CONSTRUCTION AND OPERATIONS OF A WASTEWATER TREATMENT PLANT AT THE MUZII CLINIC, ZAMBEZI REGION

ENVIRONMENTAL ASSESSMENT SCOPING REPORT

Assessed by:

Assessed for:

Ministry of Health and Social Services

August 2022

Project:	**CONSTRUCTION AND OPERATIONS OF A WASTEWATER TREATMENT PLANT AT THE MUZII CLINIC, ZAMBEZI REGION: ENVIRONMENTAL ASSESSMENT SCOPING REPORT**	
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SUMMARY

The Ministry of Health and Social Services (the Proponent) appointed Geo Pollution Technologies (Pty) Ltd to undertake an environmental assessment for the construction and operations of a wastewater treatment plant at the Muzii Clinic, Zambezi Region. The Muzii clinic is a newly constructed primary health care facility aimed at providing primary health care to the residents of the Muzii Village and the north-eastern areas of the Kabbe South Constituency. The clinic will provide treatment of basic emergencies, follow-up treatment of chronic diseases, emergency maternity services and HIV testing and counselling. A treatment plant for domestic sewage is required to service the clinic and staff accommodation at the facility. Due to the flood prone environment, typical sewage handling facilities like french drains, septic tanks or oxidation ponds are not permitted. A fully contained, aboveground, biological wastewater treatment plant will thus be installed which will treat sewage effluent to a Namibian standard, safe for disposal into the environment.

The environmental assessment was conducted to determine all environmental, safety, health and socio-economic impacts associated with the construction and operations of the facility (wastewater treatment plant). Relevant environmental data was compiled by making use of secondary data and from a reconnaissance site visit. Based on the information gathered, environmental and social impacts that may potentially realise as a result of the construction and operations of the wastewater treatment plant, were identified and are addressed in this report. It is recommended that the environmental management plan accompanying this document be implemented, and that regular monitoring of environmental performance be conducted to confirm regulatory compliance. Where non-compliance is detected, corrective measures should be implemented.

The clinic, once operational will provide essential primary health care services to the residents of Muzii and the area. During construction and operations of the clinic and its associated wastewater treatment plant, employment is provided for execution of construction and operational tasks. Through employment and contracts, the spending power of the local and regional community is increased.

Potential negative impacts that may arise from the construction and operations of the facility include potential groundwater, surface water and soil contamination by fuel and / or sewage, waste (pollution), and more specifically untreated sewage. Ecological impacts are also related to such pollution of the environment. During construction noise will be a temporary impact. Fires can originate from irresponsible use of equipment that may cause heat or sparks, or from making fires near vegetation or leaving such fires unattended.

Implementing a safety, health, environment and quality (SHEQ) policy will contribute to effective management procedures to prevent and mitigate impacts. All legislation and associated regulations applicable to the facility and its operations (e.g. water/effluent related legislation) should be adhered to. Through adherence to these, health impacts among staff and residents of the village, pollution of the environment, uncontrolled fires, etc. can be prevented. This will also require regular training of key staff on aspects such as firefighting, first aid, waste management plans and emergency response plans. As no formal waste disposal facility is available, all waste produced must be regularly burnt to prevent contamination of the environment. Hazardous waste must however be transported off site for disposal at an approved hazardous waste disposal site.

By implementing the actions prescribed in the environmental management plan, during all phases (planning, construction, operations and decommissioning) of the facility, the positive impacts can be maximised while preventing or reducing the negative impacts to acceptable levels. All monitoring and records kept should be included in bi-annual reports to ensure compliance with the environmental management plan and the requirements of the Ministry of Environment, Forestry and Tourism. Parties responsible for transgression of the environmental management plan should be held responsible for any rehabilitation and corrective action that may need to be undertaken.

Impact summary class values

Impact Category	Impact Type	Construction	Operations
	Positive Rating Scale: Maximum Value	5	5
	Negative Rating Scale: Maximum Value	-5	-5
EO	Employment	2	2
EO	Skills, Technology and Development	2	2
SC/EO	Demographic Profile and Community Health	-1	3
SC/EO	Health, Safety and Security	-2	-2
PC	Noise	-2	
EO	Fire	-3	-4
PC/BE	Waste production	-2	-2
PC/BE	Ecosystem and Biodiversity Impact	-1	-1
PC	Flood Damage to Infrastructure		-3
PV/BE	Groundwater, Surface Water and Soil Contamination	-2	-3
SC/EO	Visual Impact	-2	-2
PC/BE/SC/EO	Cumulative	-2	-2

BE = Biological/Ecological *EO = Economical/Operational* *PC = Physical/Chemical* *SC = Sociological/Cultural*

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LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
BE	Biological/Ecological
DWA	Department of Water Affairs
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EMA	Environmental Management Act No 7 of 2007
EMP	Environmental Management Plan
EMS	Environmental Management System
EO	Economic/Operational
ES	Environmental Classification
GPT	Geo Pollution Technologies
HIV	Human Immunodeficiency Virus
IAPs	Interested and Affected Parties
IUCN	International Union for Conservation of Nature
mbs	Metres below surface
MEFT	Ministry of Environment, Forestry and Tourism
mm/a	Millimetres per annum
MSDS	Material Safety Data Sheet
PC	Physical/Chemical
PPE	Personal Protective Equipment
ppm	Parts per million
SANS	South African National Standards
SC	Sociological/Cultural
SHEQ	Safety, Health, Environment and Quality
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization

GLOSSARY OF TERMS

Alternatives - A possible course of action, in place of another, that would meet the same purpose and need but which would avoid or minimize negative impacts or enhance project benefits. These can include alternative locations/sites, routes, layouts, processes, designs, schedules and/or inputs. The "no-go" alternative constitutes the 'without project' option and provides a benchmark against which to evaluate changes; development should result in net benefit to society and should avoid undesirable negative impacts.

Assessment - The process of collecting, organising, analysing, interpreting and communicating information relevant to decision making.

Biological Filter: - Biological process whereby sewage is distributed and slowly trickles over a bed containing media that houses microorganisms. Latter oxidise the biodegradable matter contained in sewage aerobically (DWAF, 2008. Code of Practice Volume 3 *Biological Filtration System: Trickling Filters General Guideline*.)

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

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

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

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

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

Environmental Impact Assessment (EIA) - process of assessment of the effects of a development on the environment.

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

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

Evaluation – means the process of ascertaining the relative importance or significance of information, the light of people's values, preference and judgements in order to make a decision.

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

Interested and Affected Party (IAP) - any person, group of persons or organisation interested in, or affected by an activity; and any organ of state that may have jurisdiction over any aspect of the activity.

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

Proponent (Applicant) - Any person who has submitted or intends to submit an application for an authorisation, as legislated by the Environmental Management Act no. 7 of 2007, to undertake an activity or activities identified as a listed activity or listed activities; or in any other notice published by the Minister or Ministry of Environment, Forestry and Tourism.

Public - Citizens who have diverse cultural, educational, political and socio-economic characteristics. The public is not a homogeneous and unified group of people with a set of agreed common interests and aims. There is no single public. There are a number of publics, some of whom may emerge at any time during the process depending on their particular concerns and the issues involved.

Scoping Process - process of identifying: issues that will be relevant for consideration of the application; the potential environmental impacts of the proposed activity; and alternatives to the proposed activity that are feasible and reasonable.

Significant Effect/Impact - means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

Stakeholder Engagement - The process of engagement between stakeholders (the proponent, authorities and IAPs) during the planning, assessment, implementation and/or management of proposals or activities. The level of stakeholder engagement varies depending on the nature of the proposal or activity as well as the level of commitment by stakeholders to the process. Stakeholder engagement can therefore be described by a spectrum or continuum of increasing levels of engagement in the decision-making process. The term is considered to be more appropriate than the term “public participation”.

Stakeholders - A sub-group of the public whose interests may be positively or negatively affected by a proposal or activity and/or who are concerned with a proposal or activity and its consequences. The term therefore includes the proponent, authorities (both the lead authority and other authorities) and all interested and affected parties (IAPs). The principle that environmental consultants and stakeholder engagement practitioners should be independent and unbiased excludes these groups from being considered stakeholders.

Sustainable Development - “Development that meets the needs of the current generation without compromising the ability of future generations to meet their own needs and aspirations” – the definition of the World Commission on Environment and Development (1987). “Improving the quality of human life while living within the carrying capacity of supporting ecosystems” – the definition given in a publication called “Caring for the Earth: A Strategy for Sustainable Living” by the International Union for Conservation of Nature (IUCN), the United Nations Environment Programme and the World Wide Fund for Nature (1991).

1 BACKGROUND AND INTRODUCTION

The Ministry of Health and Social Services (the Proponent) appointed Geo Pollution Technologies (Pty) Ltd to undertake an environmental assessment for the construction and operations of a wastewater treatment plant at the Muzii Clinic, Zambezi Region (Figure 1-1). The Muzii clinic is a newly constructed primary health care facility aimed at providing primary health care to the residents of the Muzii Village and the north-eastern areas of the Kabbe South Constituency. The clinic will provide treatment of basic emergencies, follow-up treatment of chronic diseases, emergency maternity services and HIV testing and counselling. A treatment plant for domestic sewage is required to service the clinic and staff accommodation at the facility. Due to the flood prone environment, typical sewage handling facilities like french drains, septic tanks or oxidation ponds are not permitted. A fully contained, aboveground, biological wastewater treatment plant will thus be installed which will treat sewage effluent to a Namibian standard, safe for disposal into the environment.

A risk assessment was undertaken to determine the potential impacts of the construction, operations and maintenance, and possible decommissioning phases of the wastewater treatment plant on the environment. The environment being defined in the Environmental Assessment Policy and Environmental Management Act as "land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, paleontological or social values".

The environmental assessment was conducted to apply for an environmental clearance certificate in compliance with Namibia's Environmental Management Act (Act No 7 of 2007) (EMA).

Project Justification – Community members from the Muzii area have to travel long distances to reach the nearest clinic. The two nearest villages with clinics are: Luhonono (previously known as, and often still referred to as, Schuckmansburg) 25 km northwest of Muzii; and Itomba 13.5 km to the west. Most of the land area is however flooded and inaccessible to vehicles for most of the year. The commute to visit a clinic would then entail a boat trip on the Zambezi River to Luhonono. A journey of up to two hours one way, if a small motorised boat is available. The presence of a clinic to provide basic health care is thus urgently needed in the area. To ensure environmental protection and safety for residents, a properly designed and operated wastewater treatment plant is required to service the clinic.

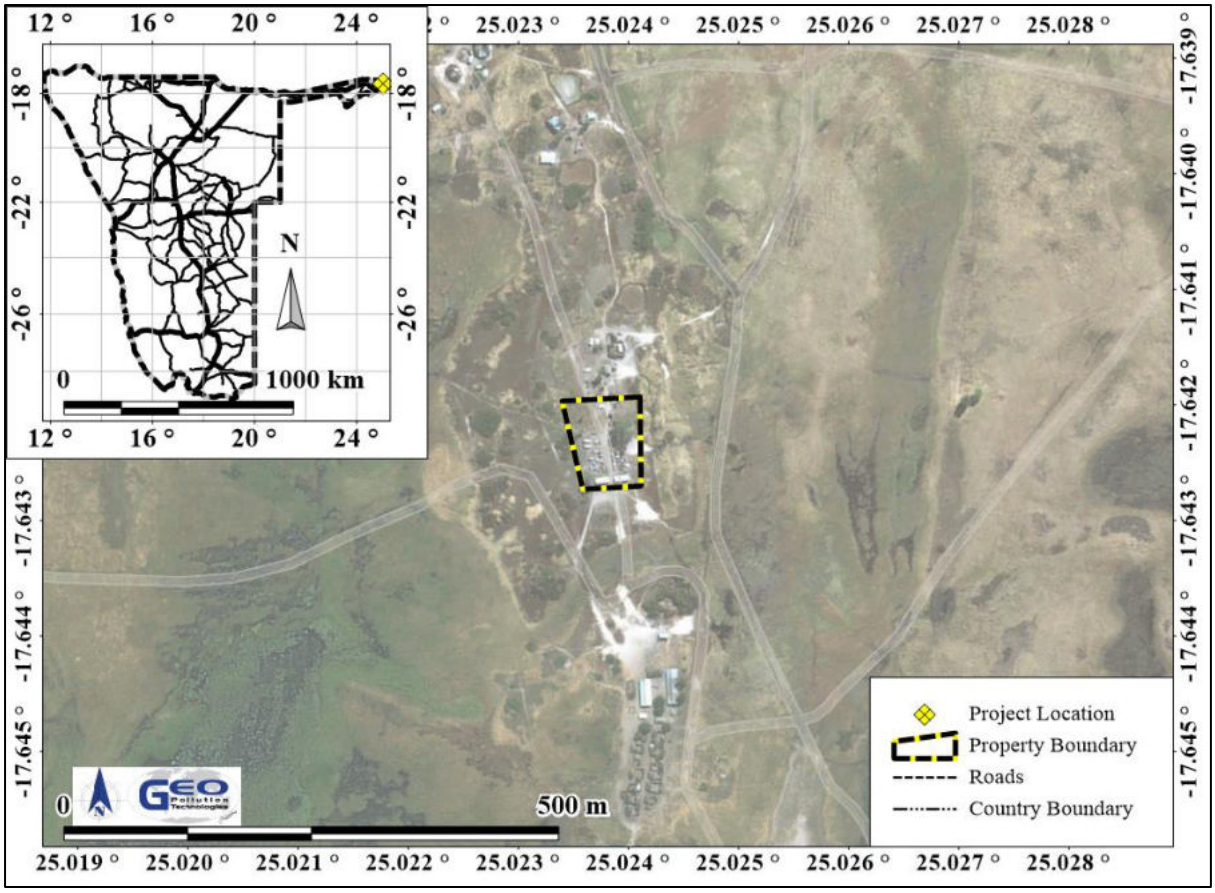

Figure 1-1 Project location

2 SCOPE

The scope of the environmental assessment is to:

1. Determine the potential environmental impacts emanating from the construction, operational (including maintenance) and possible decommissioning activities of the wastewater treatment plant.
2. Identify a range of management actions which could mitigate the potential adverse impacts to acceptable levels.
3. Comply with the requirements of EMA.
4. Provide sufficient information to the relevant competent authority and the Ministry of Environment, Forestry and Tourism (MEFT) to make an informed decision regarding the proposed wastewater treatment plant.

3 METHODOLOGY

The following methods were used to investigate the potential impacts on the social and natural environment due to the construction, operational and possible decommissioning activities of the plant:

1. Baseline information about the site and its surroundings was obtained from existing secondary information as well as from a reconnaissance site visit, conducted on 04 August 2022.
2. As part of the scoping process to determine potential environmental impacts, interested and affected parties (IAPs) were consulted about their views, comments and opinions all of which are presented in this report.
3. Based on the gathered information, potential impacts were identified and assessed. These are presented in this report together with preventative and mitigating procedures.

4 PROJECT DESCRIPTION

Construction of the clinic is a challenging venture due to the flooded terrain for most of the year. Two partly completed buildings and a small photovoltaic plant have already been constructed on site and all materials were transported to the nearest location on the Zambezi River, by boat. From there, it was transported to the site for the remaining one kilometre by ox-drawn cart. Water supply infrastructure and the wastewater treatment plant have not been established.

The general layout of the clinic and associated wastewater handling and treatment infrastructure is presented in Figure 4-1. The wastewater treatment plant is proposed to be constructed north-east of the main clinic building.

A wastewater treatment plant capable of treating 10 m^3 of wastewater per day is required. The main requirement for the wastewater treatment plant is, that it should be a fully contained system, installed above ground, which does not pose environmental and health threats during times of flooding. Various companies supply such pre-fabricated modular systems which can be customised according to the expected sewage volume to be treated. These systems function on a combination of anaerobic and aerobic treatment steps and if a final chlorination step is added, the effluent should be safe for disposal (e.g. in a soakaway) or for irrigation use. Figure 4-2 indicates the various stages of the wastewater treatment process proposed for the Muzii Clinic. A brief description of the steps follows below.

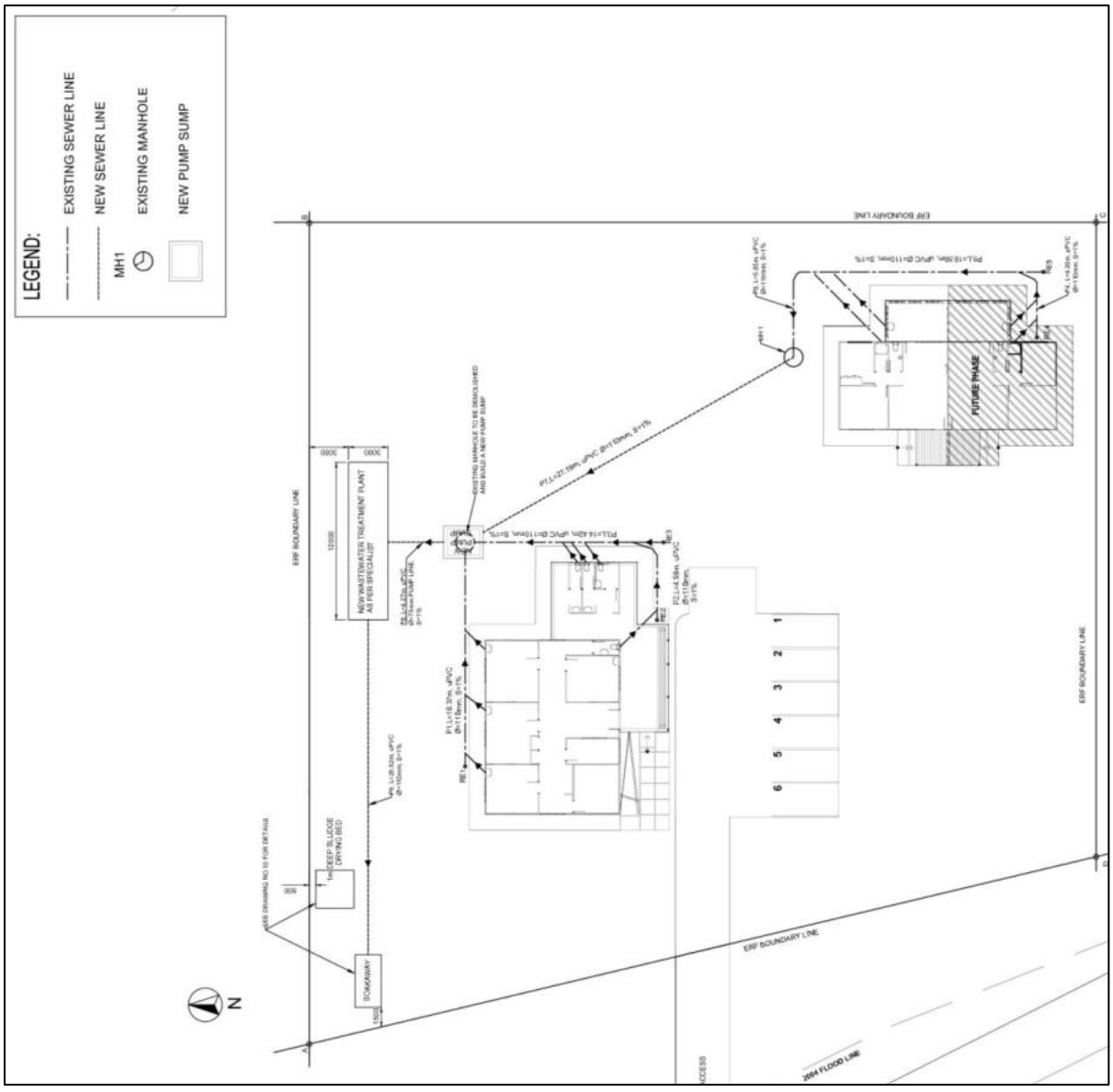

Figure 4-1 General site layout

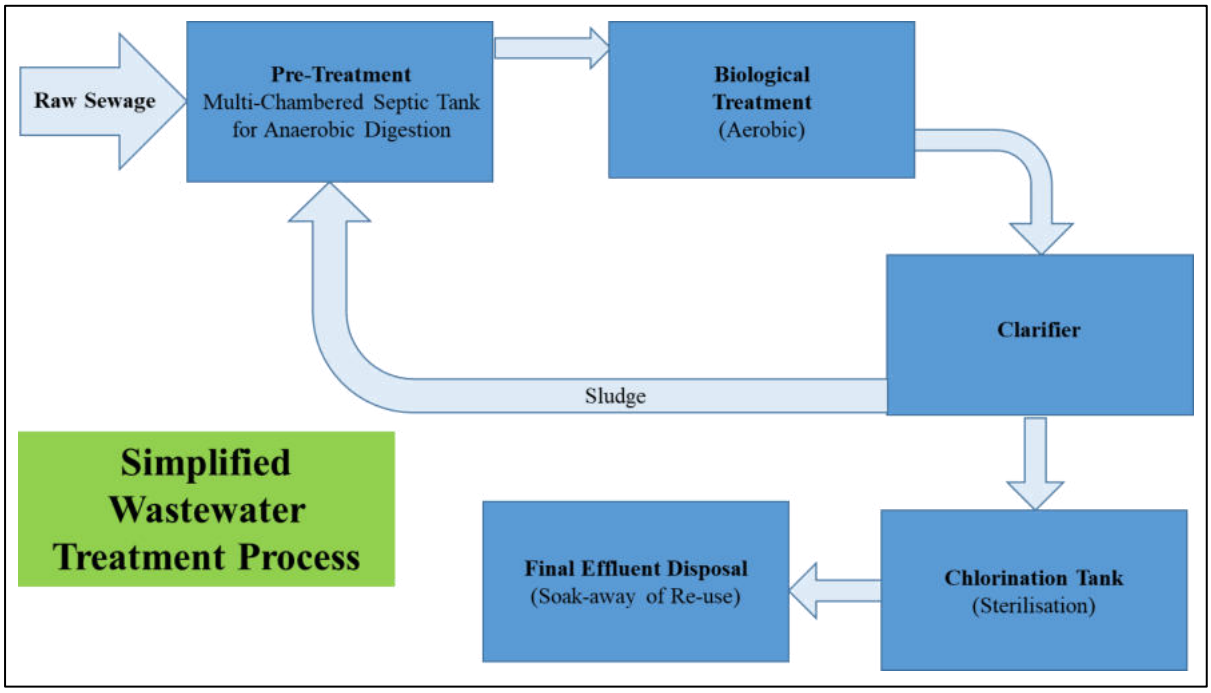

Figure 4-2 Simplified wastewater treatment process as proposed for the Muzii Clinic

4.1.1 Raw Sewage Collection and Receipt

All black- and grey- water (raw sewage) from the ablution facilities of the clinic collect in sewer pipes and are transferred to the wastewater treatment plant via a sump pump. This raw sewage enters a septic tank for pre-treatment.

4.1.2 Pre-Treatment

Pre-treatment occurs in a septic tank with two or three chambers. For the pre-fabricated modular systems, the septic tanks are not the standard concrete tanks constructed in the ground, but are surface tanks, typically of a high quality and durable plastic. Raw sewage will be a mixture of solids and liquids and will include substances like surfactants (soap) and oils (body lotions). The aim of pre-treatment is to prevent solids from entering subsequent treatment steps as well as to start the digestion process of such solids. It typically is a process of sedimentation and anaerobic digestion. The septic tank is a one or two chamber tank system although more chambers can be added in series. In the standard two chamber system, raw sewage enter the first chamber and solids settle to the bottom. Anaerobic digestion of solids occur here in the presence of anaerobic bacteria. The liquid part, containing a reduced amount solids, is allowed to flow into the second chamber where sedimentation of finer particles is allowed and more anaerobic digestion occurs. The effluent from the second tank is relatively clear and will proceed into an aerobic stage of treatment. Although the digestion of solids in the septic tank system is relatively efficient (depending on the design and efficiency of the system), it may be required to remove the solids (sludge) from time to time for disposal at a suitable location.

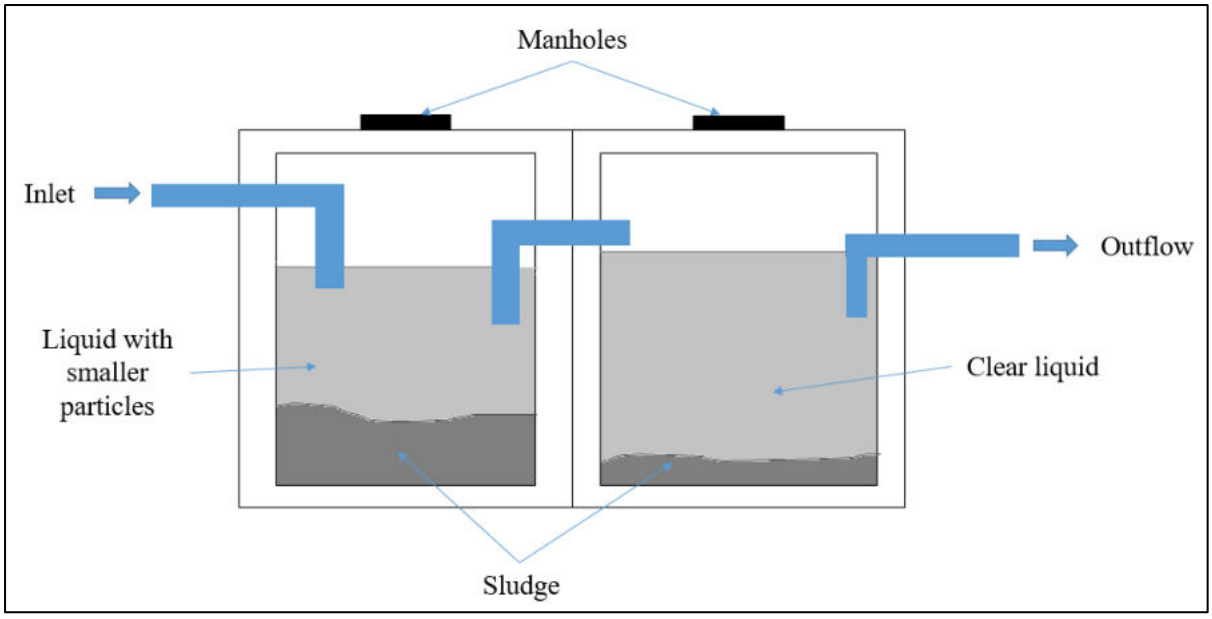

Figure 4-3 Typical septic tank design

4.1.3 Aerobic Treatment

The second stage of the treatment process is an aerobic stage where micro-organisms in the presence of oxygen degrades remaining organic material and some inorganic material (e.g. nitrite and nitrate) within the effluent form the pre-treatment process. For aerobic treatment to work optimally there are several requirements that must be met. These are: 1) the presence of an abundance of micro-organisms that can include bacteria, ciliates, protozoans and many other organisms; 2) the presence of sufficient oxygen that typically is present in the wastewater, but can also be increased by passing air through the water; 3) a large surface area covered by the micro-organisms (biofilm) which is achieved by the presence of media (e.g. coke, pumice, clinker, gravel, plastic and geotextile); 4) slow passage of wastewater over the biofilm as well as equal distribution of water over the biofilm.

A typical example of an aerobic treatment process is a trickling filter. Wastewater is trickled over biofilm covered media to allow the oxidation (and sometimes reduction) of organic and inorganic materials. The wastewater is circulated through the system to allow it to pass over the media multiple times to allow maximum treatment. Organic particles and dead microorganism are collected in the process as sludge that must be discarded. Effluent from the aerobic treatment process will contain micro-organisms and is therefore not suitable for applications where human contact or ingestion of water can occur. Thus, a sterilisation step is required.

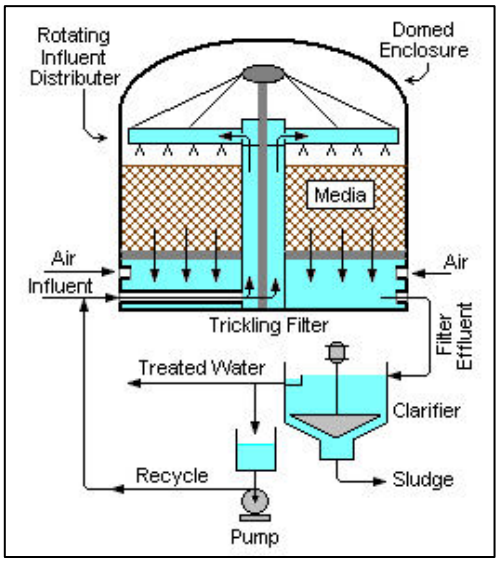

Figure 4-4 Typical trickling filter design

4.1.4 Clarifying

A clarifying step often follows the aerobic treatment phase and its purpose is to remove very fine particles that remain in the effluent. Such particles are returned to the pre-treatment phase to allow for complete digestion.

4.1.5 Sterilisation

The effluent from the aerobic process is sterilized by either chlorination or by radiation using an ultraviolet light or a combination of both. These steps kills off any micro-organisms that is present in the treated water.

4.2 FINAL EFFLUENT

Final effluent will be released into the environment in a constructed soak-away (Figure 4-5 and Figure 4-6). The soak-away will be covered to prevent storm water or flood water from entering. Final effluent must conform to the standards and requirements for effluent discharged into the environment, as per Section 21(1) and 21(2) of the Water Act (Act of 54 of 1956) and that purified water shall comply with "General Standards" as laid out in Government Gazette Regulation R553 of 5 April 1962 (see Appendix A).

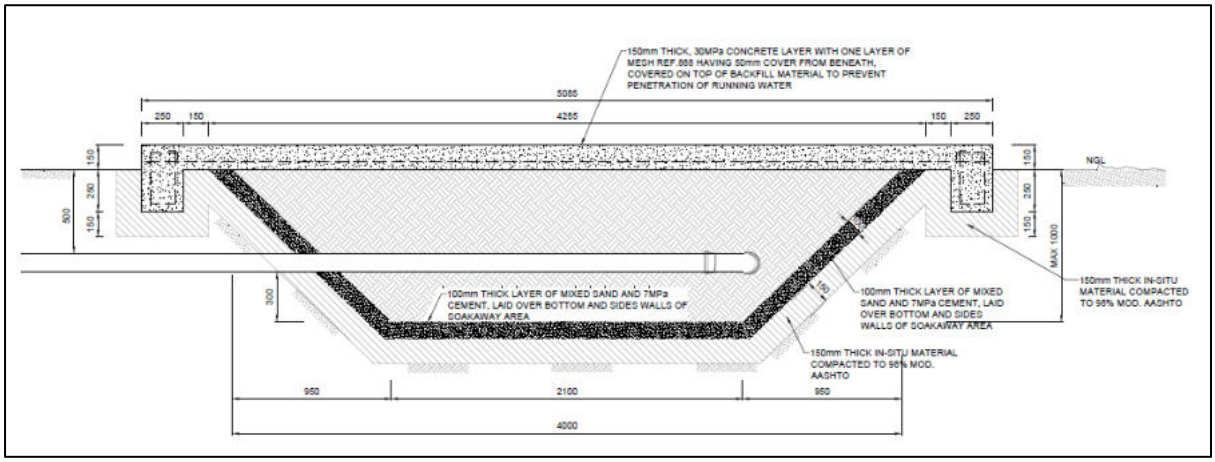

Figure 4-5 Soak-away longitudinal section

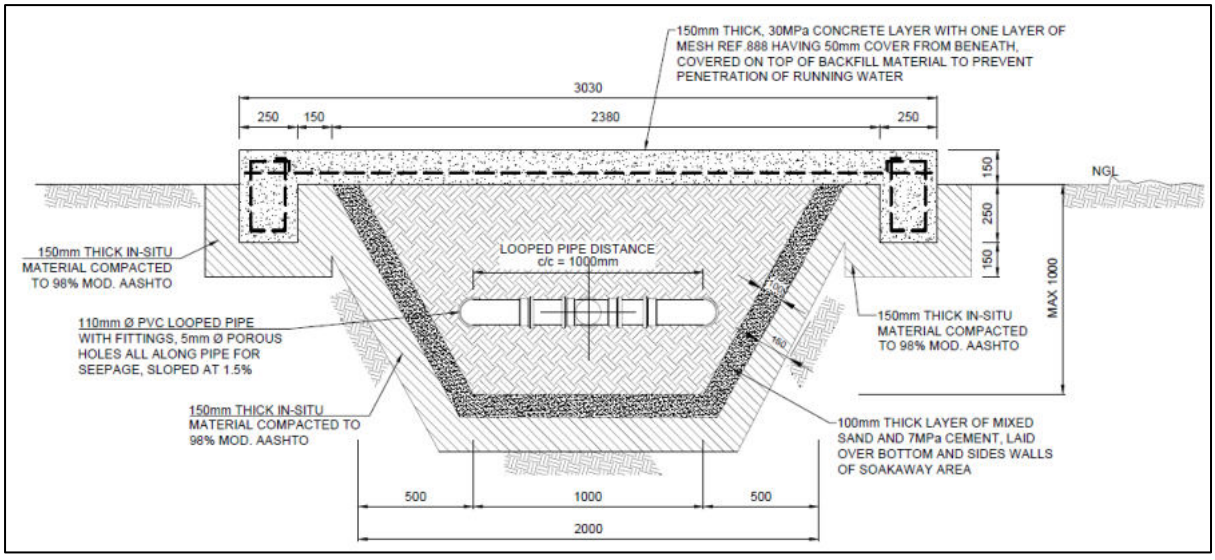

Figure 4-6 Soak-away cross section

4.3 SLUDGE

Indigestible sludge will accumulate in the treatment plant and this will require period removal and disposal. A sludge drying bed is proposed for disposal of the removed sludge (Figure 4-7).

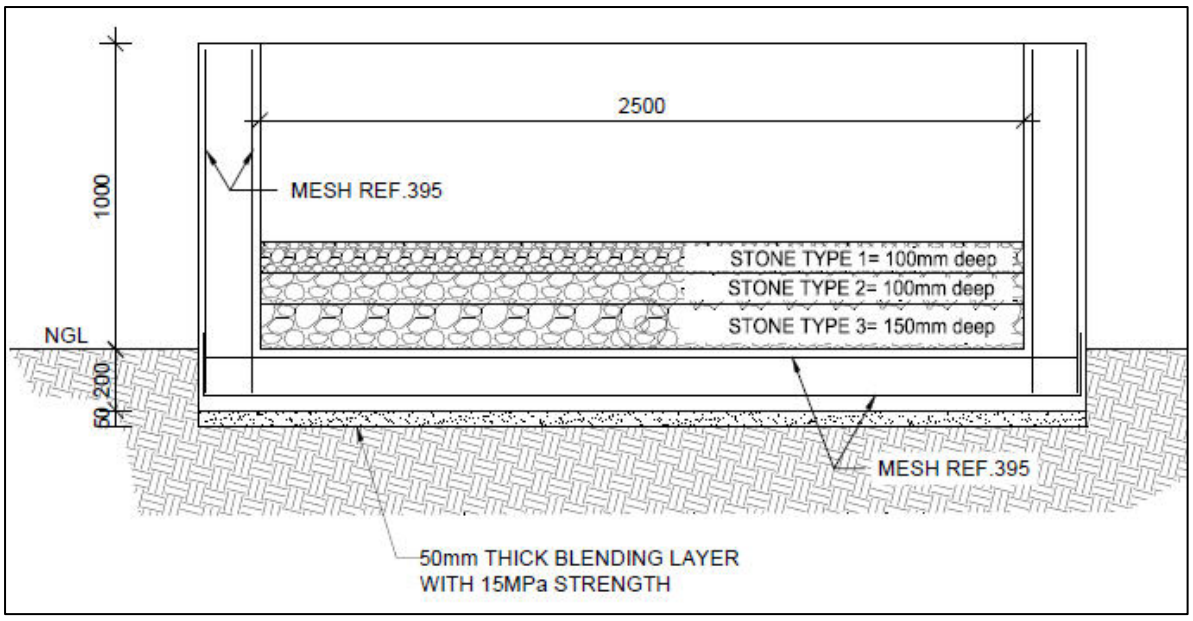

Figure 4-7 Sludge drying bed

4.1 General Operations

The wastewater treatment plant will require periodic maintenance and cleaning. This will be performed by trained individuals. Sludge will be disposed of in the sludge drying bed when required.

5 ALTERNATIVES

Various alternatives related to the project are considered and each of these alternatives are discussed. The alternatives can roughly be grouped into three main groups namely:

- Location alternatives;
- Project planning and design alternatives;
- No go alternative.

5.1 Location Alternatives

The clinic's location is dictated by the location of the village and the placement of the wastewater treatment plant is thus dictated by the location of the clinic. The plant cannot be located outside of the clinic's property. Surrounding areas are either occupied by the villagers or are prone to flooding. As such, no location alternative is thus proposed.

5.2 Project Planning and Design Alternatives

Wastewater treatment plant options considered are pit latrines, pond system, traditional septic tank with soak-away and biological treatment plants An alternative comparison of these are presented in Table 5-1.

Table 5-1 Alternative components considerations

Component	Advantages	Disadvantages	Preferred Alternative
Pit latrines	Cheap, quick and easy to install	Not suitable for shallow groundwater areas – i.e. pollution potential Not suited for handling effluent streams	Self-contained Biological Filtration System: Trickling Filter
Pond system	Can handle large volumes of effluent Simple to operate – no highly skilled operators necessary Low running costs	Large footprint Climate, topography and soil restrictions Presents drowning hazards for people and wildlife. Effluent not treated to standards acceptable for reuse. Can become odours if biological load becomes too high. Not suited to flood prone and heavy rainfall areas	
Biological Filtration System: Trickling Filters	Small footprint. Can treat effluent to a standard acceptable for environmental release Can be a contained system installed aboveground	More complicated operations with specialist involvement. Costly Dependant on electricity supply	
Septic tanks with soak-away	Relatively cheap and easy to install	Less efficient treatment of effluent when compared to trickling filters. Not suited to flood prone areas with shallow groundwater	

5.1 PROJECT PLANNING AND DESIGN ALTERNATIVES

The no-go alternative should not be considered since Muzii requires a clinic and the installation of a suitable wastewater treatment plant is imperative and an improvement on the status quo.

6 ADMINISTRATIVE, LEGAL AND POLICY REQUIREMENTS

To protect the environment and achieve sustainable development, all projects, plans, programmes and policies deemed to have adverse impacts on the environment require an environmental assessment, as per the Namibian legislation. The legislation and standards provided in Table 6-1 to Table 6-3 govern the environmental assessment process in Namibia and/or are relevant to the project.

Table 6-1 Applicable Namibian law

Law	Key Aspects
The Namibian Constitution	♦ Promote the welfare of people. ♦ Incorporates a high level of environmental protection. ♦ Incorporates international agreements as part of Namibian law.
Environmental Management Act Act No. 7 of 2007, Government Notice No. 232 of 2007	♦ Defines the environment. ♦ Promote sustainable management of the environment and the use of natural resources. ♦ Provide a process of assessment and control of activities with possible significant effects on the environment.
Environmental Management Act Regulations Government Notice No. 28-30 of 2012	♦ Commencement of the Environmental Management Act. ♦ List activities that requires an environmental clearance certificate. ♦ Provide Environmental Impact Assessment Regulations.
The Water Act Act No. 54 of 1956	♦ Remains in force until the new Water Resources Management Act comes into force. ♦ Defines the interests of the state in protecting water resources. ♦ Controls water abstraction and the disposal of effluent. ♦ Numerous amendments.
Water Resources Management Act Act No. 11 of 2013	♦ Provide for management, protection, development, use and conservation of water resources. ♦ Prevention of water pollution and assignment of liability. ♦ Not in force yet.
Forest Act (Act 12 of 2001, Government Notice No. 248 of 2001)	♦ Makes provision for the protection of the environment and the control and management of forest fires. ♦ Provides the licencing and permit conditions for the removal of woody and other vegetation as well as the disturbance and removal of soil from forested areas.
Forest Regulations: Forest Act, 2001 Government Notice No. 170 of 2015	♦ Declares protected trees or plants. ♦ Issuing of permits to remove protected tree and plant species.
Soil Conservation Act Act No. 76 of 1969	♦ Law relating to the combating and prevention of soil erosion, the conservation, improvement and manner of use of the soil and vegetation and the protection of the water sources in Namibia.
Local Authorities Act Act No. 23 of 1992, Government Notice No. 116 of 1992	♦ Define the powers, duties and functions of local authority councils. ♦ Regulates discharges into sewers.

Law	Key Aspects
Public and Environmental Health Act Act No. 1 of 2015, Government Notice No. 86 of 2015	♦ Provides a framework for a structured more uniform public and environmental health system, and for incidental matters. ♦ Deals with Integrated Waste Management including waste collection disposal and recycling; waste generation and storage; and sanitation.
Labour Act Act No 11 of 2007, Government Notice No. 236 of 2007	♦ Provides for Labour Law and the protection and safety of employees. ♦ Labour Act, 1992: Regulations relating to the health and safety of employees at work (Government Notice No. 156 of 1997).
Hazardous Substances Ordinance Ordinance No. 14 of 1974	♦ Applies to the manufacture, sale, use, disposal and dumping of hazardous substances as well as their import and export. ♦ Aims to prevent hazardous substances from causing injury, ill-health or the death of human beings.
Pollution Control and Waste Management Bill (draft document)	♦ Not in force yet. ♦ Provides for prevention and control of pollution and waste. ♦ Provides for procedures to be followed for licence applications.

Table 6-2 Relevant multilateral environmental agreements for Namibia and the development

Agreement	Key Aspects
Stockholm Declaration on the Human Environment, Stockholm 1972.	♦ Recognizes the need for a common outlook and common principles to inspire and guide the people of the world in the preservation and enhancement of the human environment.
Convention on Biological Diversity, Rio de Janeiro, 1992	♦ Under article 14 of The Convention, EIAs must be conducted for projects that may negatively affect biological diversity.

Table 6-3 Standards or codes of practise

Standard or Code	Key Aspects
Department of Water Affairs, Ministry of Agriculture Water and Forestry: Code of Practice Vol 3 Biological Filtration Systems	♦ Provides design parameters for wastewater treatment plants and the re-use of wastewater. ♦ Provides minimum requirements for the quality of wastewater.

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

Section 8 of Government Notice No. 29 of 2012: Water Resource Developments

♦ 8.6 Construction of industrial and domestic wastewater treatment plants and related pipeline systems:

8 ENVIRONMENTAL CHARACTERISTICS

This section lists pertinent environmental characteristics of the study area and provides a statement on the potential environmental impacts on each.

8.1 LOCALITY AND SURROUNDING LAND USE

The Muzii village is located in the far east of the Zambezi Region in the Kabbe South Constituency (17.642374°S; 25.023764 °E). The clinic is surrounded by informal residences of the local villagers. The nearest formal establishment is the Muzii Combined School, about 200 m to the south of the clinic. The Zambezi River is located approximately 1.2 km east of Muzii. Surrounding land use, by the villagers, is mainly cattle farming (subsistence farming) as well as fishing in the river.

Photo 8-1 Muzii Clinic

Photo 8-2 Muzii village

Photo 8-3 Muzii Combined School

Photo 8-4 Surrounding land

Implications and Impacts

The clinic will provide desperately needed primary health care in a remote area far removed from the nearest alternative health care facilities. It will thus be beneficial to the local community.

8.2 CLIMATE

According to the Köppen-Geiger Climate Classification system the project is located in a hot semi-arid climate (BSh) (http://koeppen-geiger.vu-wien.ac.at/present.htm). This means that the area receives precipitation below potential evapotranspiration, but not as low as a desert climate and have a mean annual temperature of at least 18°C.

Heavy rainfall here is mostly common between October and April, whilst May to September has little or no rainfall. The average annual rainfall typically exceeds 600 mm/a, making it one of the

highest rainfall areas in Namibia. It has a variation in rainfall of 24% and an average annual evaporation rate of between 2,400 and 2,600 mm/a.

Table 8-1 Summary of climate climatic conditions (Atlas of Namibia Project, 2002)

Average annual rainfall (mm/a)	more than 600
Variation in annual rainfall (%)	< 30
Average annual evaporation (mm/a)	2,400-2,600
Water deficit (mm/a)	less than 1,300
Average annual temperatures (°C)	21-22
Average solar radiation (kWh/m²/day)	6-6.2

Table 8-2 Rainfall statistics (Funk et al., 2015)

Month	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Minimum (mm/m)	48.41	20.59	6.56	6.74	0.00	0.00	0.00	0.00	0.00	8.07	16.95	31.98
Maximum (mm/m)	375.00	354.07	208.13	87.63	7.26	1.62	0.05	0.67	2.36	74.36	217.53	250.88
Average (mm/m)	149.0	128.7	72.9	22.5	0.4	0.1	0.0	0.0	0.3	26.0	70.4	130.4
Variability (%)	48.0	56.0	60.0	79.0	404.0	332.0	436.0	534.0	214.0	61.0	54.0	45.0
Daily maximum (mm)	47.6	47.8	39.9	36.8	7.3	1.3	0.1	0.7	2.4	29.2	33.8	52.0
Average rain days	17	13	9	3	0	0	0	0	0	4	10	17
Season July - June average: 609 mm				**Season coefficient of variation: 24 %**								
Data range	1981-Jul-01	to	2021-Jun-30							Lat: 17.6422°S Long: 25.0237°E		

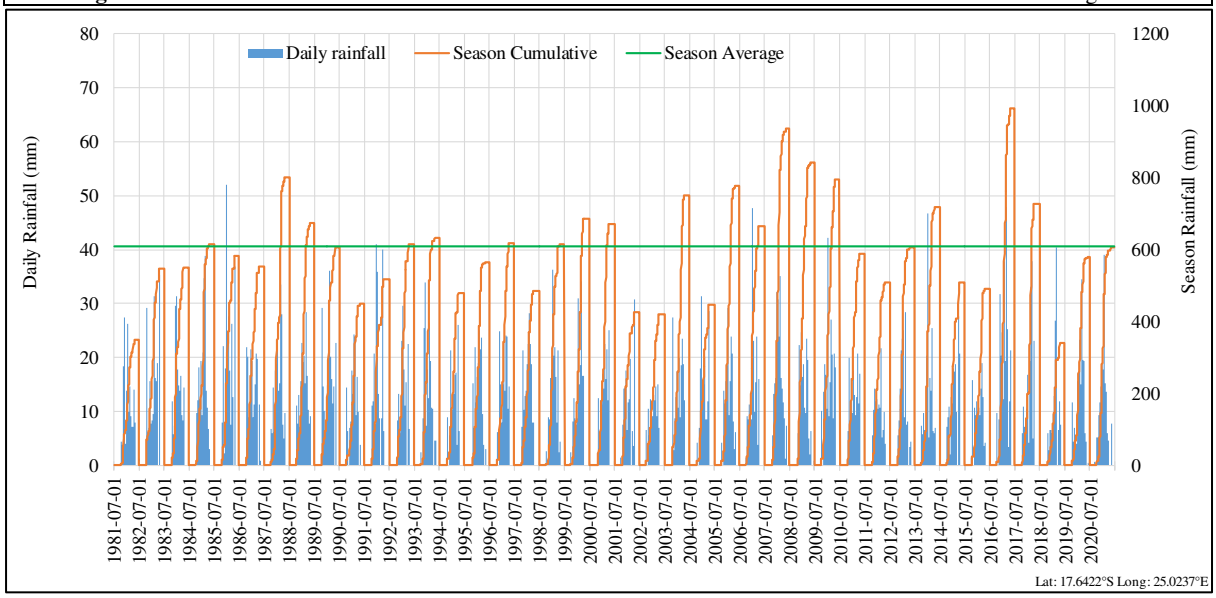

Figure 8-1 Daily and seasonal rainfall (Funk et al., 2015)

Implications and Impacts

Heavy rainfall events and annual flooding of the Zambezi River limits the type of wastewater treatment plants that can be considered for the area. Wastewater treatment design is important to prevent pollution of the environment and the Zambezi River, an international River with many downstream users and a rich ecology.

8.3 TOPOGRAPHY AND DRAINAGE

The topography of the general area is flat and pooling will mostly result during heavy rain events. The village itself is located on a slightly raised area. The surrounding areas becomes flooded for most of the year during and after the rainfall season of Namibia, Angola and Zambia. Muzii falls within a medium to high flood risk area (Figure 8-2). The site is located within the catchment of the Zambezi River, 1.2 km east, being a perennial river draining in an eastern direction.

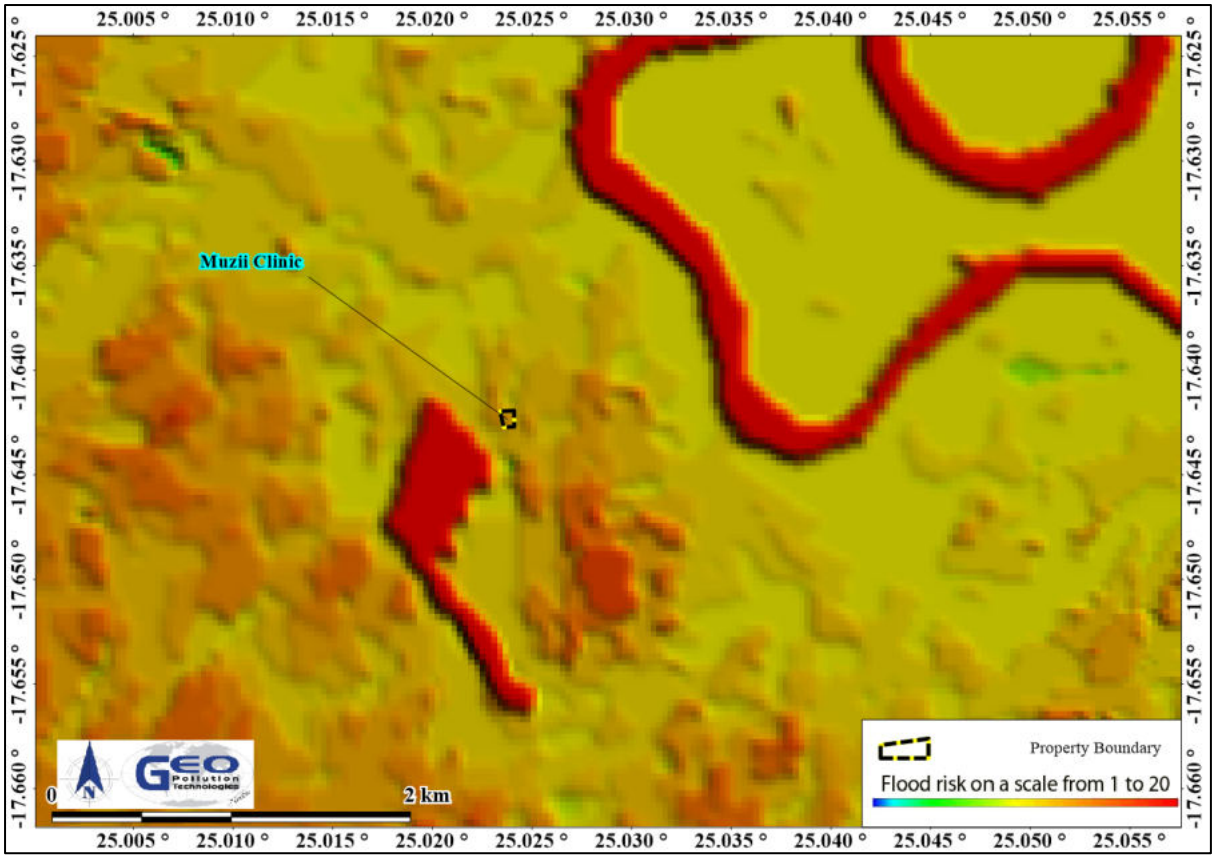

Figure 8-2 Flood risk of the general area

Implications and Impacts

The flood prone environment limits the options available for wastewater treatment. Wastewater treatment plants constructed below ground are impacted by rising groundwater levels during flooding and this results in pollution of the environment by sewage. Open systems are impacted by heavy rain. These have potential health and ecological consequences.

8.4 GEOLOGY AND HYDROGEOLOGY

Late Cretaceous to Quaternary Age Kalahari Group deposits rest unconformly over older pre-Kalahari rock formations and consist of a wide range of terrestrial sediments. These sediments originate mainly from fluvial deposition with some reworking through aeolian processes. The expected thickness of the surficial deposits at the project area is >100 m. The onset of Kalahari Group sedimentation is assumed to have started during the late Cretaceous (~ 65 Ma) when isostatic uplift of the continental margin of Namibia and South Africa started. Isostatic uplift led to the uplift of coastal escarpments and the evolution of the intracontinental hinterland basin where down warping took place. This down warping caused a change in drainage patterns into the Kalahari Basin that formed. Rifting took place at a later stage creating the Caprivi Graben as illustrated in Figure 8-3. A paleo-lake formed in the graben area, extending to include the current Okavango Delta and as far as the Makgadikgadi Pan. Groundwater quality deteriorated with an increase in salinity where the paleo-lake occurred due to the accumulation of evaporates over time. Thick deposits (>100 m) of mainly fine to coarse grained sandstone or semi consolidated sand occur in the area. In these sandy deposits thin layer of sillcrete, calcrete or clay occurs.

Groundwater in the area is poorly developed with no known boreholes within 5 km from the site, as per the Department of Water Affairs database. Note that this database might be outdated. As inferred from the surrounding area in the Caprivi Graben it is expected that fresh water perched aquifers are likely present, underlain by saline aquifers at depth. Groundwater is not extensively utilised due to the abundance of surface water in the area.

Groundwater flow in the Kalahari Sequence is expected to take place through primary porosity. Groundwater flow is inferred to be in a western direction (Figure 8-3), but local abstraction rates may have an influence it on it. The project location is situated in the Caprivi Groundwater Basin and it falls outside a water control area and therefore a permit is not required for drilling. All groundwater however remains the property of the Government of Namibia.

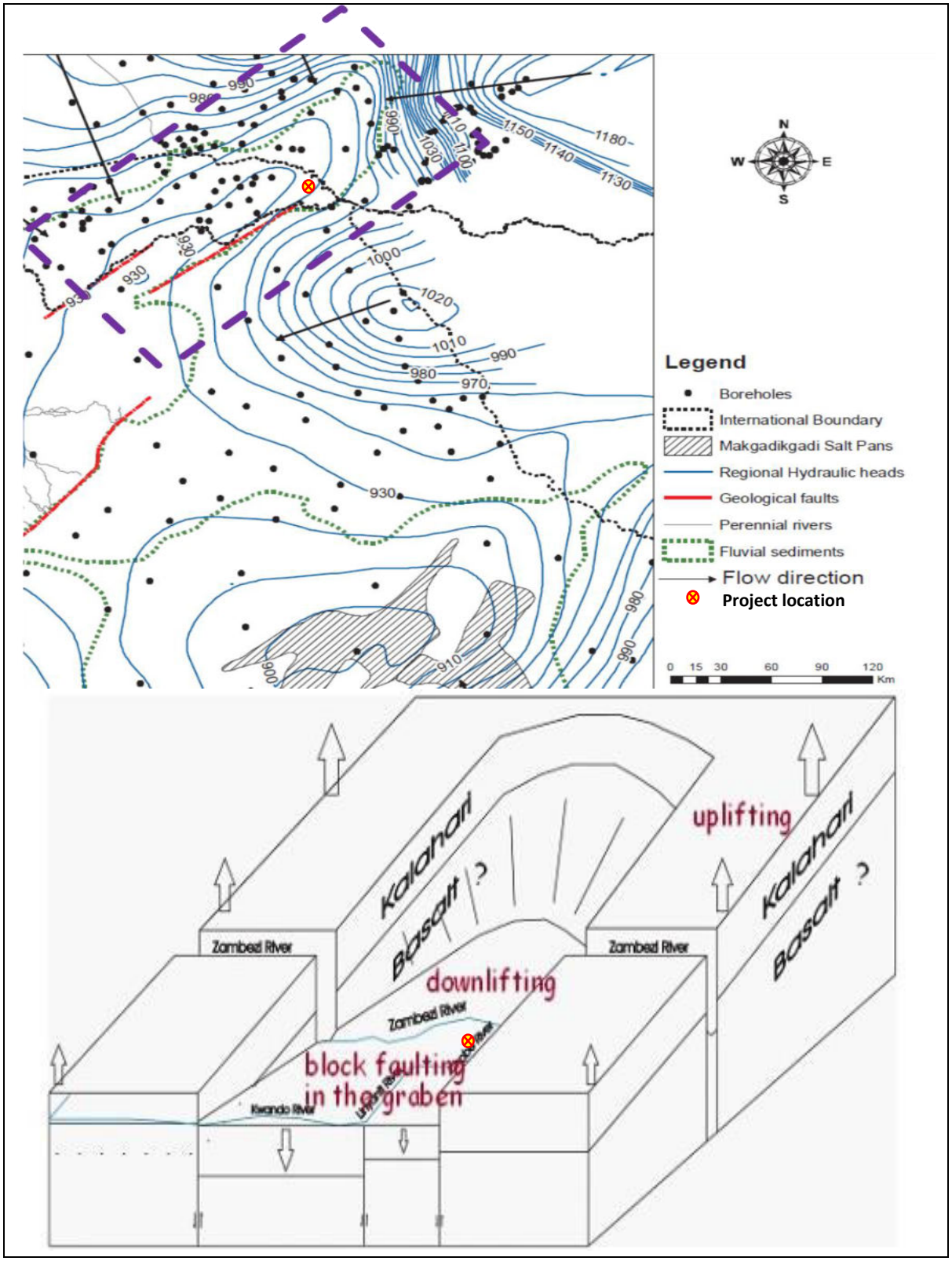

Figure 8-3 Regional hydraulic heads (Bäumle, 2018) with extent of rifting model of the Caprivi Graben setting

Implications and Impacts

A risk to groundwater pollution is expected due to the presence of shallow freshwater perched aquifers. Groundwater remains an important resource and would be at risk if hazardous substances or sewage are not contained, or if spills are not cleaned and disposed of properly.

8.5 PUBLIC WATER SUPPLY

No formal water supply scheme exist within the area.

Implications and Impacts

A groundwater supply scheme might in future be developed to supply the clinic and community. Groundwater pollution should thus be prevented.

8.6 FAUNA AND FLORA

The project area falls within the Savanna Biome with a Caprivi Floodplains vegetation type and grassland structure. Namibia's biodiversity pattern is characterised by low species diversity, but high endemism, in the west and southwest of the country, while high species diversity, but low levels of endemism, is present towards the northeast, where Muzii is located.

Plant diversity (for higher plant taxons) is expected to be high and in the vicinity of 400 to 500 species, the second highest diversity category for Namibia. Trees such as *Cynodon dactylon, Phragmites australis, Acacia hebeclada , Combretum imberb, Echinochloa pyramidalis* and *Hyphaene ventricosum* and a variety of other trees are characteristic of the Caprivi Floodplains vegetation type.

Animal diversity is high and specifically focused around the Zambezi River. Bird diversity is particularly high with fish eagle, different species of kingfisher and storks, egrets, herons and even pelicans occurring in the area. Hippopotamus and crocodiles are frequently observed and elephants also migrate through the general area from time to time.

Table 8-3 General ecological data (Atlas of Namibia Project, 2002)

Vegetation type	Caprivi Floodplains
Vegetation structure type	Grassland
Diversity of higher plants	High (Diversity rank = 2 [1 to 7 representing highest to lowest diversity])
Number of plant species	400 - 500
Percentage tree cover	0.1-1
Tree height (m)	5-10
Percentage shrub cover	0.1-1
Shrub height (m)	1-5
Percentage dwarf shrub cover	0.1-1
Dwarf shrub height (m)	< 0.5
Percentage grass cover	76-100
Grass height (m)	1-2
Mammal Diversity	106 - 120 Species
Rodent Diversity	24 - 27 Species
Bird Diversity	> 230 Species
Reptile Diversity	81 - 85 Species
Snake Diversity	> 44 Species
Lizard Diversity	24 - 27 Species
Frog Diversity	28 - 35 Species
Termite Diversity	13 - 19 Genera
Scorpion Diversity	6 - 9 Species

Implications and Impacts

The clinic has already been established and the area has previously been impacted by human settlement. No plants or animals are present on site that may be impacted by the construction of

the wastewater treatment plant. However, pollution that may result from system failure or human error will enter the environment and the may enter the river system during periods of flooding. Human wildlife conflict may occur when potentially dangerous or destructive animals like elephants enter the area.

8.7 DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS

Muzii is located in the Kabbe South Constituency of the Zambezi Region. Census data is provided in Table 8-4. During the 2011 population and housing census, the Kabbe South Constituency had an estimated 8,073 inhabitants and a population density of 6.5 people/km^2. There are no well-developed urban areas near Muzii and the closest town is Katima Mulilo 80 km to the west. Luhonono and Itomba are the closest villages with health care facilities. There is one school, the Muzii Combined School, in Muzii and at the time of preparation of this report it had 297 learners. The main sector of employment is agricultural and fisheries (Table 8-5).

Table 8-4 Demographic characteristics of Kabbe South Constituency, the Zambezi Region and Nationally (Namibia Statistics Agency, 2011)

	Kabbe South Constituency	Zambezi Region	Namibia
Population (Males)	4,228	44,099	1,021,912
Population (Females)	3,845	46,497	1,091,165
Population (Total)	8,073	90,596	2,113,077
Population Density (people/km^2)	6.5	6.1	2.6
Unemployment (15+ years)	12.8%	38%	37%
Literacy (15+ years)	84.6%	83,7%	89%

Table 8-5 Main occupation of employed population aged 15 years and above in the Kabbe South Constituency

Main Occupation	Number of People
Total	2,620
Armed force	3
Legislators senior officials and managers	22
Professionals	35
Technician and associate professionals	17
Clerk	8
Service workers	724
Skilled agricultural and fishery workers	1,327
Craft and related trades workers	217
Plant and machine operators and assemblers	3
Elementary occupations	264
Don't know	0

Implications and Impacts

The construction of the clinic is a very positive development for the Muzii Village and will eliminate the need to travel great distances to receive primary health care.

8.8 CULTURAL, HERITAGE AND ARCHAEOLOGICAL ASPECTS

No known cultural, heritage and archaeological aspects are known to occur at or around the clinic's property.

Implications and Impacts

No implications or impacts expected.

9 PUBLIC CONSULTATION

Consultation with the public forms an integral component of an environmental assessment investigation and enables Interested and Affected Parties (IAPs) e.g. neighbouring landowners, local authorities, environmental groups, civic associations and communities, to comment on the potential environmental impacts associated with the proposed facility and to identify additional issues which they feel should be addressed in the environmental assessment.

Public participation notices were advertised twice in two weeks in the national papers: The Republikein and the Namibian Sun on 12 and 19 July 2022 respectively. A site notice was placed on site and notification letters were delivered to the direct neighbours, the Muzii Combined School's principle and the Zambezi Regional Council. While on site a short meeting was conducted with members of the households directly neighbouring the clinic. Translation services were provided by the school's principle. Public notification documentation and details of people that attended the small meeting are provided in Appendix B. The main points raised during the meeting were:

- The wastewater plant must be constructed to a standard not to pollute the environment.
- The clinic must be completed as soon as possible so that residents in Muzii do not need to travel far to other clinics.
- The clinic must be completed as soon as possible so that it can be fenced and protected, and the community itself does not have to guard it against vandalism anymore.

No one registered as interested and affected parties and no further comments or responses were received regarding the facility.

10 MAJOR IDENTIFIED IMPACTS

During the scoping exercise a number of potential environmental impacts have been identified. The following section provides a brief description of the most important of these impacts.

10.1 IMPROVED HEALTH CARE

The clinic will provide essential primary health care services to a community that otherwise has to travel great distances to the nearest clinics.

10.2 GROUNDWATER CONTAMINATION – SEWAGE

The shallow groundwater is prone to contamination by sewage and chemicals if not successfully contained. Sources are oil or fuel leaking from vehicles, hydraulic fluid leaks from earthmoving equipment, etc. Raw and semi-purified sewage accidentally entering the groundwater can contaminate the water with bacteria like *Escherichia coli*. This can render the water unfit for human consumption.

10.3 SURFACE WATER CONTAMINATION – SEWAGE

Raw and semi-purified sewage accidentally entering the surface water during times of flooding can contaminate the water with bacteria like *Escherichia coli* and pose health risks to inhabitants of Muzii.

10.4 HEALTH AND SAFETY

Construction activities have some health and safety risks that mainly relate to injuries on site. Contamination of the environment as a result of sewage spilled into the environment pose health risks to inhabitants of Muzii.

10.5 WASTE

No formal waste disposal facilities are available at Muzii. Waste generated during the construction and operational phases may pollute the environment if not contained or properly disposed of. Litter is currently a big problem in the village with most of the environment being affected by various forms of household and other types of waste.

11 ASSESSMENT AND MANAGEMENT OF IMPACTS

The purpose of this section is to assess and identify the most pertinent environmental impacts that are expected from the construction, operational and potential decommissioning activities of the wastewater treatment plant. An EMP based on these identified impacts is also incorporated into this section.

For each impact an environmental classification was determined based on an adapted version of the Rapid Impact Assessment Method (Pastakia, 1998). Impacts are assessed according to the following categories: Importance of condition (A1); Magnitude of Change (A2); Permanence (B1); Reversibility (B2); and Cumulative Nature (B3) (see Table 11-1)

Ranking formulas are then calculated as follow:

Environmental Classification = A1 x A2 x (B1 + B2 + B3)

The environmental classification of impacts is provided in Table 11-2.

The probability ranking refers to the probability that a specific impact will happen following a risk event. These can be improbable (low likelihood); probable (distinct possibility); highly probable (most likely); and definite (impact will occur regardless of prevention measures).

Table 11-1 Assessment criteria

Criteria	Score
Importance of condition (A1) – assessed against the spatial boundaries of human interest it will affect	
Importance to national/international interest	4
Important to regional/national interest	3
Important to areas immediately outside the local condition	2
Important only to the local condition	1
No importance	0
Magnitude of change/effect (A2) – measure of scale in terms of benefit / disbenefit of an impact or condition	
Major positive benefit	3
Significant improvement in status quo	2
Improvement in status quo	1
No change in status quo	0
Negative change in status quo	-1
Significant negative disbenefit or change	-2
Major disbenefit or change	-3
Permanence (B1) – defines whether the condition is permanent or temporary	
No change/Not applicable	1
Temporary	2
Permanent	3
Reversibility (B2) – defines whether the condition can be changed and is a measure of the control over the condition	
No change/Not applicable	1
Reversible	2
Irreversible	3

Cumulative (B3) – reflects whether the effect will be a single direct impact or will include cumulative impacts over time, or synergistic effect with other conditions. It is a means of judging the sustainability of the condition – not to be confused with the permanence criterion.	
Light or No Cumulative Character/Not applicable	1
Moderate Cumulative Character	2
Strong Cumulative Character	3

Table 11-2 Environmental classification (Pastakia 1998)

Environmental Classification	Class Value	Description of Class
72 to 108	5	Extremely positive impact
36 to 71	4	Significantly positive impact
19 to 35	3	Moderately positive impact
10 to 18	2	Less positive impact
1 to 9	1	Reduced positive impact
0	-0	No alteration
-1 to -9	-1	Reduced negative impact
-10 to -18	-2	Less negative impact
-19 to -35	-3	Moderately negative impact
-36 to -71	-4	Significantly negative impact
-72 to -108	-5	Extremely Negative Impact

11.1 RISK ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PLAN

The EMP provides management options to ensure impacts of the plant are minimised. An EMP is a tool used to take pro-active action by addressing potential problems before they occur. This should limit corrective measures needed, although additional mitigation measures might be included if necessary. The environmental management measures are provided in the tables and descriptions below. These management measures should be adhered to during the various phases of the operation and maintenance / construction of the facility. This section of the report can act as a stand-alone document. All personnel taking part in the operations of the facility should be made aware of the contents in this section, so as to plan the operations accordingly and in an environmentally sound manner.

The objectives of the EMP are:

- to include all components of construction activities and operations of the facility;
- to prescribe the best practicable control methods to lessen the environmental impacts associated with the facility;
- to monitor and audit the performance of construction and operational personnel in applying such controls; and
- to ensure that appropriate environmental training is provided to responsible operational personnel.

Various potential and definite impacts will emanate from the operations, maintenance / construction and decommissioning phases. The majority of these impacts can be mitigated or prevented. The impacts, risk rating of impacts as well as prevention and mitigation measures are listed below.

As depicted in the tables below, impacts related to the operational phase are expected to mostly be of medium to low significance and can mostly be mitigated to have a low significance. The extent of impacts are mostly site specific to local and are not of a permanent nature. Due to the nature of the surrounding areas, limited cumulative impacts are likely.

11.1.1 Planning

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

- Ensure that all necessary permits from the various ministries, local authorities and any other bodies that governs the construction, operations and decommissioning activities of the facility remains valid. This include an effluent discharge permit from the Ministry of Agriculture, Water and Land Reform.
- Ensure a contractor management program is in place and that it includes the EMP.
- Employees to adhere to relevant sections of the EMP, as applicable to their scope of work and general operations.
- Make provisions to have a Health, Safety and Environmental Coordinator or similar to oversee implementation of the EMP, occupational health and safety as well as general environmental related compliance at the site.
- Public liaison processes to be followed in the event of complaints from public entities.
- Have the following emergency plans, equipment and personnel on site, where reasonable, to deal with all potential emergencies:
  - EMP, risk management plan, emergency response plan and HSE manuals.
  - Adequate protection and indemnity insurance cover for incidents.
  - Procedures, equipment and materials required for emergencies (e.g. firefighting, first aid, etc.).
  - Relevant labour and safety standards.
- Develop and adopt a waste management plan inclusive of a waste minimisation strategy for all aspects of the facility.
- Ensure availability of sufficient funds or insurance spill clean-up or pollution remediation if ever required.
- Establish and / or maintain a reporting system to report on aspects of construction activities, operations and decommissioning as outlined in the EMP.
- Submit bi-annual reports to the MEFT to allow for environmental clearance certificate renewal after three years. This is a requirement by MEFT.
- Update the EIA and EMP and apply for renewal of the environmental clearance certificate prior to expiry.

11.1.2 Employment

Skilled and unskilled labour are required for the construction and operational activities associated with the wastewater treatment plant. Livelihoods are thus sustained and spending power increased.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Support for employment in the specialist services supply and construction industry	2	1	2	2	1	10	2	Definite
Daily Operations	Permanent employment during operations linked to the clinic and periodic maintenance and servicing of the wastewater treatment plant	2	1	3	2	1	12	2	Definite

Desired Outcome: Provision of employment to local Namibians.

Actions

Enhancement:

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

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Bi-annual summary report based on employee records.

11.1.3 Skills and Development

During the construction and operational phases, some training is provided to a portion of the workforce to be able to conduct certain tasks according to the required standards. Skills are periodically transferred to an unskilled workforce for general tasks. Development of people and technology are key to economic development. During normal operations, employees identified to operate and maintain the wastewater treatment plant will enhance their working expertise.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Transfer of skills, technological advancements	2	1	2	2	1	10	2	Definite
Daily Operations	Transfer of skills, work experience and professional development	2	1	3	2	2	14	2	Definite

Desired Outcome: To see an increase in skills of local Namibians, as well as development and technological advancements.

Actions

Mitigation:

- Sourcing of employees and contractors must first be at local level and if not locally available, regional or national options should be considered.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Record should be kept of training provided.
- Ensure that all training is certified or managerial references provided (proof provided to the employees) inclusive of training attendance, completion and implementation.
- Include all information in a bi-annual report.

11.1.4 Demographic Profile and Community Health

Construction sites often entice jobseekers to migrate to the area. This may lead to increased unemployment and expansion of informal settlements. Here, factors such as communicable disease like HIV / AIDS as well as alcoholism and drug abuse may thrive. These are typically aggravated with an influx of possible foreign construction teams and contractors into the area. The scale of construction activities of the wastewater treatment plant at the Muzii clinic are limited, and these impacts are not foreseen to be significant. In fact, the establishment of the clinic will actually enhance living conditions in Muzii by providing readily available primary health care services, including testing for and providing support to HIV/AIDS patients.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	In-migration and social ills related to foreign contractors temporarily on site	2	-1	1	1	1	-6	-1	Improbable
Daily Operations	Better living conditions in Muzii through provision of health care	2	2	3	2	1	24	3	Definite

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

Actions:

Prevention:

- Appointment of reputable contractors where applicable.
- Employ only people from the area, deviations from this practice should be justified.
- Adhere to all local authority by-laws relating to environmental health, which includes, but is not limited to, sanitation requirements for employees.
- Educational programmes for employees and the community in general on various topics of social behaviour and HIV/AIDs and general upliftment social status.

Mitigation:

- Take disciplinary action against employees not adhering to contractual agreements with regard to socially deviant behaviour (e.g. alcohol or drug abuse during working hours).

Responsible Body:

- Proponent
- Contractor

Data Sources and Monitoring:

- Bi-annual summary report based on educational programmes and training conducted.
- Employee contracts on file.
- Bi-annual report and review of employee demographics.

11.1.5 Health, Safety and Security

Construction and daily operational and maintenance activities are reliant on human labour. Such activities have varying degrees of health and safety risks. Examples include the operation of machinery and exposure to raw and semi-treated sewage. Treated effluent may still contain parasitic cysts, even after treatment with chlorine. As such exposure and ingestion of such water, continue to pose health risks. Maintenance of the wastewater treatment plant may be difficult due to accessibility difficulties during times of flooding.

Encounters with wild animals like elephants and venomous species like snakes may pose risks to staff and patients. Security risks will be related to unauthorized entry, theft and vandalism.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Physical injuries, human wildlife conflict and criminal activities	1	-2	2	2	1	-10	-2	Probable
Daily Operations	Physical injuries, exposure to contaminated water, human wildlife conflict and criminal activities	1	-2	3	2	1	-12	-2	Probable

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

Actions

Prevention:

- Implement and maintain an integrated health and safety management system, to act as a monitoring and mitigating tool.
- Comply with all health and safety standards as specified in the Labour Act and related legislation.
- Ensure that all personnel receive adequate training on the operational procedures of equipment and machinery and the handling of potential hazardous substances.
- Provide employees with required and adequate personal protective equipment (PPE) where required.
- Train selected personnel of the construction team in first aid and ensure first aid kits are available on site.
- The contact details of all emergency services must be readily available.
- Lock away or store all equipment and goods on site in a manner suitable to discourage criminal activities (e.g. theft).
- Implement a maintenance register for all equipment whose malfunction can lead to injury or exposure to hazardous substances.
- Maintain and regularly services the wastewater treatment plant as per the manufacturers requirements to ensure its proper function and thus generation of effluent safe for disposal. Due to the remoteness of the location, an employee at the clinic should be trained in the basic maintenance procedures of the wastewater treatment plant to ensure its continued effective functioning.
- Any functionality issues experienced with the wastewater treatment plant should be reported to the service agent without delay to ensure quick servicing and repair of equipment.

Mitigation:

- Treat all minor work related injuries immediately and obtain professional medical treatment if required.
- Assess any safety problems and implement corrective action to prevent future occurrences.

- Security procedures and proper security measures must be in place to protect workers and patients.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Any incidents must be recorded with action taken to prevent future occurrences.
- Compile a bi-annual report of all incidents reported. The report should contain dates when training were conducted and when safety equipment and structures were inspected and maintained.

11.1.6 Fire

Construction activities, failing electrical infrastructure and fires outside of designated areas may increase the risk of the occurrence of uncontrolled fires which may spread into the nearby veld.

The general area is known to experience severe fires, some originating in the neighbouring country. The almost annual fires are well documented and the area has an elevated risk related to veld fires. Lightning can be a natural ignition source for veld fires, which in turn can spread and damage infrastructure and rangeland, or pose health impacts. Failing electrical infrastructure and fires may increase the risk of the occurrence of uncontrolled fires which may spread into area. Similarly machinery can ignite dry vegetation if sufficient heat (e.g. exhaust pipes) or sparks are produced. Improper waste burning or discarding of cigarette buds further increases fire risks. Damage to infrastructure or the wastewater treatment plant caused by fire, may result in a failure of such infrastructure to pump, store or dispense water.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Fire risk	3	-2	2	2	2	-36	-3	Probable
Daily Operations	Fire risk	3	-2	3	2	2	-42	-4	Probable

Desired Outcome: To prevent property damage, veld fires, possible injury and impacts caused by uncontrolled fires. To prevent damage the wastewater treatment plant and related infrastructure.

Actions:

Prevention:

- Prepare a holistic fire protection and prevention plan. This plan must include evacuation plans and signage, an emergency response plan and a firefighting plan.
- Personnel training (safe operational procedures, firefighting, fire prevention and responsible housekeeping practices).
- Ensure all flammable chemicals are stored according to material safety data sheet (MSDS) and SANS instructions and all spills or leaks are cleaned immediately.
- Maintain regular site, mechanical and electrical inspections and maintenance.
- Maintain firefighting equipment and promote good housekeeping.
- Allow fires used for purposes such as cooking (by staff) in designated areas only.

Mitigation:

- Implement the fire protection and firefighting plan in the event of a fire.
- Quick response time by trained staff will limit the spread and impact of fire.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Maintain a register of all incidents. Include measures taken to ensure that such incidents do not repeat themselves.
- Compile a bi-annual incidents report. The report should also contain dates when fire drills were conducted and when firefighting equipment were tested and training given.

11.1.7 Noise

Some noise will be generated during the construction phase (installation of the wastewater treatment plant). The wastewater treatment plant will not create significant noise during operations and is considered to be a quite system which will not disturb the clinic or its patients.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Excessive noise generated from construction activities – nuisance and hearing loss	1	-2	2	2	1	-10	-2	Probable

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

Actions

Prevention:

- Follow Health and Safety Regulations of the Labour Act and / or World Health Organization (WHO) guidelines on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment and nuisances.
- All machinery must be regularly serviced to ensure minimal noise production.

Mitigation:

- Hearing protectors as standard PPE for workers in situations with elevated noise levels.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Health and Safety Regulations of the Labour Act and WHO Guidelines.
- Contractor HSE plan.
- Maintain a complaints register.
- Bi-annual report on complaints and actions taken to address complaints and prevent future occurrences.

11.1.8 Waste Production

Various waste streams result from the construction and operational activities. No official waste disposal site is available in Muzii. Waste may include hazardous waste associated with hydrocarbon products and chemicals, as well as soil and water contaminated with such products. Construction waste may include building rubble and discarded equipment. Domestic waste will be generated by the patients and staff at the clinic. Waste presents a contamination risk and when not removed regularly may become a health and / or fire hazard and attract wild animals and scavengers. Sewage is a form of liquid biological waste that needs disposal.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Excessive waste production, littering, illegal dumping, contaminated materials	1	-2	2	2	2	-12	-2	Definite
Daily Operations	Excessive waste production, littering, contaminated materials	1	-2	3	2	2	-14	-2	Definite

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

Actions

Prevention:

- Prepare a waste management plan focussed on reduction and recycling of waste in order to minimize the local impact of waste.
- Educate employees on the importance of proper waste handling and disposal. As a proactive approach such educational programmes can be extended to the residents of Muzii and clean-up campaigns can be initiated to reduce the amount of waste carelessly disposed of in the environment.
- Ensure adequate temporary storage facilities for waste are available and that these facilities are secure so that waste is contained and scavenging (human and non-human) of waste is prevented and that waste cannot be blown away by wind.

Mitigation:

- Waste should be disposed of regularly and hazardous material / waste (empty chemical containers, and contaminated materials, soil and water) must be disposed of at approved facilities.
- Given the lack of formal waste disposal sites, all waste should be burnt in a designated waste disposal pit, at regular intervals and under close supervision.
- Empty chemical containers that may present a contamination / health risk must be treated as hazardous waste. Workers or residents should not be allowed to collect such containers for purposes of storing water or food. This can be achieved by puncturing or crushing such containers prior to disposal.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Maintain a register of disposal of hazardous waste. This should include type of waste, volume as well as disposal method/facility.
- Any complaints received regarding waste should be recorded with notes on action taken.
- All information and reporting to be included in a bi-annual report.

11.1.9 Ecosystem and Biodiversity Impact

The establishment of the wastewater treatment plant and related infrastructure will not result in a significant change in local ecosystems or biodiversity, especially considering the nature of the system. However, malfunction and or operational failures may contaminate and alter localised ecosystems. The potential operational impact on the local ecology mainly relates to pollution of the environment by waste and/or sewage.

Poaching and illegal collection of plant and animal materials may occur during the construction phase. While construction activities may result in localised compaction of soil. Invader species may established on the site which will need to be controlled. Such aspects will result in a change of the localised habitat and related ecosystems. The impact is however considered low when considering the greater region and grassland areas.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Pollution of the environment: Change in localised habitat and related ecosystem.	1	-1	2	3	2	-7	-1	Probable
Daily Operations	Pollution of the environment: Change in localised habitat and related ecosystem.	1	-1	3	2	2	-7	-1	Probable

Desired Outcome: To avoid pollution of, and impacts on, the ecological environment.

Actions.

Prevention:

- Educate all contracted and permanent employees on the value of biodiversity.

Mitigation:

- Mitigation measures related to waste handling and the prevention of groundwater, surface water and soil contamination should limit ecosystem and biodiversity impacts.

Responsible Body:

- Contractor
- Proponent

Data Sources and Monitoring:

- Compile a bi-annual report on all monitoring results and incidents.

11.1.10 Flood Damage to Infrastructure

As the area is prone to flooding, the design and placement of the wastewater treatment plant must be carefully considered to ensure it is not damage during flooding events.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Daily Operations	Damage to the wastewater treatment plant as a result of flooding	2	-2	3	2	1	-24	-3	Probable

Desired Outcome: To construct a wastewater treatment plant that can withstand the risks of flooding.

Actions

Prevention:

- Appoint reputable suppliers and contractors to ensure the facility that is planned on site can withstand flood events.
- Construct the main components of the plant aboveground, taking cognisance of rising groundwater levels during flooded periods.

Mitigation:

- Report any damage to the wastewater treatment plant as a result of flooding to ensure it is repaired and actions are taken to prevent future occurrences.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- A report should be compiled of any damage to the wastewater treatment plant and actions taken to prevent future occurrences.

11.1.11 Groundwater, Surface Water and Soil Contamination

During the construction phase various activities may require the use of fuel, lubricants and chemicals such as paints and solvents. The use of such materials poses a contamination risk to the soil, groundwater and surface water. Spills and leaks may occur which may detrimentally affect the environment. Porous surface substrate can allow hazardous substances to seep down to the water table either at the location of the spillage or after being washed away by surface flow. Groundwater might spread pollutants to neighbouring receptors and may create an impact on downstream water users. During operations, contamination risks are related to indiscriminate disposal of biological and medical wastes and possible sewage leakages. Theses may occur due to a system malfunction or overload. Damage to the wastewater treatment plant which may result in such malfunction may be caused by wildlife damage (elephants, baboons, etc.).

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Contamination from hazardous material spillages and hydrocarbon leakages	2	-1	2	2	1	-10	-2	Probable
Daily Operations	Contamination from sewage spillages/leakages and effluent not treated to levels safe for disposal	2	-2	3	2	1	-24	-3	Probable

Desired Outcome: Prevent any form of contamination of the groundwater, surface water and soil.

Actions

Prevention:

- All fuel and chemicals must be stored and handled according to their respective SANS and / or MSDS requirements.
- The procedures followed to prevent environmental damage during service and maintenance of potentially polluting equipment and infrastructure, and compliance with these procedures, must be audited and corrections made where necessary.
- All construction and operational machines to have the necessary spill kits and drip trays where and if required.
- Training to be provided to clinic staff in emergency measures to be taken should the wastewater system fail or have operational issues.
- The wastewater treatment plant must be designed to meet the requirements of section 21(1) and 21(2) of the Water Act (Act of 54 of 1956) and that purified water shall comply with "General Standards" as laid out in Government Gazette Regulation R553 of 5 April 1962.
- Wildlife deterrent infrastructure or management measures should be considered.
- Regular inspection and maintenance of all equipment and sewage handling and treatment infrastructure (e.g. pipes, sumps, treatment plant, etc.).

Mitigation:

- Removal of waste should be at regular intervals to maintain visual orderliness, but more so to not give time for liquid waste to enter the soil substrate.
- Strictly adhere to the effluent standards as determined by the effluent discharge permit.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Effluent discharge permit
- Effluent monitoring as per effluent disposal permit conditions including daily residual chlorine concentrations.
- Maintain MSDS file for all hazardous chemicals kept on site.
- A report should be compiled bi-annually of all spills or leakages reported and effluent and groundwater quality analysis results.

11.1.12 Visual Impact

This is an impact that not only affects the aesthetic appearance, but also the integrity of the facility.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Aesthetic appearance and integrity of the site	1	-1	2	2	2	-6	-1	Probable
Daily Operations	Aesthetic appearance and integrity of the site	1	-1	2	2	2	-6	-1	Probable

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

Actions

Mitigation:

- Regular waste disposal, good housekeeping and routine maintenance on infrastructure will ensure that the longevity of structures are maximised and a low visual impact is maintained.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Compile a bi-annual report of all complaints received and actions taken.

11.1.13 Cumulative Impact

Due to the isolated nature of Muzii, very few cumulative impacts are associated with the construction and operational phases of the wastewater treatment plant. The main negative cumulative impacts are related to pollution of the environment by waste and potentially inadequately treated sewage or raw sewage if the treatment plant fails.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	The build-up of minor impacts to become more significant	2	-1	2	2	1	-10	-2	Probable
Daily Operations	The build-up of minor impacts to become more significant	2	-1	3	2	1	-12	-2	Probable

Desired Outcome: To minimise cumulative all impacts associated with the facility.

Actions

Mitigation:

- Addressing each of the individual impacts as discussed and recommended in the EMP would reduce the cumulative impact.
- Reviewing biannual reports for any new or re-occurring impacts or problems would aid in identifying cumulative impacts. Planning and improvement of the existing mitigation measures can then be implemented.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Bi-annual reports

11.2 DECOMMISSIONING AND REHABILITATION

Closure and decommissioning of the wastewater treatment plant as a whole is not foreseen during the validity of the ECC or in the foreseeable future. However, it is more likely that certain components of the plant may be decommissioned or changed. Decommissioning is therefore included for this purpose. Future land use after decommissioning should be assessed prior to decommissioning and rehabilitation initiated if the land would not be used for future purposes. Should decommissioning occur at any stage, rehabilitation of the area may be required. Decommissioning will entail the complete removal of all infrastructure including buildings and underground infrastructure. Any pollution present on the site must be remediated. The impacts associated with this phase include noise and waste production as structures are dismantled. Noise must be kept within the Labour Act's Health and Safety Regulations or WHO standards and waste should be contained and disposed of at an appropriately classified and approved waste facility and not dumped in the surrounding areas. The EMP for the facility will have to be reviewed at the time of decommissioning to cater for changes made to the site and to implement guidelines and mitigation measures.

12 CONCLUSION

The operations of the clinic will have a positive impact on the local community. The installation of a properly designed wastewater treatment plant, that can withstand flooding events, will ensure the environment is not polluted.

Negative impacts associated with the construction and operational activities can successfully be mitigated. Implementing a safety, health, environment and quality (SHEQ) policy will contribute to effective management procedures to prevent and mitigate impacts. Groundwater, surface water and soil pollution must be prevented at all times. Fire prevention should be key and fire response plans must be in place and regular training provided. All staff must be made aware of the importance of biodiversity. Any waste produced must be stored and regularly burnt at a designated site to prevent pollution of the environment. Hazardous waste must be disposed of at an approved hazardous waste disposal site.

The environmental management plan (Section 11) should be used as an on-site reference document for the construction and operation of the facility. Relevant construction and operational personnel must be taught the contents of these documents. Parties responsible for transgressing of the environmental management plan should be held responsible for any rehabilitation that may need to be undertaken.

Should the Directorate of Environmental Affairs (DEA) of the MEFT find that the impacts and related mitigation measures, which have been proposed in this report, are acceptable, an environmental clearance certificate may be granted to the proponent. The ECC issued, based on this document, will render it a legally binding document which should be adhered to. Focus could be placed on Section 11, which includes an EMP for this project. It should be noted that the assessment process's aim is not to stop the activity, or any of its components, but to rather determine its impact and guide sustainable and responsible development as per the spirit of the EMA.

Table 12-1 Impact summary class values

Impact Category	Impact Type	Construction	Operations
	Positive Rating Scale: Maximum Value	5	5
	Negative Rating Scale: Maximum Value	-5	-5
EO	Employment	2	2
EO	Skills, Technology and Development	2	2
SC/EO	Demographic Profile and Community Health	-1	3
SC/EO	Health, Safety and Security	-2	-2
PC	Noise	-2	
EO	Fire	-3	-4
PC/BE	Waste production	-2	-2
PC/BE	Ecosystem and Biodiversity Impact	-1	-1
PC	Flood Damage to Infrastructure		-3
PV/BE	Groundwater, Surface Water and Soil Contamination	-2	-3
SC/EO	Visual Impact	-2	-2
PC/BE/SC/EO	Cumulative	-2	-2

BE = Biological/Ecological EO = Economical/Operational PC = Physical/Chemical SC = Sociological/Cultural

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Appendix A: Effluent Standards

Determinants	General*	Special*
Physical Requirements		
Colour, odor, taste	No substance that will produce colour, odor, taste	
pH	5.5 - 9.5	5.5 – 7.5
Temperature- ^{o}C	≤35	≤25
Conductivity-mS/m @ 25^{o}C	NS	
Turbidity-NTU	NS	
Total Dissolved Solids (TDS)-mg/ℓ	<500 mg/ℓ above the intake potable water quality	≤15% mg/ℓ more than the inlet water
Total Suspended Solids (TSS)-mg/ℓ	25	10
Dissolved Oxygen (DO)-% saturation	at least 75% saturation	
Organic Requirements		
Biological Oxygen Demand (BOD)-mg/ℓ	NS	NS
Chemical Oxygen Demand (COD)-mg/ℓ	75	30
Oxygen Absorbed-mg/ℓ	10	5
Soap, oil or grease-mg/ℓ	2.5	Nil
Phenolic compounds (Phenol)-mg/ℓ	0.1	0.01
Inorganic Macro Determinants		
Ammonia free & saline (NH_4 as N)-mg/ℓ	10	0.1
Nitrate (NO_3 as N) mg/ℓ	NS	1.5
Total Kjeldahl Nitrogen (TKN as N)mg/ℓ	NS	NS
Chloride (as Cl)-mg/ℓ	NS	NS
Sodium (as Na)-mg /ℓ	< 50 mg/ℓ above the intake potable water quality	
Sulphate (as SO_4)-mg/ℓ	NS	NS
Ortho-Phosphate (PO_4 as P)-mg/ℓ	NS	NS
Total Phosphates (as P)-mg/ℓ	NS	2.0
Fluoride (as F)-mg/ℓ	1.0	1.0
Sulphides (as S)- mg/ℓ	1.0	0.05
Cyanide and related compounds (as Cn)- mg/ℓ	0.5	0.5
Inorganic Micro Determinants		
Arsenic (as As)-mg/ℓ	0.5	0.1
Boron (as B)-mg/ℓ	1.0	0.5
Chromium, hexavalent (as Cr)- mg/ℓ	0.05	NS
Chromium, Total (as Cr)-mg/ℓ	0.5	0.05
Copper (as Cu)-mg/ℓ	1.0	0.02
Lead (as Pb)-mg/ℓ	1.0	0.1
Zinc (as Zn)-mg/ℓ	5.0	0.3
Iron (as Fe)-mg/ℓ	NS	0.3
Manganese (as Mn)-mg/ℓ	NS	0.1

Biological Requirements		
Total coliforms-counts/100 mℓ	0/100mℓ	0/100mℓ
E. *Coli*-counts/100 mℓ	0/100mℓ	0/100mℓ
Disinfection		
Residual Chlorine- mg/ℓ	0.1	Nil
* as per Regional Effluent Standard: R553 of 15 April 1962 and amendments (Water Act, Act 54 of 1956) NS = not specified		

Appendix B: Proof of Public Consultation

Notified IAPs & Public Meeting Attendance

Public Meeting Attendance: Environmental Assessment Muzii PHC Clinic

Name & Surname	Organisation/Address	Tel / Mobile	Email	Signature
Cosmas Mateng'a	Muzii C. School	Privacy Block		
Dominic Siyumbwa	Muzii Community			
Simasiku Patricia	" "			
Presley Siyumbuka	" "			
Anneth Masiwa	" "			
Sipula Nbreen	" "			
Patricia Simasiku	" "			

Geo Pollution Technologies
EIA – CUMET Project, Lüderitz

August 2022

Zambezi Regional Council Notification

03/08/2022
CRO Office
ZRC

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To: **Interested and Affected Parties** **02 August 2022**

Re: **Environmental Scoping Assessment and Environmental Management Plan for the Construction and Operations of an Effluent Treatment Plant at the Muzii Clinic, Zambezi Region**

Dear Sir/Madam

In terms of the Environmental Management Act (No 7 of 2007) and the Environmental Impact Assessment Regulations (Government Notice No 30 of 2012), notice is hereby given to all potential interested and/or affected parties that an application will be made to the Environmental Commissioner for an environmental clearance certificate for the following project:

Project: Construction and Operations of an Effluent Treatment Plant at the Muzii Clinic, Zambezi Region

Proponent: Ministry of Health and Social Services

Environmental Assessment Practitioner: Geo Pollution Technologies (Pty) Ltd

The Ministry of Health and Social Services (the Proponent) is constructing a basic health care facility (clinic) at Muzii in the Zambezi Region (Figure 1). The clinic will provide treatment of basic emergencies, follow-up treatment of chronic diseases, emergency maternity services and HIV testing and counselling for the local community. A treatment plant for domestic sewage is required to service the clinic and staff accommodation at the facility. Due to the flood prone environment, typical sewage handling facilities like french drains, septic tanks or oxidation ponds are not permitted. A fully contained biological waste water treatment plant will thus be installed which will treat sewage effluent to a Namibian standard, safe for disposal into the environment.

Geo Pollution Technologies (Pty) Ltd was appointed by the Proponent to conduct an environmental assessment for the proposed effluent treatment plant. As part of the assessment we consult with interested and affected parties (IAPs). All IAPs are invited to register with the environmental consultant to receive further documentation and communication regarding the project. By registering, IAPs will be provided with an opportunity to provide input that will be considered in the drafting of the environmental assessment report and its associated management plan.

Please register as an IAP and provide comments by **15 August 2022**.

To register, please contact:
Email: **muzii@thenamib.com**
Fax: 088-62-6368

Should you require any additional information please contact Geo Pollution Technologies at telephone 061-257411.

Thank you in advance.

Sincerely,
Geo Pollution Technologies

André Faul
Environmental Assessment Practitioner

Advertisements

FRESH: Maxime Zacharie Estoppe covering his graffiti with a fresh coat of paint. PHOTOS: CONTRIBUTED

WORD: The 'artist' spray-painted the word ZIN on several walls in Swakopmund.

• NEIGHBOURHOOD WATCH STOPS VANDALISM

Graffiti artist forced to cover his 'zins' in Swakop

A Swiss graffiti artist who was caught red-handed in Swakopmund was forced to paint over his acts of vandalism.

ADAM HARTMAN
SWAKOPMUND

Swiss national Maxime Zacharie Estoppe, who spray-painted the word 'Zin' on walls in Swakopmund's central business area, was caught red-handed last week and forced to cover his acts of vandalism with a fresh coat of paint.

The Swakopmund Neighbourhood Watch, during one of their patrols on Wednesday morning, ran into the "wannebe Picasso" while he was spray-painting a boundary wall of the Swakopmund police station.

"[Estoppe] was very relaxed until he noticed our jackets. He then took off like the proverbial bat out of hell, leaving his tools of the trade behind," a post on social media by a member of the watch read.

The suspect was observed on CCTV cameras in town and was eventually apprehended on Libertina Amathila Street. At first, he denied knowing anything about the graffiti, but eventually admitted that he was the "budding Picasso" and pointed out a second "masterpiece" against a wall in the vicinity of Georg Ludwig Kindergarten, just down the road from the police station.

Andre van Rensburg told *Erongo 24/7* that the graffiti artist did not divulge what 'Zin' stands for. "Due to the 'foreign substances', which he used earlier, he could not remember the location of his third masterpiece," the social media post stated.

Bad tourist

It came to light that the suspect is from Switzerland.

The social media post stated that the spray painter was of the mistaken opinion that the Swakopmund centre needed a touch of art to improve its appeal for residents and visitors alike, but he was wrong and consequently received a quick introduction to the Namibian legal system.

"He had to switch from cans of spray paint to tins of paint and a roller to cover his masterpieces, and by the looks of it, it was hard work! Hopefully, he has learnt a lesson and will become a model tourist who will always respect any country he visits," the post concluded.

Kerri Rust, a resident, posted on social media, asking why a person would spend money to travel to Namibia just to spray-paint Swakopmund walls, adding that the graffiti was not even good.

Hannelie Schoonbee said Estoppe should be asked to do his artwork in areas that need improvement, "but with permission from the owners."

GROOT AUB RESIDENTS LIST VILLAGE MISERIES

OGONE TLHAGE
GROOT AUB

The Independent Patriots for Change (IPC) has questioned the lack of development at the Groot Aub settlement, five years after the village became part of the City of Windhoek.

As part of a community engagement event this past weekend, IPC councillors met with the community to introduce IPC representatives serving on the council and to assess their needs. Residents highlighted their problems, including the alleged illegal transfer of land to new arrivals at the settlement, the frequent destruction of newly-built housing structures by city police officers, because of a lack of title deeds, and the lack of water and electricity.

Falling on deaf ears

Johanna Garoses, who has built a crèche at the settlement, said she could not get water or electricity connections for her facility, despite the critical work she undertakes for the community.

"We cannot get water from the main supply pipe. We even suggested laying our own pipes. We have no electricity for our structures and when we apply, we are being sent from pillar to post," Garoses lamented.

"We also don't have property ownership here in Groot Aub. Since 2017, we cannot build here in Groot Aub, even if a structure is damaged, we cannot fix it," she added.

Another resident, Bonitha Goagoses, said there has been an influx of people from outside of the settlement who are acquiring land, while Groot Aub residents are not afforded the same opportunities. Riana Janser, another resident, said it would only be fair for the settlement to be granted village council status.

"We don't want the City of Windhoek, we want to get rid of Windhoek, give us village council status," Janser said.

Questions asked

Addressing members of the settlement, IPC leader Panduleni Itula said he wanted to understand what the needs of the community were and why the settlement was still in its current state, despite its incorporation under the City of Windhoek in 2017.

"Why is there no development in Groot Aub? Is it because of the people of Groot Aub or is it because of the leadership that had managed the settlement?", he asked.

IPC councillor Jürgen Hecht said it was likely that the settlement was integrated into Windhoek with very little planning.

"You must look around, you must plan, you have to do something strategic... they had five years and it seems very little was done," Hecht said. Councillor Ndeshihafela Larandja said the Groot Aub budget allocation is too small to cater to the needs of residents.

"The budget for Groot Aub is N$2 million, which really is not enough to do everything that you need because you cannot provide water, roads and electricity for the people," Larandja said.

"The settlement fell within the boundaries of Windhoek when it expanded its boundary in 2011. The settlement was proclaimed as an extension of Windhoek in 2017, despite widespread opposition from residents.

The village lies 50 kilometres south of Windhoek.

UP IN ARMS: Groot Aub residents met with IPC councillors over the weekend. PHOTO: OGONE TLHAGE

Herstel in lugverkeer 'indrukwekkend'

» Afrika se rederye vaar die swakste

Die wêreldwye verkeer van vlugte is nou op 68,7% van wat dit voor die pandemie was. Dié herstel word as "indrukwekkend" beskryf.

› Ronelle Rademeyer

"Die herstel in lugverkeer is niks minder nie as indrukwekkend," sê Willie Walsh, direkteur-generaal van die Internasionale Lugvervoervereniging (Iata), oor rederye se groeisyfers vir Mei 2022 wat nou bykans 70% is van wat dit voor die Covid-19-pandemie was.

Die totale internasionale verkeer in Mei 2022 (gemeet in Inkomste-Passasier Kilometers of RPK's) was 83,1% hoër vergeleke met wat dit in Mei 2021 was. Mei 2022 se internasionale RPK's het 64,1% van Mei 2019 se vlakke bereik.

Die RPK's, wat die algemene metingsmetode in die lugverkeerbedryf is, word bereken deur die aantal betalende passasiers te vermenigvuldig met die afstand wat afgelê is

Volgens Iata is wêreldwye verkeer nou op 68,7% van wat dit voor die Covid-19-reiskrisis was.

Binnelandse verkeer vir Mei 2022 was 0,2% hoër vergeleke met 'n jaar gelede. Beduidende verbeterings in talle binnelandse markte is egter verbloem deur 'n jaar-op-jaar-daling van 73,2% in die Chinese binnelandse mark as gevolg van Covid-verwante dalings in beperkings.

Binnelandse verkeer was in Mei 2022 altesaam 76,7% van wat dit in Mei 2019 was.

Internasionale verkeer het met 325,8% gestyg teenoor Mei 2021. Die opheffing van reisbeperkings in die meeste dele van Asië versnel die herstel van internasionale reise.

Walsh wys in 'n verklaring daarop die sterk resultate in die meeste internasionale en binnelandse markte vergeleke met 'n jaar gelede, wys die vraag na vlugte is vinnig besig om 2019 se vlakke te bereik.

Walsh voeg wel by namate besprekings toeneem op pad na die piek van die Noordelike Halfrond se somerseisoene, duik probleme in die lugverkeerstelsel in sommige van die besigste Europese en Noord-Amerikaanse reisbestemmings op.

Dit word grootliks toegeskryf aan die feit dat 'n groot aantal mense in die bedryf as gevolg van die pandemie hul werk verloor het en rederye nog nie alle poste weer gevul het nie.

Hy sê niemand wil sien dat passasiers aan vlugvertragings of -kansellasies uitgelewer word nie, en hy beloof dat oplossings dringend geïmplementeer sal word.

"Lugrederye, lughawens en regerings werk saam, maar om die getal werknemers aan te vul om aan die groeiende vraag te voldoen, sal tyd neem en geduld verg daar waar die knelpunte die ergste is," sê hy.

"Op langer termyn moet regerings hul begrip van hoe lugvaart funksioneer verbeter en nouer saamwerk met lughawens en lugrederye."

Walsh wys uit dat nadat regerings soveel onsekerheid geskep het tydens die pandemie deur die wyse waarop reisbeperkings ingestel is, het hulle min gedoen om 'n gladde herstelpad moontlik te maak.

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Fitty probeer weer vir borg

› Kristien Kruger

Een van die Fishrot-beskuldigdes, mnr. Tamson (Fitty) Hatuikulipi – wat die staat aanvoer 'n integrale rol in dié skandaal gespeel het – doen nou vir die tweede keer aansoek om borgtog.

Hatuikulipi se tweede aansoek om borgtog, wat op nuwe feite gebaseer is, sou gister in die hoërhof in Windhoek aangehoor word, maar is tot vandag uitgestel.

Mnr. Richard Metcalfe, Hatuikulipi se regsverteenwoordiger, het gesê hulle sal tydens vandag se verrigtinge die nuwe gronde bekend maak.

Volgens Metcalfe het sy kollega, mnr. Florian Beukes, dié aansoek behartig. Beukes het Sondag siek geword en kon nie gister in die hof verskyn nie. Hy het glo aangedui hy sal gereed wees om vandag met die saak voort te gaan.

Hatuikulipi is die skoonseun van mede-beskuldigde en voormalige minister van visserye en mariene hulpbronne, mnr. Bernard Esau. Albei is op 27 November 2019 in hegtenis geneem en landdros Duard Kesslau het op 22 Julie 2020 hul eerste aansoek om borgtog van die hand gewys.

Die duo het later in die hoërhof in Windhoek teen dié besluit geappelleer, maar die hof het bevind dat Kesslau se beslissing korrek was.

Op grond van die erns van die oortreding, het Kesslau aangevoer dat die vrylating van Hatuikulipi en Esau nie in openbare belang of in die belang van geregtigheid sou wees nie.

Hatuikulipi probeer dié keer op sy eie en met nuwe feite aansoek om borgtog doen.

GUSTAVO EN KIE

Slegs een van die Fishrot-beskuldigdes, mnr. Ricardo Gustavo, was suksesvol in sy borgtogaansoek.

Ses van die beskuldigdes is vroeër vanjaar borgtog geweier en het verlede week by die hoërhof 'n aansoek om verlof tot appèl ingedien om teen dié besluit in die hooggeregshof te appelleer.

Hulle sal op 22 Julie hoor of hulle verder met die appèlsaak mag gaan.

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EDITORIAL

We live in a world where children starve while there is enough food to feed us all. We live in a world where trillions are spent on arming nations and dealing in warfare while citizens lack the basic necessities to live fruitful and rewarding lives. We live in a world where politicians play us like pieces on a chessboard and power plays for more wealth consume boardrooms and cabinet chambers of so-called first world nations and others. We live in a world where members of former liberation movements spend their time on the accumulation of meagre personal scraps, while selling their countries' resources. Instead of using their hard-earned global collateral to wage a struggle on behalf of developing nations, these movements have been beset by gross corruption. We live in an information age, but we are more interested in gossip and playing voyeur into the lives of the so-called rich and famous. The corrupt are admired for the things they possess, while a human tragedy of monumental proportions plays out across the world every day. Proximity to political and financial power determines where you will end up in life, your status and how seriously your views are considered by the general body of 'right-thinking people'. In the Namibian context, three decades after liberation, we are still grappling with historical hangovers while the new elite of wealthy politicians rub properties, luxury vehicles and other assets in the faces of the poor.

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Beating

Continued from page 1

Mandume, who suffered an injury to her left knee, in her statement indicated that it is not the first time her husband has assaulted her.
The couple have three children together. *Namibian Sun* has established that the pair, who got married in 2008, are no longer living together following a serious fallout in 2020.

Cold feet

At court yesterday, *Namibian Sun* was informed that the complainant was considering retracting her initial police statement as she allegedly no longer objects to her husband being released on bail.
It appears that her unemployment status and alleged pressure from the accused's family is what has motivated this consideration.
Attempts to get comment from Madume proved futile at the time of going to print. She had earlier promised to grant this publication a tell-all interview about what happened.
The State, however, indicated that even if she changes her statement, it will go ahead with the case and bail can be objected to, even if she says otherwise.

'I did not touch her'

Meanwhile, one of Karembera's close friends told *Namibian Sun* that a day before the police apprehended him, he had confided in his friend, saying he was aware that the police were looking for him.
According to the source, Karembera told him that he "did not touch" his wife and that she sustained the injury after falling to the ground.
According to the source, on the day of the incident, one of the couple's children told their father that they are in need of food.
While he was at the house the children share with their mother, Madume allegedly "appeared out of nowhere", which resulted in a commotion that led to her injury.
"He told me that one of the children asked for food and then he went to buy [it] and took it to their house. While he was at the house, the complainant arrived and she was intoxicated.
"She then threw him with a beer bottle but she missed," the friend narrated.
"After she missed with the bottle, she then saw a stone and picked it up to throw at him. In the process, she slipped and fell to the ground. That is how she apparently got the injury on her knee."

Swapo factor

Karembera is known for his outspoken personality and for a character known as Kafu KaNamibia, who regards himself as a Swapo Party foot soldier and mostly engages supporters on various social media platforms.
He is also a pro-Kavango activist who has been vocal in calling out leaders for "neglecting" residents in those regions, as well as speaking out on social issues affecting Namibians.
Karembera is also a businessman who owns a restaurant and a car wash in Nkurenkuru.

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CAN'T HAVE BOTH: Windhoek mayor Sade Gawanas. PHOTO: FACEBOOK

Benefits

Continued from page 1

Matter not dealt with

According to him, the matter had not been dealt with correctly internally by Mayumbelo, who in January informed Gawanas about the benefits she was entitled to.
According to Emvula: "It is an issue that the respective strategic executive seemingly failed to deal with and direct to the administrative superior."
He added that Mayumbelo either misinterpreted the matter, or felt the need to instigate the City and the general public against the mayor "without exhausting internal communications and consultation processes".
"Any flaw in the implementation process of an institutional policy represents a high level of incompetence of a head of administration in such an institution," he added.
The matter was also being discussed internally at the City and is due to be finalised this month, Emvula said. Mayumbelo declined to comment on the accusation yesterday, saying he will not dwell on personal attacks.

Cheetah Cement: Union set to protest today

AUGETTO GRAIG
WINDHOEK

Namibia's second biggest cement factory will go through more labour unrest today after the Mineworkers Union of Namibia (MUN) announced last Friday that its members will protest in front of the Cheetah Cement gates in Otjiwarongo this morning.

MUN northern organiser Brian Tjihero officially informed the plant's parent company, Whale Rock Cement, that the strike would kick off at 07:30 this morning.
Meanwhile, the company on Sunday urged the union and its workers' representatives to listen to reason.
General manager Kevin Lee said the workers' "unrealistic demands and threats of industrial action are counterproductive and can lead to unwanted job losses".
He admitted that the plant had not been operational for six consecutive months since its inception in early 2018.
Recently, activities were once again halted after the labour ministry demanded that worker safety issues be addressed.
The plant was subsequently closed between 10 and 23 May.
The company tried its best to ensure employees received their full basic salaries during the pandemic, he said.
Lee added that employees received half-wage bonuses at the end of 2020, and full bonuses at the end of 2021, even though the company made no profit in those years.
"Despite these sacrifices made by Whale Rock Cement, MUN and workers' representatives continue to make unrealistic demands," he said.

Demands

According to Lee, the company is offering increases of N$800 for employees who earn less than N$6 000 a month, while those who earn more than N$6 000 will pocket an extra N$500.
Cheetah further provides 80% contribution to medical aid membership, N$500 housing allowance and N$30 meal allowance per working day, he said, while night shift allowance would increase from 10% to 15% over the next two years.
He said the union is demanding a 9% salary increase for all workers as well as a 15% contribution to pension funds, 100% medical aid contribution for employees and two dependents and N$2 500 more for housing. The employees have demanded that these changes apply from April 2020, he said.
Furthermore, the union demanded that employees be compensated in similar fashion to those at Ohorongo Cement.

'Doesn't make sense'

According to Tjihero, most Cheetah employees earn between N$3 600 and N$4 600 per month, while workers at Ohorongo earn three to four times more.
"It does not make sense in mining. We suggested a rating system to them, but they never responded.
"Imagine, someone earns more than his supervisor. It does not make sense," he said.
Tjihero added that some employees only receive N$100 housing allowance, and that the offer for N$500 was made very recently.
Furthermore, he said it has been about three and a half years since employees' last increase, despite negotiations having begun in 2020.
The previous increase was effected before MUN was appointed as the negotiating unit at the cement factory, and was also applied selectively, he said. Asked yesterday whether the strike was still going ahead as planned, he said: "Yes, yes, the strike continues".

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Defamation

Continued from page 1

"It imputes, suggests or directly implies that the second plaintiff [Beata] is married to a man who is dishonest; a corrupt businessman who is committing criminal acts in addition to embezzling public funds for his own benefit," it read.
The defamatory statements were further made intentionally and with malice to lower and undermine his reputation, he added.
"The defamation was aggravated by the fact that the defendant made the statements immediately after the event, while it was still receiving a lot of publicity," the affidavit read.
"The person has no knowledge of medicine at all and yet he has a tender to deliver medicine, fellow Namibians? Oh no, honestly, we really have to scrutinise these things closely," the clip added.
The couple are demanding a combined N$400 000 from Kadhikwa, with a 20% per annum from the day of the judgment as well as an unconditional apology and punitive legal costs.

Statements intentional

Beata echoed her husband's sentiments that the statements made in the clip were intentional and with malice, and added that Kadhikwa's utterances had a direct and injurious effect on her status and dignity.
Last September, Beata successfully won a legal suit against Independent Patriots for Change (IPC) spokesperson Immanuel Nashinge, who was ordered to apologise and pay her N$60 000 for remarks in which he called her a prostitute.
Speaking to *Namibian Sun* yesterday, Kadhikwa said she has not yet seen the papers filed against her and will not comment until then.
She, however, added that she is informed that Betty has listed academic qualifications that are 'interesting'.
"She would have to explain some of these listed qualifications in court," a seemingly unfazed Kadhikwa said.

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WEER

BINNELAND: Gedeeltelik bewolk en matig in die suide en weste. Elders sonnig en matig tot warm.

KUS: Gedeeltelik bewolk en matig tot warm met miskolle in die oggend.

GETYE BY WALVISBAAI: H: 07:42 **L:** 13:35 **H:** 20:11

VOORUITSIGTE

WINDHOEK	06°	22°
RUNDU	08°	26°
OSHAKATI	10°	26°
GOBABIS	06°	25°
MARIENTAL	08°	25°
KEETMANSHOOP	06°	26°
WALVISBAAI	14°	25°
LUANDA	19°	25°
JOHANNESBURG	07°	18°
KAAPSTAD	08°	16°

» Staking op nippertjie gestop

TransNamib steeds in vervoerbond se visier

Die Namibiese Unie vir Vervoer- en Verwante Werkers vra dat die hoogste gesag moet ingryp nadat alle pogings sover misluk het.

Augetto Graig

Die Namibiese Unie vir Vervoer- en Verwante Werkers (Natau) dring steeds daarop aan dat die hoogste gesag moet ingryp, ondanks 'n hofbevel wat gister se beplande staking by TransNamib op die nippertjie gestop het. Die hofgeding sal op 29 Julie hervat.

Die waarnemende sekretaris-generaal van Natau, me. Narina Pollmann, het gister gesê: "Ons bevestig dat ons Vrydagmiddag, 15 Julie, ná 'n dringende aansoek deur die regsfirma Kopplinger Boltman bedien is.

"Gedurende die hofgeding van 16 Julie het die bestuur probeer om die staking uit te stel wat (gister) sou begin en 'n hofbevel is uitgereik om die kwessie ter syde te stel totdat die dringende aansoek afgehandel is."

TransNamib beweer 'n stemproses wat werknemers sou toelaat om vir of teen die staking te stem, is ná die toekenning van 'n sertifikaat van geskil nie gehou nie.

Pollmann sê egter daar is tevore gestem en die bestuur is vyf keer genooi om toesig te hou, maar het nooit gereageer nie.

Die kwessie is egter vir die hof om te beslis. In haar toespraak het Pollmann 'n beroep op pres. Hage Geingob gedoen om in te gryp.

Sy het gepleit Geingob "moet ons werkers van hierdie kartel red, en ons toelaat om die aandeelhouer te help om die nasionale spoormaatskappy te vernuwe en te red van dieselfde lokval waarin die Padkontrakteursmaatskappy (RCC) geval het, en meer onlangs ook die nasionale lugredery Air Namibia," sê sy.

Sy het verwys na 'n ondersoek deur Ernst & Young waarin die vakbond insette gelewer het, maar die verslag is nooit vrygestel nie.

Natau dring aan dat die bevindings van die ondersoek openbaar gemaak word.

BEVINDINGS

In die verslag word na bewering voorgestel dat dissiplinêre stappe gedoen moet word teen uitvoerende beamptes en werknemers wat onderpresteer. Uitvoerende beamptes wat prestasiebonusse aan hulself toegeken het, moet dié geld terugbetaal, sê sy.

"Die forensiese verslag lê 'n magdom onreëlmatighede bloot – vanaf ondoeltreffende en onvoldoende kostebeheer van dienste tot twyfelagtige kontrakte en gemanipuleerde huurooreenkomste," sê sy.

"Hoekom word die dokument geheim gehou? Belastinggeld het vir die ondersoek betaal en ons as 'n nasie en as werknemers het dus die reg om te weet wat daarin staan," dring sy aan.

TransNamib se uitvoerende hoof, mnr. Johny Smith, en die uitvoerende beampte van menslike hulpbronne, mnr. Webster Gonzo, word spesifiek uitgewys omdat hulle glo nie die patriotisme waardeer wat die werknemers toon sedert onderhandelinge in 2019 begin het nie.

Ook TransNamib se raadsvoorsitter, mnr. Lionel Matthews, en sy adjunk, adv. Sigrid Tjijorokisa, word beskuldig dat hulle werknemers beledig en verontagsaam het nadat die vakbond die raad oor kwessies genader het.

Pollmann sê die vakbond het alle rolspelers, insluitend die ministerie van werke en vervoer, staatsinstansies en die arbeidsministerie sonder sukses genader.

"Waarheen moet werkers gaan as die strukture wat hulle behoort te help, bloot hul rug draai?" vra sy.

Die vakbond het TransNamib se raad 48 uur gegee om op hul vorige eise te reageer.

"Versuim sal tot ongewilde aksie lei, want ons was lank genoeg geduldig met hierdie uitvoerende beamptes – sedert 2019.

"Ons is dié keer ernstig en sal 'n punt daarvan maak dat wangedrag deur toevertroude senior amptenare nie meer in Namibië toegelaat word nie, aangesien dit die nasie meer skade berokken," sê sy.

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Die dubbele moordbeskuldigde, mnr. Ernst Lichtenstrasser, saam met sy regsverteenwoordiger, mnr. Albert Titus.

OTO STEFAN NOECHEL

Skoen- en wielspore onder die loep in moordverhoor

Stefan Noechel en Kristien Kruger

Die verhoor van mnr. Ernst Lichtenstrasser het Maandag ná 'n vier maande lange breek hervat en die fokus is tans op die ammunisie en vuurwapen wat in die woestyn gevind is.

Inspekteur Job Kauvi het gister die getuiebank ingeneem. Hy was destyds verantwoordelik om foto's van die wiel- en skoenspore op die misdaadtoneel en in die woestyn te neem. Hy kon egter nie gipsafdrukke hiervan maak nie.

Op 18 Mei 2019, 'n maand ná die dubbele moord op die Namibië Instituut vir Mynbou en Tegnologie (Nimt) se uitvoerende direkteur, mnr. Eckhart Mueller (72), en sy adjunk, mnr. Heimo Hellwig (60) op die Arandis-kampus, is Kauvi van Windhoek na Arandis gestuur. Polisiebeamptes het die grondpaaie naby die moordtoneel vir leidrade fyngekam.

'n Voertuig se wielspore het hulle na 'n geweer gelei wat sowat 25,6 km van die moordtoneel in die sand begrawe was.

Hoewel die wiel- en voetspore, wat glo omtrent 'n maand vantevore in die sand gemaak is, albei gedeeltelik na Lichtenstrasser en sy voertuig gewys het, kon dit nie met 100% sekerheid vasgestel word nie.

Met die hulp van Kauvi se foto's is vasgestel dat die voertuig se bande onder die aanvaarbare wetlike standaard was en die skoenafdrukke het verslete kolle getoon.

Die tweede getuie wat gister die bank ingeneem het, was adjunkkommissaris Paulus Katopi wat deel was van die span wat die spore gevolg en op die versteekte bewysstukke afgekom het.

"Ek het die spore gevolg tot by 'n klipperige heuweltjie. Ek het gesien sommige van die klippe is geskuif," het hy getuig.

Volgens sy getuienis het hy onmiddellik die plofstofeenheid in kennis gestel en hulle het met 'n metaalverklikker die gebied deursoek. Die metaalverklikker het aangedui dat daar metaal onder die grond was.

Hierna het hulle die ammunisie en geweer gevind.

Die verhoor duur vandag voor regter Christie Liebenberg voort.

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Onmenslike verval by staatskole

VAN BL. 1

Die verslag verwys na die raamwerk vir instandhoudingsbestuur (MMF) wat dien as beheermeganisme om die instandhouding van alle regeringsgeboue te reguleer. Die oudit was om te bepaal of die infrastruktuur van regeringskole onderhou word in ooreenstemming met die MMF en verwante kabinetsbesluite.

'n Vorige ouditverslag het toe reeds gewys sommige regeringskole is vervalle en oorvol. Koshuise oraloor die land is in 'n vervalle toestand, met sommige wat deur die ministerie van gesondheid en maatskaplike dienste as ongeskik verklaar is om leerlinge te huisves. Ook is toe al vasgestel geen opnames vir behoeftes vir herstelwerk is gedoen nie, terwyl koshuise geen herstelwerkprogram in plek het nie. 'n Bykomende ouditverslag deur die ministerie van onderwys het ook bevind die algemene toestand van koshuise waar inspeksies gedoen is, is "baie swak" en het dringend grootskaalse opknappings nodig.

Die jongste ouditverslag verwys na die impak wat die vervalle infrastruktuur op leerlinge het wat in "vieslike omstandighede" moet bly, terwyl die tekort aan klaskamers die onderrigproses ontwrig, aangesien leerlinge noodgedwonge lessenaars en stoele moet deel. Die oorvol klaskamers het weer gelei tot hoë druipsyfers.

FOTO VERSKAF

Die ministerie begroot jaarliks vir instandhouding, met die betrokke geld wat op 'n maandelikse basis aan die verskillende streekdirektorate oorgedra word. Fondse geoormerk vir die instandhouding van klaskamers word ook aan streke gestuur, terwyl die hoofkantoor groot projekte soos die opgradering van skole en klaskamers adverteer, toeken en bestuur.

Streekkantore stuur inspekteurs na die onderskeie skole om die funksionaliteit van toerusting en geboue te verifieer. Kontrakteurs word as deel van 'n jaarlikse tender aangewys, met die onderhoudsdepartement in die streekdirektorate wat vir die koste verantwoordelik is.

Van direktorate word vereis om voorsiening vir instandhouding te maak soos deur die betrokke skole aangevra is. Alle regeringsgeboue is veronderstel om ten minste elke drie jaar aan 'n volledige inspeksie onderwerp te word, afhangend van die toestand van die infrastruktuur.

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Site Notice

Appendix C: Consultant's Curriculum Vitae

ENVIRONMENTAL SCIENTIST **André Faul**

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

CURRICULUM VITAE ANDRÉ FAUL

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

EDUCATION AND PROFESSIONAL STATUS:

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

First Aid Class A	OSH-Med, 2022
Basic Fire Fighting	OSH-Med, 2022

PROFESSIONAL SOCIETY AFFILIATION:
Environmental Assessment Professionals of Namibia (Practitioner)

AREAS OF EXPERTISE:
Knowledge and expertise in:
- Water Sampling, Extractions and Analysis
- Biomonitoring and Bioassays
- Biodiversity Assessment
- Toxicology
- Restoration Ecology

EMPLOYMENT:

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

PUBLICATIONS:

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