deodorization and killing bacteria.

The relative humidity (RH) in the storage facilities should be managed. If it is too dry (low RH), then there will be more dust generated when handling manure. High moisture levels in the indoor air (high RH) can lead to ammonia production and in some cases will promote anaerobic conditions in the manure which will lead to odour. An air quality specialist study has been commissioned for further assessments of this aspect and is attached as **Annexure E**.

Figure 18: Anti Odour Carbon Filter

8.1.4. Traffic Impacts

The development will result in a disruption of traffic due to increased vehicle movement on site as a result of the trucks bringing the raw materials to the plant as well as those ferrying the finished products to the various customers. Operations personnel will be commuting between Okahandja town proper and the site, they will be bussed to and fro. It is projected that one truck will be bringing in raw materials every two days, with one truck going out with the finished products in the same period. The changing road conditions may result in short term confusion for frequent road users. This will, however, be very transient in nature and is unlikely to have significant long term impacts. Care should, however, be taken to ensure that the adequate road traffic management practises are put in place to allow for the smooth movement of traffic. Consideration should also be given to equitable contribution to the maintenance of the gravel road.

8.2. Construction Phase Impacts

During the construction phase the following potential impacts have been identified: flora and fauna; noise; surface and ground water; health, safety and security; air quality; traffic impacts; solid waste management; storage and utilisation of hazardous substances; social.

8.2.1. Flora and Fauna

Okahandja lies within the Tree-and-shrub Savanna biome. The Acacia Tree-and-shrub Savanna is characterised by large, open expanses of grassland dotted with Acacia trees. The area is largely covered with Acacia trees, the proponent will be advised to maintain these trees and avoid removing them to the extent possible.

8.2.2. Noise

Noise is perceived as one of the most undesirable consequences of a construction activity. The most common reported impacts are interference in oral communication and sleep disturbance. the construction of the structures, buildings and installation of the relevant equipment will result in associated noise impacts. These noise impacts will mainly be associated with construction machinery and vehicles, concrete and mixing; and excavation for foundations. The noise levels may potentially be a nuisance to the community and fauna found in the area. However, these will be short term activities and are not likely to have long term negative impacts to the residents and animals that are in the vicinity. The project site is subjected to the regular ambient noise.

8.2.3. Surface and Ground Water Impacts

Surface and ground water impacts may be encountered during the construction phase, especially if construction takes place during the rainy season. The risk of contaminating such water sources can be increased by accidental spillage of oils and fuels and any other equipment used during construction; chemical contamination from construction materials such as cement, paint and mechanical fluids. This risk is minimised by the fact that the construction period will be a short term activity.

8.2.4. Health, Safety and Security Impacts

Due to a high demand of construction workers during this phase of the project, the deployment of a temporary construction workforce in Okahandja may be necessary. These types of projects, where construction workers have the opportunity to interact with the local community, create a significant risk for the development of social conditions and behaviors that contribute to the spread of HIV, AIDS and Covid-19. The Ministry of Environment, Forestry and Tourism has initiated a programme aimed at mainstreaming HIV and gender issues into environmental impact assessments. Safety and security aspects are a critical part of any construction activity and high standards have to be upheld for the duration of the construction period. The safety and security aspects pertain not only to Plot 59, but also in respect of the adjacent properties as it poses risk to potential theft and poaching activities. The placement of sufficient security personnel is critical.

8.2.5. Air Quality

During the construction phase fugitive dust and exhaust gases generated have a potential impact on the air quality of the area and its surroundings. Dust is a major component of air pollution and could negatively affect the health of nearby communities if not mitigated. Due to the proximity of the development site to the access road, traffic on this road is also at risk of being impacted by dust. Dust particles can carry gasses and odours. These are however short-term impacts. Dust is generated mainly from the following activities:

- Excavations and stockpiles during site clearance and preparation;
- Use of heavy vehicles, machinery and equipment;
- Procurement and transport of construction materials to the site.

8.2.6. Traffic Impacts

Traffic is expected to increase during the construction phase of the project. A number of trucks and other heavy machinery will be required to deliver, handle and position construction materials as well as to remove spoil material. Not only will the increase in traffic result in associated noise impacts, it will also impact on the vehicular traffic in the area. The use of slow moving heavy construction trucks has the potential to cause traffic jams. Traffic moving along the access road may be impacted the most during this phase.

8.2.7. Solid Waste Management

The construction activities will lead to the generation of significant amounts of solid waste mainly in the form of construction building rubble. This could have a negative environmental impact if not managed well. Therefore, enough waste bins and skip containers should be availed to manage the solid waste. All solid waste should be disposed of at the designated landfill site of Okahandja as approved by the local authority.

8.2.8. Storage and Utilisation of Hazardous Substances

Hazardous substances are regarded by the Hazardous Substance Ordinance (No. 14 of 1974) as those substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure in certain circumstances. It covers manufacture, sale, use, disposal and dumping as well as import and export. During the construction period, the use and storage of these types of hazardous substances, such as shutter oil, curing compounds, types of solvents, primers, adhesives and diesel, on-site, could have negative impact on the surrounding environment, if these substances spill and enter the environment.

8.2.9. Social Impacts

The project will result in long-term positive impacts as far as the social welfare of the affected community is concerned. There is potential of an influx of migrant workers into the town of Okahandja. This would boost the local economic development of the town as a result of an increase in consumers of goods, and spending power. The local community will benefit through preferential recruitment of local labour and procurement as far as possible.

8.3. Operational Phase Impacts

The operational phase impacts that have been identified are: environmental monitoring and evaluation; noise; waste management; Air Quality, social; and visual impact.

8.3.1. Environmental Monitoring and Evaluation

The Environmental Commissioner requires regular environmental monitoring and evaluations on environmental performance to be conducted on developments that have received environmental clearance, as well as the setting and monitoring of targets for improvement.

As part of this exercise bi-annual reports have to be submitted to the Office of the Environmental Commissioner for the validity of the environmental clearance certificate.

8.3.2. Noise Impacts

The operation of the plant will produce noise which may be disturbing to neighbouring property owners and fauna, as well as the operational staff. The operations will take place mainly within enclosed structures, which will mitigate most of the noise from the plant. Because of the large distances to the nearest properties it is unlikely that neighbouring properties will be negatively affected by the noise emanating from the plant. The International Finance Corporation (IFC) standards provide guidelines for acceptable noise levels for various settings, it will be recommended that noise levels are contained within the prescribed limits and that relevant technologies are employed to achieve this. The levels of noise produced by the plant are not expected to significantly affect the surroundings if managed properly.

8.3.3. Waste Management

With an increase in human activity on site, as well as the operational activity itself, it is likely that an increase in the generation of waste can be expected. The proponent must ensure that the site is also serviced by a service provider who offers formal waste management solutions in Okahandja. Provision should be made for adequate number of bins for the collection of solid waste, a designated place, properly secured so as not to allow waste to be blown away by the wind, should be identified where the waste is stored for collection by the waste contractor. This will ensure that the waste generated on site does not become a litter issue prior to removal, since there is potential for that scenario to develop if not managed correctly and adequately. Waste should be disposed of at a formally designated waste facility in Okahandja.

8.3.4. Social Impact

The construction and operation of the organic fertiliser plant will have a positive impact on the socio-economic status of Okahandja and its residents. This is due to the job opportunities that will be created both directly related to the plant operations and indirectly from supporting services; as well as the opportunities for skills development and on-site training. During the construction phase the required jobs will be higher, at approximately 50, but will scale down to about 12 people per shift afterwards when operations commence and fewer people are needed on a permanent basis. The establishment of the fertiliser plant will have a positive effect on the cost of fertiliser in the entire country.

8.3.5. Visual and Sense of Place Impacts

The proposed site which is intended for the fertiliser plant development is currently developed with existing infrastructure. The existing infrastructure will be improved and renovated to accommodate the proposed designs. The development will bring an increased

number of people to the area for various purposes, but mainly for work purposes. Individuals who live or frequent the area will experience a change in their sense of place. This may cause a feeling of invasion in the privacy and serenity of the area and surrounds. The extent of this disturbance will depend on how high they valued the initial aesthetic quality of the site. Therefore, the aesthetics quality of the new structures has to be pleasing and designed to blend in with the natural surrounds.

9. SUMMARY OF POTENTIAL IMPACTS

A summary of the significance of the potential impacts from the proposed project assessed above is included in **Table 7**. The **Tables 8 – 10** provide a summary of the mitigation measures proposed for the impacts.

Table 7: Overview of potential impacts

Impacts	Negative		Positive		No Impact
	Short Term	Long Term	Short Term	Long Term	
Planning and Design Phase					
1. Increased water extraction from subterranean sources		X			
2. Pollution of subterranean and surface water sources		X			
3. Odour		X		X	
4. Traffic	X				
Construction Phase					
5. Fauna and flora	X				
6. Noise	X				
7. Surface and groundwater	X				
8. Health, safety and security	X				
9. Air quality	X				
10. Traffic	X				
11. Waste management	X				
12. Hazardous substances	X				
13. Social	X				
Operational Phase					
14. Environmental monitoring and evaluation		X			
15. Noise		X			
16. Waste Management		X			
17. Social				X	
18. Visual		X			

Table 8: Proposed mitigation measures for the planning and design phase

PLANNING AND DESIGN PHASE IMPACTS	
Impact	**Mitigation Measures**
Increased water extraction from subterranean sources	• Water saving mechanisms should be incorporated within the proposed development's design and plans in order to reduce water demands. • Re-use of treated waste water should be considered wherever possible to reduce the consumption of potable water. • Adhere to water quality guidelines in terms of The Water Act, 1956. • Only indigenous trees and shrubs are to be used for landscaping purposes. • Where possible, water reclamation systems shall be installed. • Regular monitoring of boreholes shall be carried out. • Water will only be used for the purposes of the project and its employees and will not be given or sold to any other party. • Limitations are to be placed on the size of gardens for growing plantations for other purposes. • The proponent shall ensure that, where required, he has a valid permit from MAWLR at all times and conform to the requirements thereof.
Pollution of subterranean and surface water sources	• Ensure that, where relevant, all facilities are constructed in line with the requirements stipulated in the permit from MAWRL. • Ensure that all facilities are regularly inspected and supervised by a suitably experienced person. • Ensure that all facilities are not within 50 metres of ground or surface water sources. • Fertiliser spillage should be recovered and recycled to the process. • Appoint professional engineers to develop a detailed storm water management design as part of the infrastructure service provision of the development. • No dumping of waste products of any kind in or in close proximity to any water bodies. • Ensure that surface water accumulating on-site are channelled and captured through a proper storm water management system to be treated in an appropriate manner before disposal into the environment. • Wastewater should not be discharged directly into the environment. • Disposal of waste from the development should be properly managed. • Ensure consultation and compliance with relevant authorities responsible for services, such as the Municipality. • Risk of impact from this can be lowered through proper training of staff. • Storage and handling of potential contaminant sources to be restricted to designated areas.

PLANNING AND DESIGN PHASE IMPACTS	
Impact	**Mitigation Measures**
	• Installation of suitable containment structures and installation of spill containment areas around the operational areas. • Use a closed-handling system that transfers chemicals directly from a storage container to the application equipment. • Staff must be provided with emergency response procedures which they should be familiar with. • Fuel storage tank(s) should be placed in suitable containment structures, such as bund walls and/or plastic liners to avoid the spread of spills. • Staff should at all times be aware of the precautions associated with the handling of petroleum / chemical products as described in the relevant Material Safety Data Sheets. • A spill management plan should be written to ensure effective response to spills. Ensure all staff is familiar with the plan and it is regularly updated. The general response to any spill should be: (i) Contain the spill. Use booms or a sand/soil dam to prevent the spill from entering stormwater drains. Use the absorbents in the spill kit to soak up as much fuel as possible; (ii) Notify the site manager and/or local authority: (iii) Keep the public away from the spill; (iv) Contract a licensed waste • Proper containment mechanisms installed should be able to contain any spillage / leakages that might occur during the operation of the development. • Proper monitoring of the product levels in all storage must take place to eliminate overfilling. • Maintaining all project installations in good operating order is of paramount importance in preventing equipment failure. • Prevent discharge of any pollutants, such as cements, concrete, lime, chemicals, and hydrocarbons into nearby streams, stormwater systems and waterways. All hazardous wastes generated in the project area should be safely contained, transported and disposed of. • Where necessary, remove leaking vehicles, equipment and machinery from the project site immediately. • Equipment and materials to deal with spill cleanup must be readily available on site and staff must be trained as to how to use the equipment and briefed about reporting procedures. • Develop and implement a groundwater monitoring system and programme, with the aim of monitoring possible contamination to groundwater.

PLANNING AND DESIGN PHASE IMPACTS	
Impact	**Mitigation Measures**
	• Groundwater should be monitored in designated boreholes installed, and should be sampled and analysed regularly. • Use drip trays, linings or concrete floors when evidence of leaks are observed on operational vehicles, equipment and machinery. • Any leaks from reticulation lines should be repaired immediately and affected areas rehabilitated as needed. • Any spillage of hazardous substances including wastewater, chemicals, fuel, oil, paint or cleaning solvent must be contained, cleaned up immediately and disposed of at a designated disposal facility. • Ensure all stormwater drains or channels are clear of litter or obstructing material. • Remove all excess sedimentation or any other waste material present in waterways and dispose of in a suitable manner to ensure good drainage runoff. • Ensure that stormwater management systems are regularly maintained and tested, and are in good working order. • Develop and implement a stormwater management plan.
Odour	• The developer must ensure that odour from the operation is kept to a minimum through the following measures: • Ensure feedstock and the end products are stored and handled in an enclosed containment environment that minimises or eliminates odour for the nearby communities. • Locate manure storage facility away from sensitive receptors, they should be located in such a way that prevailing winds do not carry odours in the direction of the sensitive receptors. • Invest in a well-designed ventilation system in the factory and storage area, to maintain adequate supply of fresh air, remove access moisture and remove combustion gasses • Maintain good housekeeping practices in the storage and processing area at all times. • Focus at least an hour per day on housekeeping patrol, where stray and spillages are cleaned and picked up and put into a pile. • Ensure that the feedstock is quickly processed to avoid stockpiling which will lead to odour • Personnel should wear correct PPE whilst handling feedstock • Operation should keep a systematic record of odour complaints and must take actions on complaints received. • Provide natural or artificial barrier between facility and public eye. Planting several rows of fast growing trees or shrubs or high windbreak fence between manure storage and public roads and communities downwind can help filter and disperse odours from the facilities • Develop an odour control plan and train all staff to identify and mitigate odours • Park feedstock delivery vehicles away from sensitive receptors

PLANNING AND DESIGN PHASE IMPACTS	
Impact	**Mitigation Measures**
	• Proponent should invest in the application of chemical or biological additives which will eliminate or reduce odours on the feedstock when stockpiled for processing. • It is recommended that HP should stablish meteorological stations at the site for it to be used for modelling purposes and to determine trends and prevailing meteorological data in the area. • It is also proposed that a personnel monitoring programme is set up in accordance with the guidelines of the currently accepted practice and the Labour Act of Namibia to determine the exposure of personnel involved in the handling of material. • It is also recommended that the Air Quality Management Plan be implemented during the operational phases. All personnel should be trained/ inducted to understand air quality impacts and their respective roles in managing air quality impacts and ensure that controls are effectively implemented. • HP should ensure that they conduct regular inspection and employ external audits, to confirm that the mitigation measures are implemented and effective. • HP is recommended to run a clean, neat operation. To consider planting trees and shrubs to enhance appearance of the operation. To keep neighbours and public educated and informed about the processes and any plans for expansion and activities.
Traffic	• Ensure that road junctions have good sightlines. • Adhere to the speed limit. • Implement traffic control measures where necessary. • Ensure movement of heavy trucks are confined to daylight hours.

Table 9: Proposed mitigation measures for the construction phase

CONSTRUCTION PHASE IMPACTS	
Impact	**Mitigation Measures**
Fauna and flora	• Prevent contractors from collecting wood, veld food, etc. during the construction phase. • Do not clear cut the entire development site, but rather keep the few individuals shrubs and trees not directly affecting the development as part of the landscaping. • Transplant removed vegetation where possible, or plant new trees in lieu of those that have been removed.

CONSTRUCTION PHASE IMPACTS	
Impact	**Mitigation Measures**
Pressure on existing infrastructure	• Educate workforce on water and energy saving measures. • Ensure all potable water points are metered and regularly read. • Ensure that the workforce is provided with temporary toilets during the construction phase. • Designs and building materials should be as such to reduce dependency on artificial heating and cooling in order to limit the overall energy demand.
Surface and Ground Water	• It is recommended that construction takes place outside of the rainy season in order to limit flooding on site and to limit the risk of ground and surface water pollution. • Stabilise cleared areas as soon as possible to prevent and control surface erosion. • No dumping of waste products of any kind in or in close proximity to water bodies. • Heavy construction vehicles should be kept out of any surface water bodies and the movement of construction vehicles should be limited where possible to the existing roads and tracks. • Ensure that oil, lubricant and fuel spillages from construction vehicles and machinery are minimised and that where these occur, that they are appropriately dealt with. • Drip trays must be placed underneath construction vehicles when not in use to contain all oil and spillages that might be leaking from these vehicles. • Contaminated runoff from the construction sites should be prevented from entering the surface and ground water bodies. • All materials on the construction site should be properly stored. • Disposal of waste from the site should be properly managed and taken to the Okahandja landfill site. • Construction workers should be given ablution facilities at the construction site that are located at least 50 m away from any surface water and these should be regularly serviced. Run-off from these toilets due to overflows should be avoided at all cost. • Washing of personnel or any equipment should not be allowed on site. Should it be necessary to wash construction equipment this should be done at an area properly suited and prepared to receive and contain contaminated waters. • All major servicing and maintenance of vehicles and/or equipment should be conducted designated areas with suitable containment structures. • Spillage control procedures must be in place according to relevant SANS standards or better. Waste water collection systems should be connected to these systems.

CONSTRUCTION PHASE IMPACTS	
Impact	**Mitigation Measures**
	• The contractor shall ensure that there is always a supply of absorbent material readily available to absorb/breakdown minor hydrocarbon spillage at the construction site. • Proper environmental awareness and remedial response training of operators must be conducted on a regular basis.
Health, Safety and Security	• Provide sufficient security personnel. • Construction personnel should not overnight at the site, except for security personnel. • Ensure that all construction personnel are properly trained depending on the nature of their work. • Provide for a first aid kit and properly trained personnel to apply first aid when necessary. • A wellness program should be initiated to raise awareness on health issues, especially the impact of sexually transmitted diseases and Covid-19. • Provide free condoms in the workplace throughout the construction phase. • Facilitate access to Antiretroviral medication for construction personnel. • Conform to the stipulated protocols related to Covid-19. • Restrict unauthorised access to the site and implement access control measures. • Clearly demarcate the construction site boundaries along with signage of no unauthorised access. • Clearly demarcate dangerous areas and no go areas on site. • Staff and visitors to the site must be fully aware of all health and safety measures and emergency procedures. • The contractor/s must comply with all applicable occupational health and safety requirements. The workforce should be provided with all necessary Personal Protective Equipment where appropriate.
Air quality	• All loose material should be kept on site for the shortest possible time. • It is recommended that dust suppressants such as Dustex be applied to all the construction clearing activities to minimise dust. • Construction vehicles to only use designated roads. • During high wind conditions the contractor must make the decision to cease works until the wind has calmed down. • Cover any stockpiles with plastic to minimise windblown dust. • Ensure construction vehicles are well maintained to prevent excessive emission of smoke. • Maintain roads.

CONSTRUCTION PHASE IMPACTS	
Impact	**Mitigation Measures**
	• Limit vehicles and adhere to off road speed limit. • Ensure personnel wears correct PPE to prevent exposure to particulate matters.
Noise	• No amplified music should be allowed on site. • Inform neighbouring communities of construction activities to commence and provide for continuous communication between them and contractor. The Developer must ensure that noise levels are kept to minimum by implementing the following measures: • Install technology such as silencers on construction machinery. • Do not allow the use of horns/hooters as a general communication tool, but use it only where necessary as a safety measure. • Provide protective equipment such as ear muffs and ear plugs to workers. • Limiting operation of heavy earthmoving equipment and construction activities to normal working hours, and to normal work days (i.e. Monday to Friday, between 08h00 and 17h00). • The developer must display an all-hours telephone number on the site for emergency calls or complaints. • Vehicles and equipment must be properly serviced to avoid noise pollution. • Limit number and movement of vehicles and adhere to off road speed limit.
Traffic	• Limit and control the number of access points to the site. • Ensure that road junctions have good sightlines. • Construction vehicles need to be in a road worthy condition and maintained throughout the construction phase. • Transport the materials in the least amount of trips as possible. • Adhere to the speed limit. • Implement traffic control measures where necessary. • Minimise the movement of heavy vehicles during peak time. • Minimise the movement of vehicles on or close to the B1 and C31 Main Road.
Waste Management	• It is recommended that waste from the temporary toilets be disposed of at the Okahandja Wastewater Treatment Works, on a regular basis. • A sufficient number of weather and vermin proof waste bins should be placed around the site for the soft refuse. • A sufficient number of skip containers for the heavy waste and rubble should be provided for around the site.

CONSTRUCTION PHASE IMPACTS	
Impact	**Mitigation Measures**
	• The waste containers should be able to be closed to prevent birds and other animals from scavenging. • Empty bins regularly as required. • Solid waste will be collected and disposed of at an appropriate local landfill in Okahandja, in consultation with the local authority. • No disposal of /or burying of waste on site should be conducted. • Solid and liquid hazardous waste shall be stored in separate containers. Hazardous waste should be disposed of at the approved hazardous waste disposal site. • The hazardous waste storage is to be clearly marked to indicate the presence of hazardous substances, and the protocols associated with handling of such hazardous wastes shall be known by all relevant staff members.
Hazardous Substances	• All chemicals and other hazardous substances must be stored and maintained in accordance with the Hazardous Substances Ordinance (No. 14 of 1974), with all relevant licences and permits to be obtained where applicable. • Given the potential harm to human health during handling and use of any of hazardous substances it is essential that all staff be trained with regards to the proper handling of these substances as well as First Aid in the case of spillage or intoxication. • Storage areas for all substances should be bunded and capable to hold 120% of the total volume of a given substance stored on site.
Social	• Ensure locals enjoy priority in terms of job opportunities, to the extent possible, for skills that are available locally. • Ensure local procurement where commodities are available locally.
Geology and Topographical Impacts	• Excavations deeper than 1.5m should be cut back to not more than 75° of horizontal and that the ingress of water in and around any excavations must be prevented. • Ensure that good quality general fill is available on site and care should be taken when specifying engineered fills, that the required strengths are attainable without the need to import fills, or addition of lime or cement. • Provide adequate storm water surface drainage as per the storm water management plan as part of the infrastructural development of the site.

CONSTRUCTION PHASE IMPACTS	
Impact	**Mitigation Measures**
	• All stockpiles must be restricted to designated areas and are not to exceed a height of 2m. • All stockpiles created during the construction phase must be removed before the operational phase. • The contractor must be limited to clearly defined access routes to ensure that sensitive and undisturbed areas are not disturbed. • Demolition of existing infrastructure on site and construction activities should preferably take place during dry months. • All surfaces that are susceptible to erosion should be covered with a suitable vegetation cover as soon as construction is completed. • All surface run-off must be managed in such a way so as to ensure erosion of soil does not occur.

Table 10: Proposed mitigation measures for the operational phase

OPERATIONAL PHASE IMPACTS	
Impact	**Mitigation Measures**
Environmental monitoring and Evaluation	• An Environmental Practitioner should monitor the implementation of the EMP, and recommend any changes to this document when necessary. • The Environmental Practitioner should inspect the site on a regular basis (preferably monthly or bi-monthly). • Biannual reports are to be submitted to the Environmental Commissioner.
Noise	• Limit the types of activities that generate excessive noise. • All areas where noise levels are above 85 dB should be managed and controlled in accordance with the relevant guidelines. • Continuous monitoring of noise levels should be conducted to make sure the noise levels do not exceed acceptable limits. • Maintain equipment used during the operation and keep them in a good state such that they do not emit excessive noise.

OPERATIONAL PHASE IMPACTS	
Impact	**Mitigation Measures**
	• No activity having a potential noise impact should be allowed after 18:00 if possible. • Conduct noise monitoring network around the boundary of the project and at the nearest farms to ensure that that noise is within acceptable limits. • Personnel should wear correct hearing PPE when working in noisy environment.
Waste management	• The area will be kept free of waste, except in designated waste storage areas. • Any wastes distributed by winds will be regularly cleaned up. • A sufficient number of waste bins should be placed around the site for the soft refuse. • A sufficient number of skip containers for the heavy waste and rubble should be provided for around the site. • Solid waste will be collected and disposed of at an appropriate local land fill. • Place priority on waste reduction, waste reuse and waste recycling, in that order. • All raw materials must be managed in accordance with the requirements for that specific raw material. • Wastewater generated from the fertilizer factory should be recycled, re-used, or collected for treatment to acceptable standards (as per MAWLF guidelines) and then released to the environment. • Any contaminated soil generated must be contained and disposed of accordingly.
Air Quality	• Implement dust suppression on unpaved roads by wetting with water, some chemical binders can be applied to the roads, e.g Spray with lignosulphonate or Dust-A-side. • Maintain roads. • Limit vehicles and adhere to off road speed limit. • Ensure personnel wears correct PPE to prevent exposure to particulate matters. • Building interiors and surfaces should be cleaned regularly. Strict adherence to housekeeping practices will help reduce dust levels. • Ensure proper and timely maintenance of feeders and handling equipment. • HP should undertake a gas monitoring exercise once a year to monitor the gases emitted during the operational process in order to ensure effectiveness of the technology and compliance.
Social	• Provide sufficient security personnel. • Operation personnel should not reside on site. • Ensure locals enjoy priority, in terms of job opportunities, for skills that are available locally, to the extent possible.

OPERATIONAL PHASE IMPACTS	
Impact	**Mitigation Measures**
	• Ensure local procurement where commodities are available locally.
Visual	• It is recommended that more 'green' technologies be implemented within the architectural designs and building materials of the development where possible in order to minimise the visual prominence of such a development within the more natural surrounding landscape. • Natural colours and building materials such as wood and stone should be incorporated. • Ensure that the infrastructure is designed and supervised by suitably qualified engineering professionals. • It is recommended that electricity demand for the operations be met with the same technology utilised in generation.

9.1. Decommissioning

A full decommissioning plan should be developed within the first 12 months of operation.

10. CONCLUSION AND RECOMMENDATIONS

10.1. Construction Phase Impacts

Most of the construction phase impacts were deemed to have a negative impact without mitigation. However, these were mostly short-term and can be significantly reduced with the mitigation measures proposed.

10.2. Operational Phase

During the operational phase the impacts of environmental monitoring and evaluation; noise; waste management, social and visual were assessed to have a long-term negative effect without mitigation. The impacts will however be significantly reduced when the recommended mitigation measures in the scoping report and environmental management plan (EMP) are implemented.

10.3. Level of Confidence in Assessment

With reference to the information available at this stage, the confidence in the environmental assessment undertaken is regarded as being acceptable for decision-making, in terms of the environmental impacts and risks. The Environmental Assessment Practitioner believes that the information contained within this ESR is adequate to allow MEFT: DEA to determine the environmental viability of the proposed project.

It is acknowledged that the project details may evolve during the detailed design and construction phases. However, these are unlikely to change the overall environmental acceptability of the proposed project and any significant deviation from what was assessed in this ESR should be subject to further assessment. If this was to occur, an amendment to the Environmental Authorisation may be required in which case the prescribed process would be followed.

10.4. Mitigation Measures

With the implementation of the recommended mitigation measures in this report as well as in the EMP, the significance of the planning and design, construction and operational phase impacts is likely to be reduced to a ***Low (negative)***. It is further extremely important to include an Environmental Control Officer (ECO) on site during the construction and operational phases of the proposed project to ensure that all the mitigation measures discussed in this report and the EMP are enforced.

It is strongly advised that the proponent appoint suitably qualified professionals to design and supervise the construction and installation of the services and other equipment and infrastructure.

It is noted that where appropriate, these mitigation measures and any others identified by the EC could be enforced as Conditions of Approval in the Environmental Authorisation.

10.5. Opinion with respect to the Environmental Authorisation

Regulation 15(j) of the EMA, requires *that the EAP include an opinion as to whether the listed activity must be authorised and if the opinion is that it must be authorised, any condition that must be made in respect of that authorisation*.

Based on the evidence produced during the assessment process, it is very unlikely, with the proposed mitigation, that this project will have any significant negative impacts on the environment. It is therefore recommended that a clearance certificate be issued for the project. It is recommended that the following conditions in respect of Air Quality and Hydrogeology should be included in the authorisation:

Hydrogeology

All known surface and groundwater risks can be minimised and managed through implementing preventative measures and sound management systems. The site specific Environmental Management Plan should be used as an on-site tool during all phases of the development.
It is recommended that:

- All operations of the organic fertilizer factory must be located on impermeable hard surfacing with engineered containment measures;
- Storage and handling of potential contaminant sources to be restricted to designated areas;
- Spill containment and clean-up kits must be readily available at the factory;
- Regular and effective training of employees who handle these potential contaminants; and
- A groundwater monitoring programme be implemented for the development.

Air Quality

- It is recommended that HP should establish meteorological stations at the site for it to be used for modelling purposes and to determine trends and prevailing meteorological data in the area.
- It is also proposed that personnel monitoring programme is set up in accordance with the guidelines of the currently accepted practice and the Labour Act of Namibia to determine the exposure of personnel involved in the handling of material.
- It is also recommended that the Air Quality Management Plan be implemented during the operational phases. All personnel should be trained/ inducted to understand air quality impacts and their respective roles in managing air quality impacts and ensure that controls are effectively implemented.
- HP should ensure that they conduct regular inspection and employ external audits, to ensure that that the mitigation measures are implemented and effective.

- HP is recommended to run a clean, neat operation. To consider planting trees and shrubs to enhance appearance of the operation. To keep neighbours and public educated and informed about the processes and any plans for expansion and activities.
- Although the new technology indicates a reduction in gas emissions, HP should undertake a gas monitoring exercise once a year to monitor the gases emitted during the operational process in order to ensure the effectiveness of the technology and compliance.
- The data will then dictate the frequencies of future monitoring.

11. REFERENCES

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