

# **Environmental Impact Assessment for the proposed Construction, Operation and Maintenance of the Proposed Okahao Wastewater Treatment Plant, Omusati region**

## **ENVIRONMENTAL SCOPING REPORT**



### **Prepared for**

**Okahao Town Council  
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Omusati Region**

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# LIST OF ACRONYMS

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DEA	Directorate of Environmental Affairs
DWA	Directorate of Water Affairs
EAP	Environmental Assessment Practitioner
ECC	Environmental Clearance Certificate
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
I&AP	Interested and Affected Parties
MAWLR	Ministry of Agriculture Water and Land Reform
MEFT	Ministry of Environment, Forestry and Tourism
MoHSS	Ministry of Health and Social Services
OTC	Okahao Town Council
ADWF	Average Dry Weather Flow
WTP:	Wastewater Treatment Plant

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# EXECUTIVE SUMMARY

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The Okahao town is served with an Oxidation Pond system which receives and treat all sewage originating from the town. The Oxidation Ponds were preferred due to low population at that time. The town of Okahao being the administrative center of the Okahao electoral constituency has shown substantial population and economic growth over the last 10 years. This growth has resulted in the existing townships extending and requires additional infrastructures and upgrading of the existing services. One such service affected by the town growth is the wastewater management system.

The existing Okahao Oxidation Pond system is in a poor state, not properly functional and totally overloaded. The Okahao Town Council has proposed to construct a new Wastewater Treatment Plant (WTP) to accommodate the sewer from all development and residential areas in the town.

In terms of the Environmental Management Act (EMA, No.07 of 2007) and regulations (No.03 of February 2012), Construction of industrial and domestic wastewater treatment plants and related pipeline systems may not be carried out without an Environmental Clearance Certificate being obtained. Green Gain Consultants cc has been appointed as an independent Environmental Assessment Practitioner (EAP) to undertake the Environmental Impact Assessment (EIA), prepare the Environmental Management Plan and apply for the Environmental Clearance Certificate for the operation of this project.

The main objective of this EIA is to determine the potential environmental impacts emanating from the construction, operation, maintenance, and decommissioning of the proposed infrastructure. The EIA was conducted in a multidisciplinary approach and followed Namibia's Environmental Assessment process. Relevant environmental data have been sourced from personal observations during site visits as well as from input from NamWater officials, stakeholders, and Interested and Affected Parties (I&APs) as well as a review of relevant literature and legal instruments.

This report constitutes an Environmental Scoping Report which provides information that enables the Department of Water Affairs (DWA) and the Directorate of Environmental Affairs (DEA) to make informed decisions about the project. Moreover, an Environmental Management Plan (EMP) has been prepared and it should be read in conjunction with this Scoping Report. The EMP will be used as a mitigation tool and an onsite reference document during all phases of the proposed project (planning, construction, operation, and decommissioning).

# 1. INTRODUCTION

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## 1.1 Context and Background

The town currently uses the Oxidation Pond system for the collection and disposal of the town's wastewater. The oxidation ponds were preferred due to low urban population < 5000. However, the heavy rain and seasonal floods received over the years have resulted in the oxidation ponds breaking and spilling raw sewage into the open areas. The overflow of raw sewage causes environmental challenges and health hazards for humans & livestock.

The Okahao Town Council appointed Om'kumoh Consulting Engineers to design a new wastewater treatment works for the Okahao Town. The proposed wastewater treatment plant will be designed in such a way to accommodate the sewer from all development and residential areas in the town.

In terms of the Environmental Management Act (EMA, No.07 of 2007) and regulations (No.03 of February 2012), Construction of industrial and domestic wastewater treatment plants and related pipeline systems may not be carried out without an Environmental Clearance Certificate being obtained. The Okahao Town Council has appointed Green Gain Environmental Consultant as an independent Environmental Assessment Practitioner (EAP) to undertake the Environmental Impact Assessment (EIA), prepare the Environmental Management Plan (EMP) and apply for the Environmental Clearance Certificate from the Ministry of Environment, Forestry and Tourism (MEFT).

The EAP takes cognizance of the fact that the Environmental Scoping Report and EMP are reviewed by IAPs and also will be independently reviewed by the relevant competent authority; Directorate of Water Affairs (DWA) and by the MEFT. In this way, practical and realistic solutions to potential problems can be identified in a consultative manner where all stakeholders are involved.

## 1.2 About the EAP

Green Gain Consultants cc is a Namibian based professional environmental and natural resource consulting company established and driven through belief, passion and dedication to sustainable development. Established in 2012, Green Gain has grown into a substantial team of environmental practitioner in Namibia providing innovative and cost-effective solutions to environmental challenges and help our clients meet regulatory and stakeholder expectations for environmental performances. The table below presents a details information about Green Gain.

**Table 1: Details of the EAP**

<b>Environmental Assessment Practitioner (EAP): Green Gain Consultants cc</b>	
Physical address	Erf 1540 Conciliation Street, Meersig, Walvis Bay
Postal address	P.O. Box 5303, Walvis Bay
Contact numbers	0813380114 or 0811422927
Email address	<a href="mailto:info@greengain.com.na">info@greengain.com.na</a> or <a href="mailto:eap@greengaincom.na">eap@greengaincom.na</a>
<b>Team Leader</b>	<p><b>Name:</b> Mr. J.K. Amushila</p> <p><b>Qualifications:</b> <i>M. Sc. Environmental Management, B. Honors Agriculture, B. Degree Agriculture, National Diploma in Agriculture.</i></p> <p><b>Experience:</b> He is a registered EAPAN member (No.165) He has worked on a number of projects, including Strategic Environmental Assessments, Environmental Impact Assessments, Environmental Management Plans, and Environmental Auditing. Through his consulting work he gained experience of not only EIA project management, but also environmental specialist experience. (CV attached)</p>



### 1.3 Purpose of the study

The main aim of this Environmental Impact Assessment (EIA) is to examine both the positive and negative impacts that are associated with the project and thus propose possible mitigation measures. Early identification of possible impacts promotes environmental sustainability as anthropogenic factors are balanced with natural environmental needs.

The aims of this study were to;

- To investigate any environmental and socio-economic impacts associated with this project (both positive and negative).
- To suggest the most suitable mitigation measures so as to reduce the nature and extent of any negative impact associated with this project.
- To investigate the current and pending legal framework to which this project will need to comply,
- Consult all Interested and Affected Parties (I&AP's), with specific emphasis on the residents in the affected area to ensure that their needs and concerns are taken into account; and
- Above all, ensure complies with Environmental Management Act (EMA, 2007)

### 1.4 Scope of the study

The study used a multidisciplinary approach to establish the baseline situation. The methods used included site screening, surveys, review of different legislation and consultations of Interested and Affected Parties. The study also benefited a great deal from the use of existing information and most importantly from inputs and contributions submitted by various stakeholders such, Town Council officials and Government ministries. This ToR are inferred from the requirements of the Environment Impact Assessment Regulations (Government Notice No 30 of 2012), to enable an application for Environmental Clearance Certificate with the Environmental Commissioner, as required by Section 27(3) of the Environment Management Act (No 7 of 2007).

The study includes a description of the existing biophysical and socio-economic environment affected by the activity and the manner and degree at which the activity may affect the environment was considered. Information pertaining to the receiving environment and its social surroundings has been sourced through baseline site investigations, desktop analysis and spatial analysis by means of Geographic Information Systems (GIS) and Google earth maps.

The following was therefore required as part of the scope of work:

**a). Environmental impacts (biophysical)**

- Impact on local Ecology
- Impact on surface water and drainage
- Impact on groundwater quality

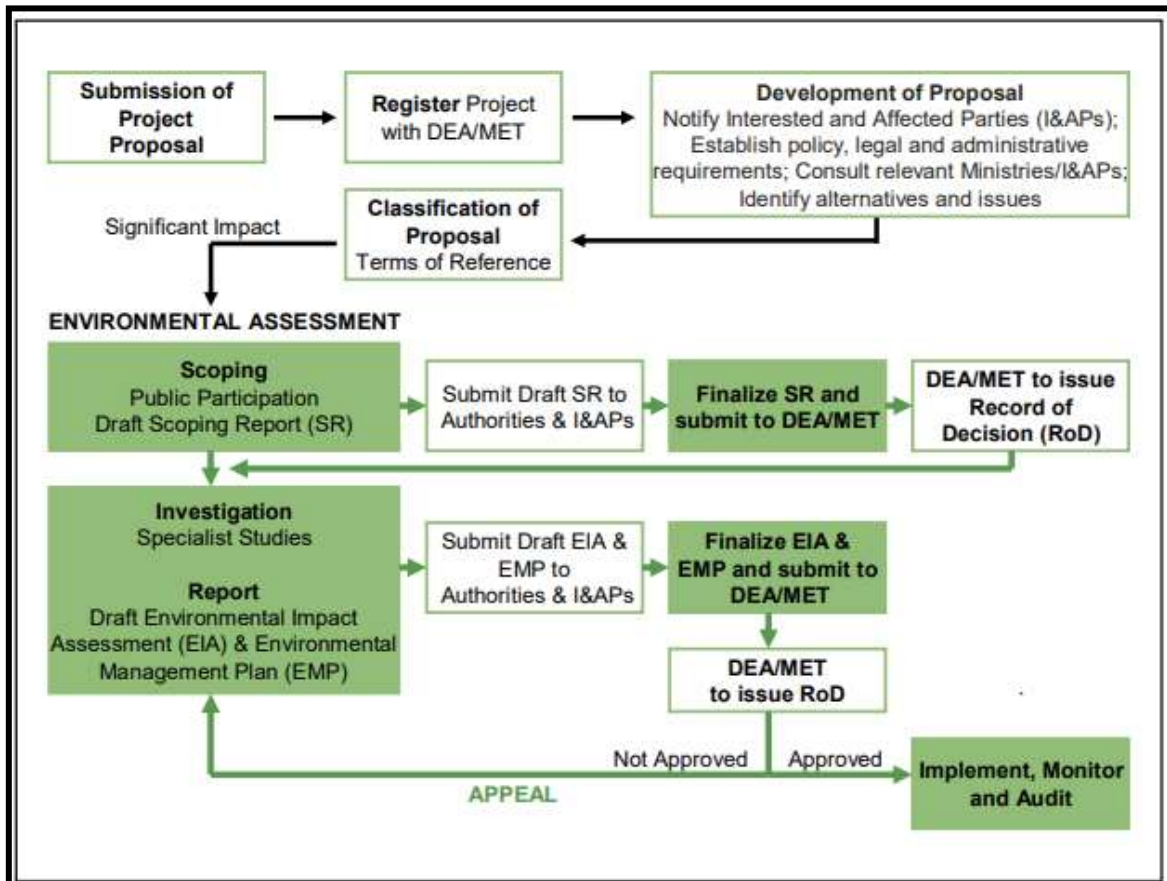
**b). Socio-economic impacts**

- Impact on the local community and adjacent land uses
- Possible Public Health Impacts
- Biological Hazards
- Ergonomist hazards
- Physical hazards (Safety of the community)

## 2. APPROACH TO THE STUDY

### 2.1 Namibian approach

This EIA study was conducted in line with the EIA Regulations (No. 30, February 2012). This draft Scoping report will be shared with the registered I&APs and relevant stakeholders, and will be submitted to the competent authority, and the regulatory authority, for record of decision thereafter.



### 2.2 Data collection methods

As explained above, a multidisciplinary approach was used during this study in gathering information required for the comprehensive assessment. These include.

- ✓ Site visits to collect primary data
- ✓ Legal and policy review
- ✓ Gleaning over existing information
- ✓ Discussions, meetings and site visits with Authorities
- ✓ Opinions and concerns raised by interested and affected parties.
- ✓ Specialist studies will be conducted to collect detail information for the informed assessment of possible impacts.

## 3. PUBLIC PARTICIPATION

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### 3.1 Background

Public Participation Process is an integral part of EIA study; thus, it allows for a transparent approach. Different relevant stakeholders and potential Interested and Affected Parties (I& AP) were invited to register and forward concerns / comments to the EIA practitioner in order to ensure an equitable and effective participation.

### 3.2 Consultation

- **Notification of Stakeholders and IAP**

All interested and affected parties were notified through various means such as the Newspaper advertisement that was advertised twice in two local newspapers: (**NEW ERA for 14 & 18 April 2023 and Confidante for 06 & 14 April 2023**). Several public notices were displayed at public around town and at the project site. These adverts provided brief information about the proposed project and the EIA process. Moreover, the residents whose houses are adjacent to the project were given invitation letters to the public meeting.

The public meeting was held on **Friday 26 April 2023** at Okahao Town Council Fire brigade Hall. During the meeting attendants were introduced to the project and then given a chance to give their views and concerns and explained about their right to participate.



### 3.3 Summary of issues from public participation

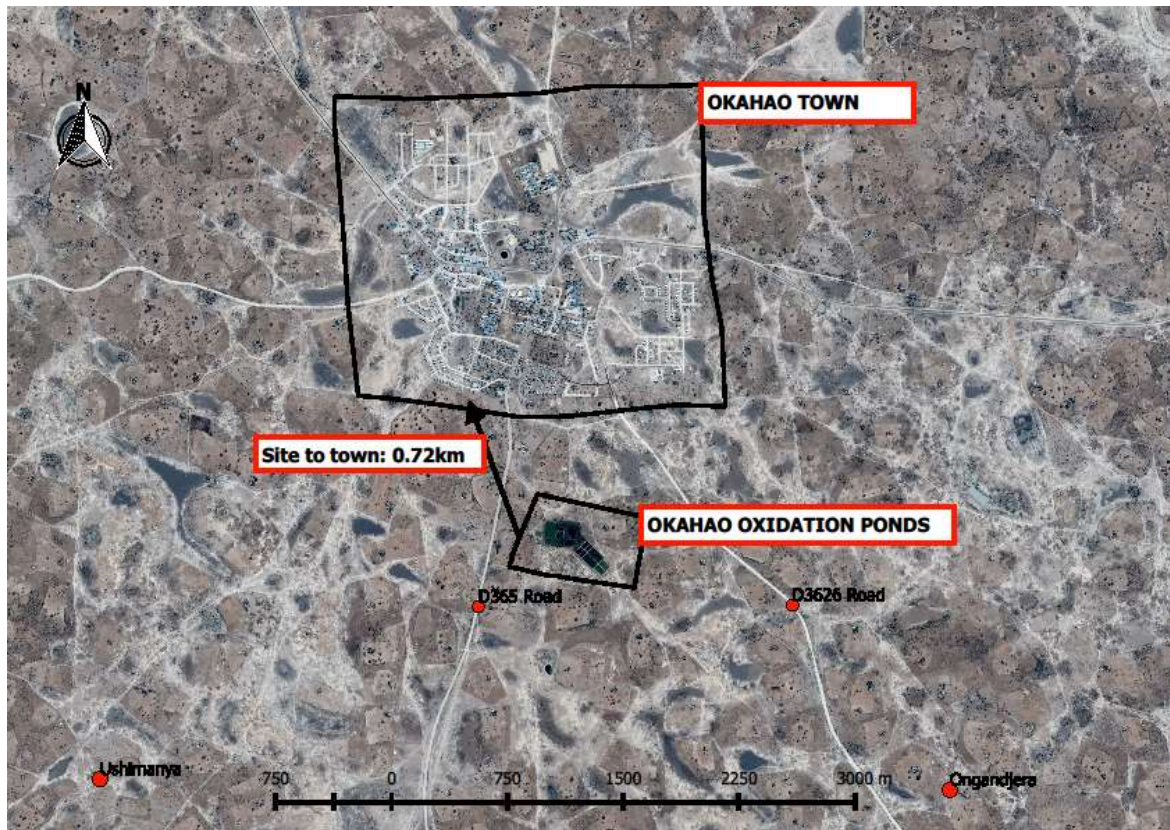
This section provides a summary of issues and questions raised during the consultation process.

Raised by who?	Issue/Question/Suggestions	Response/Comment
<b>Ms. Hileni</b>	<p>-Does Council have extra land for the proposed WTP, or will it relocate the nearby houses?</p> <p>-When do expect to start with this project/</p> <p>-What will the purified effluent be used for and how are you going to contain it?</p>	<p>-The proposed WTP will be constructed at the existing oxidation pond area and no resident will be relocated at this stage.</p> <p>-As soon as we receive the ECC</p> <p>-Purified effluent will be used for limited agricultural activities. Two additional ponds will be constructed to contain the treated effluent</p>
<b>Tk Tomas</b>	<p>-Isn't there alternative land for the proposed WTP far from houses?</p> <p>-How will the sewage and effluent pipes going to be constructed, above ground or below ground/</p>	<p>-It will be ideal to construct the proposed WTP at the existing ponds in order to solve current challenges of overflowing sewage water</p> <p>-All the pipes will be below ground. Portable pumps will be used to pump sewage water from the existing ponds to the new ponds</p>
<b>Ms. Hileni</b>	<p>-We are happy to hear that the Town Council has planned to upgrade the existing oxidation ponds because we have been having problems with overflows of sewage water from the</p>	<p>-Noted.</p>
<b>Tt Uushona</b>	<p>-We have seen some marks/beacon in the area surrounding the oxidation ponds, what are those marks for?</p>	<p>-The marks were for the topographic survey done by the Engineering consultant working on the project</p>
	<p>-Let's work according to what we discussed at this meeting</p>	<p>noted</p>
<b>Ms. Herta</b>	<p>-Will there be another meeting or is this all?</p>	<p>-The purpose of this meeting was to collect input from the I&amp;APs, depending on the outcome of the assessment, a second meeting can be arranged to clarify any outstanding issues, if any.</p>
<b>Ms. Emilia</b>	<p>-I think the two ponds that is being proposed is not enough.</p>	
<b>Ms. Maria</b>	<p>-Will the proposed WTP able to reduce the issue of smell that we currently experience?</p>	<p>-It is expected that the smell or bad odor emitted from the current system will be reduced.</p>

## 4. PROJECT DESCRIPTION

### 4.1 Locality

The existing Okahao oxidations ponds are located about 0.72 km south of town, adjacent to the village of Oshuukwa in the Ongandjera District. The site is within the approved town boundaries of Okahao town.



**Figure 1: Location map**

The proposed Okahao Wastewater Treatment Plant (WTP) will replace the existing Oxidation Ponds and it will be located at the same location as the oxidation ponds.

- **Existing Oxidation Ponds system**

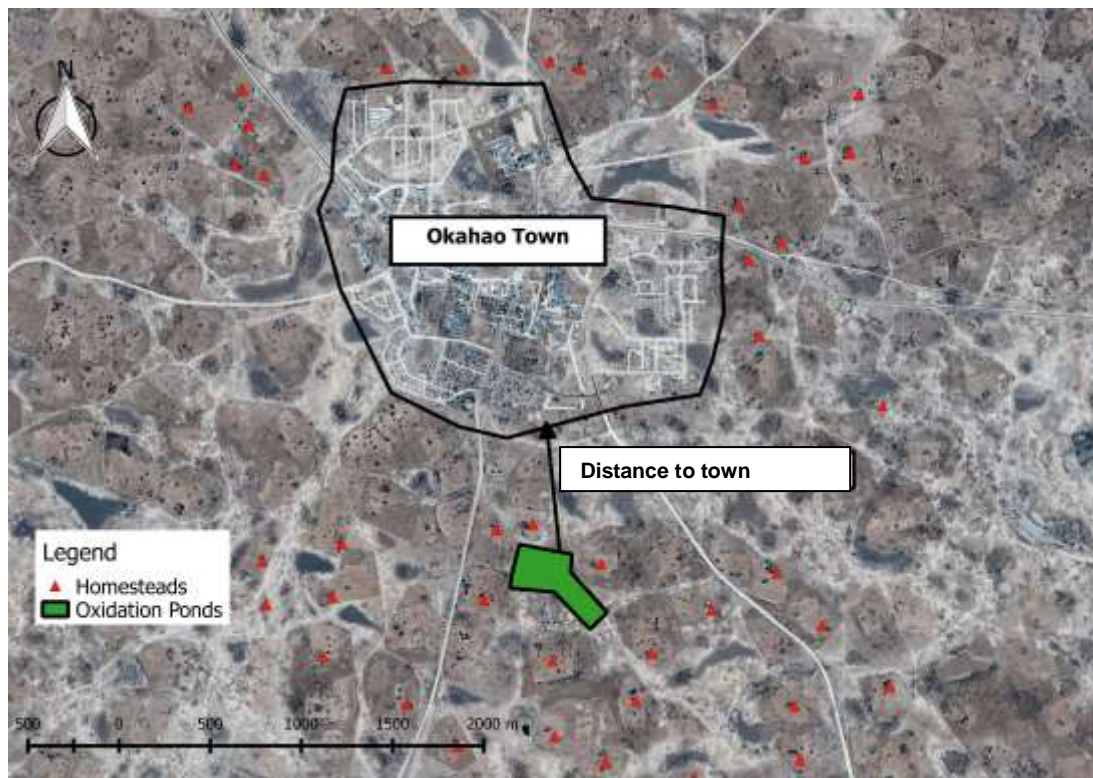
The Okahao town oxidation pond system has a reticulated collection network consisting of four (4) pump stations which are distributed throughout the town area and a final destination of the collected residuals consisting of 14 ponds (six old and 8 new ponds) with a total theoretic design capacity of 690m<sup>3</sup>/d. The six (6) old ponds are relatively big but not lined. The new ponds which are extensions to the old ponds cover an area of about 9,255m<sup>2</sup> which consist of anaerobic ponds with a depth of 2.5m to freeboard and facultative and maturation ponds of 1.5m depth to freeboard.



**Figure 2: Project layout and design**

- **Surrounding land use**

The village of Oshuukwa which is adjacent to the ponds is made up of about 15 homesteads of which close to 5 houses are within 500m radius from the ponds. The adjacent homesteads are predominantly substance farmers who are engaged both in crop production and animal husbandry. The surrounding area is also made of shallow natural streams as well as open grazing areas mainly occupied by domestic animals i.e. goats, sheep, cattle, donkeys, pigs and etc.



**Figure 3: Surrounding environment**



- **Effluent treatment and management**

Sewage that runs into the ponds includes mainly household liquid waste from toilets, baths, showers, kitchens, and sinks. The stabilization process consists largely of the interactions of bacteria and algae. Bacteria digest and oxidize the constituents of sewage and render it harmless and odor free. There is an inlet structure with sluice gates to that effect. Sludge removal in parallel anaerobic ponds should occur annually while sludge removal on dried pond can be done via ramp and front-end loader.

Oxidation ponds are shallow ponds designed specifically to treat sewage by natural purification processes under the influence of air and sunlight. The oxidation ponds also called stabilization ponds or lagoons are biological treatment systems, which processes and operations are highly dependent on the environmental conditions such as temperature, wind speeds and light intensity which highly variable and any given combination of these environmental parameters is usually unique to a given location.

- **General maintenance services**

The ponds are properly fenced off and are guarded 24hr hours. There are also warning signs displaying the message "Water not fit for Human Consumption". The Town Council provides weekly maintenance services of un-blocking of sewer lines and sluice gates. The most challenges at the ponds are *Odour from the ponds which is a nuisance to the residents, Algae or scum which compromise the quality of wastewater and Reeds* which serve as breeding site for mosquitoes and birds. The reeds also serve as breeding sites for mosquitoes which are a nuisance to the neighbors. There are also reported cases of illegal fishing from the ponds by the community.

## 3.2 The proposed Wastewater treatment works

### 3.2.1 Need and desirability

The need and desirability of this project is within the context of the Town's developmental objective in providing sewerage network to its residents in order to safeguard the health of the population in the town and augment the capacity in order to meet the future demand safeguard the health of the population in the town, increase.

According to Om'kumoh Consulting Engineers, the estimated theoretical Average Dry Weather Flow (ADWF) for current existing developments is 610m<sup>3</sup>/day. The heavy rains and severe flooding experienced during the last couple of years in the northern part of the country have resulted in the oxidation ponds breaking and/or spilling raw or insufficiently treated sewage into the surrounding low-lying areas. The overflow of raw sewage causes dangerous health conditions for the people who largely commute by foot through the efundjas (flooded areas). Therefore, it can be said that the existing Okahao Oxidation Pond system is in a poor state, not properly functional and totally overloaded.

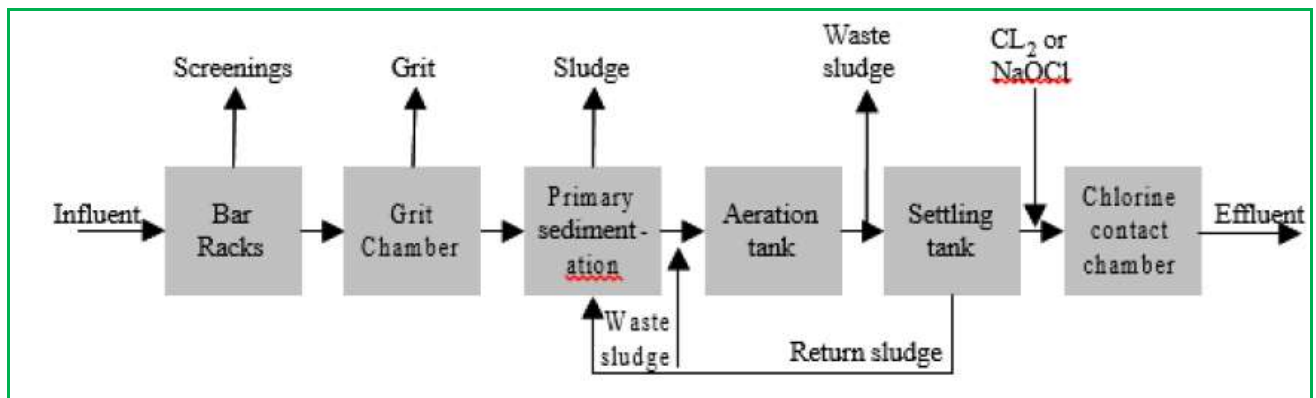
Moreover, the proposed wastewater treatment plant is considered an effective part of the sanitation services which is vital for human health, generates economic benefits, contributes to dignity and social development, and protects the environment.

### 3.2.2 Scope of works

The envisaged Okahao Wastewater Treatment Plant is a trickling filter system and will take into consideration the fluctuations in both load and flow due to daily activities of the local population and operating hours of various institutions and commercial areas. The proposed treatment plant will be designed in such a way to accommodate the sewer from all development and residential areas in the town.

The trickling filter system is the most encountered aerobic attached-growth biological treatment process used for the removal of organic matter from wastewater. A complete trickling filter system includes a primary treatment step, the anaerobic reactor (which can be an anaerobic settler or septic tank), trickling filter and secondary settler as main process units.

The sewage treatment passes through four main stages namely, screening, de-gritter, bioreactor, and clarifier & disinfection.



Stage 1: The first component is preliminary treatment, typically consisting of screening, flow measurement, and perhaps grit removal. The grit traps are designed to remove granular solids from the wastewater like sand, gravel, and other heavy solids, which have significantly higher subsiding velocities and specific weights, than decomposing organic solid waste with the same parameters.

Stage 2: The second component is the primary clarifier, used to remove settleable suspended matter. The purpose of primary sedimentation is to remove unsolved organic material from wastewater, resulting in reduced pollution loads on the next biological treatment stages. Removed organic material, which is called the primary sludge, mainly contains biologically easily degradable compounds and is very well exposed to subsequent anaerobic decomposition with high methane yield.

**Stage 3:** The third stage, the underflow goes to sludge treatment and disposal and the overflow goes to an aeration tank. After a definite time, biological solid compounds move from aerotanks to the settling tank, where a certain portion of settled sludge is digested in bioreactor in order to maintain the desired concentration of microorganisms. The remaining excess sludge is removed from the system.

**Stage 4:** The last stage is the clarification and disinfection. There are two main products produced from the treatment plant namely the purified effluent (PE) and manure. The effluent and manure produced can be used in ornamental garden maintenance.

### 3.2.3 Plant Design Capacity

The design flow of the proposed sewage treatment plant is assumed to be 700m<sup>3</sup>/day which is equivalent to 7000 people. The envisaged WTP will be constructed in two phases as follows.

**Phase 1:** 3000 People Equivalent (PE) (300m<sup>3</sup>/day) Trickling Filter Plant: under this phase a complete Trickling Filter Wastewater Treatment Plant is proposed to be constructed to accommodate the sewer load of the population (2014 ≈ 2000) which is about 200 m<sup>3</sup>/day and an additional sewer load from institutions, commercial places and light industrial areas estimated to be 100 m<sup>3</sup>/day.

**Phase 2:** Additional 4000 PE Trickling Filter Plant; When all the proposed new extensions are fully developed with the residential areas and light industrial, a second modular 4000PE (400m<sup>3</sup>/day) Trickling Filter will be added to the Phase -1 Component. The Phase-1 scope of work will be developed in a way that it can be expanded in the future easily.

### 3.2.4 Project infrastructure

The proposed WTP will be complete with all treatment components required to accomplish screening, primary treatment, carbon removal, nitrifications, solids removal and disinfection. The notable WTP infrastructure are as follows.

- Screens
- Pumps
- Chlorine room and Chlorine contact tanks
- Ponds (old and two additional)

### 3.3 Assessment of Alternatives

The following alternatives were given consideration.

#### i) Site alternative

Considerations were given to the location of the envisaged wastewater treatment works. It was later realized that the current location of the Oxidation Ponds will be suitable for the new Okahao WTP due to the scarcity of suitable land in and around Okahao. Moreover, the current location of the existing Oxidation Ponds is large enough to accommodate the envisaged WTP and placing the new WTP at the oxidation ponds will help to make use of existing ponds to contain the treated effluent.

#### ii). Type of the treatment system

Below is the comparison between the existing oxidation pond system and the proposed treatment system.

**Table 2: Comparison of alternatives**

	Oxidation Lagoon Systems (existing system)	Trickling treatment system (Proposed)
<b>Capital investments</b>	Low	High
<b>Investment in equipment and spares importing costs</b>	Low	High
<b>Energy consumption and operation costs.</b>	Low	High
<b>Ability to function with little control and minimal or no use of electromechanical equipment</b>	High	Low
<b>Area and land requirements</b>	High	Low
<b>Process control</b>	Low	High
<b>Operation and maintenance requirements and requirements of technical sophistication and personnel training</b>	Mediocre – With effluent re-circulation	High
<b>Ability of equalization of large volumes ability of peak hydraulic loads and resistance to shock organic loads</b>	High – Due to large lagoon volumes, long retention times and high buffer capacity.	Low
<b>Effluent quality</b>	Mediocre	High
<b>Ability to control the process for removal of substances other than organic, such as nitrogen, phosphorus - to an exact desired concentration.</b>	Low	High
<b>Flow schemes, equipment, and installation</b>	Simple - Piping, pumping and reduced pre-treatment facilities	complex
<b>Removal of pathogenic bacteria, viruses and protozoa</b>	Relatively high due to long detention periods, solar irradiance	Low

## 4. LEGAL FRAMEWORK

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### 4.1 Environmental requirements

The proposed activities (construction, operation, maintenance, and decommissioning of the proposed Aroab Scheme extension and upgrade) will trigger activities listed under the Environmental Management Act No. 7 of 2007 and the EIA Regulations (No. 03 of February 2012) as follows:

Proposed project activities	Activities triggered	
	Category	Specific activity
<ul style="list-style-type: none"><li>• <b>Construction of new Wastewater treatment plant</b></li></ul>	No. 8 Water Resource Developments	8.6 Construction of industrial and domestic wastewater treatment plants and related pipeline systems
<ul style="list-style-type: none"><li>• <b>Storage of chemicals (Chlorine gas or HTH) for treatment purposes</b></li></ul>	N0.9 Hazardous Substance treatment, handling, and storage	9.1 The storage of a hazardous substance defined in the Hazardous Substance Ordinance 1974

## 4.2 Applicable legislations

In addition to assessing the possible impacts of the project to the environment, it is also required by the EMA that assessment do take in consideration a number of significant pieces of environmental legislation that the project needs to comply with. The list of applicable legislations is presented in the Table below.

**Table 3: Applicable National Legislation**

LEGISLATION	PROVISION and Project implication	Project implications
<p>Constitution of the Republic of Namibia (1990)</p>	<p>Articles 91 (c) commands the state to actively promote and sustain the environmental welfare of the nation by formulating and institutionalizing policies to accomplish the sustainable objectives which include:</p> <ul style="list-style-type: none"> <li>• Guarding against overutilization of biological natural resources,</li> <li>• Limiting over-exploitation of non-renewable resources,</li> <li>• Ensuring ecosystem functionality,</li> <li>• Protecting Namibia’s sense of place and character.</li> <li>• Maintain biological diversity.</li> <li>• Pursuing sustainable natural resource use.</li> </ul> <p>Article 95 (l) recites: “The State shall actively promote... maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future”.</p> <p>Furthermore, Artic 95 (l) ensures that workers are paid a living wage adequate for the maintenance of a decent standard of living and the enjoyment of social and cultural opportunities.</p>	<p>Through the implementation of the EMP, the proponent shall be advocating for sound environmental management as set out in the Constitution.</p>

Environmental Management Act (EMA), Act No. 7 of 2007.	<p>-Ensuring that the significant effects of activities on the environment are considered carefully and in time.</p> <p>-To promote the sustainable management of the environment and the use of natural resources by establishing principles for decision making on matters affecting the environment.</p>	An EIA has been undertaken and ECC will be applied for the proposed project.
Water Supply and Sanitation Sector Policy, 2008	<p>-Enforces the sustainable development and efficient utilization of water resources.</p> <p>-To improve access to safe water for communities in rural, communal areas.</p> <p>- Make sure the provision of sanitation should contribute to improved health, ensure a hygienic environment, protect water sources from pollution, promote water conservation and stimulate economic development</p>	The proposed works are aimed at ensuring proper management of wastewater
Water Resources Management Act 11 of 2013.	To provide for the management, protection, development, use, and conservation of water resources; to provide for the regulation and monitoring of water services and to provide for incidental matters. This Act has been passed by Parliament, but it is not enforced yet. It will be enforced once a date is set by the Minister in the Government Gazette. The Regulations of the WRMA also outlined the water quality guidelines and standards for potable water specified in Table 1 to Table 3 of the WRMA.	Treated effluent should meet the discharge standards as prescribed in the WRA Regulations.
Sewerage and Drainage Regulations (amendments) Local authorities by-law	Affords the prevention of pollution and environmental damage caused by the improper construction of sewerage and water pipelines in drainage lines.	All infrastructure of the new WTP should be of the required engineering standards
Public and Environmental Health Act, 2015	<p>The objectives of the PHE Act are to;</p> <ul style="list-style-type: none"> <li>Promote public health and wellbeing.</li> </ul>	Ensure the new WTP is operated in a manner that to



	<ul style="list-style-type: none"> <li>• Prevent injuries, diseases and disabilities</li> <li>• Protect individuals and communities from public health risks</li> <li>• Encourage community participation in order to create a healthy environment</li> <li>• Provide for early detection of diseases and public health risks</li> </ul>	prevent safety, health and environmental risks.
Labour Act (No 11 of 2007)	To establish a comprehensive labour law for all employers and employees; to entrench fundamental labour rights and protections. Regulate basic terms and conditions of employment; ensure the health, safety and welfare of employees; to protect employees from unfair labour practices; to regulate the registration of trade unions and employers' organisations; to regulate collective labour relations; to provide or the systematic prevention and resolution of labour disputes;	All Labour related issues should be handled according to the Act
Employment Service Act no. 08 of 2011	To provide for the establishment of the National Employment Service; to impose reporting and other obligations on certain employers and institutions; to provide for the licensure and regulation of private employment agencies; and to deal with matters incidental thereto.	Employment conditions during construction and operation phases should be handled in accordance with the Employment scheme.

## 5. THE AFFECTED ENVIRONMENT

This section provides a brief description of the existing biophysical and socio-economic environments of the study area. It draws on information from site visits, the study team and member's experiences, background literature as well as maps and photographs. In doing so, it presents a background against which the positive and negative impacts of the projects can be assessed. Biophysical information includes *Climate, Soil & Geology, Hydrology and Flood risk vulnerability*, whereas information on social environment includes description of the affected or adjacent land-use, culture and historical aspects of the area as well as economic and social development of the town and the affected area/village.

### 5.1 Description of Biophysical Environment

- **Climate overview (Regional)**

In general, the climatic condition of the northern central of Namibia is described as semi-arid to sub-humid with the rainfall confined mainly in summer months (November-March). The northern area receives a significantly greater amount of precipitation, averaging around 400 mm (15.7 in) per year. The rainfall pattern is highly variable in amount and distribution. The wet and dry spells are thus a normal climatic feature of this environment, and it has been persistent for millions of years. Temperatures are cooler and more moderate, with approximate seasonal variations of between 10 and 30 C (Kangombe, 2010).

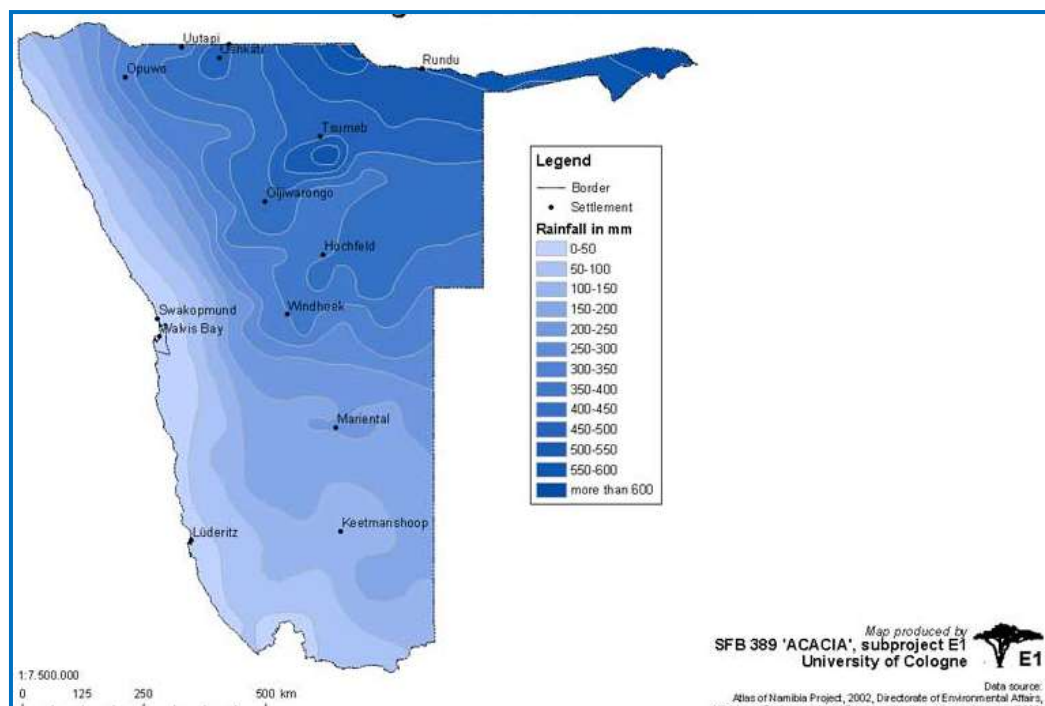


Figure 4: Climatic map of Namibia

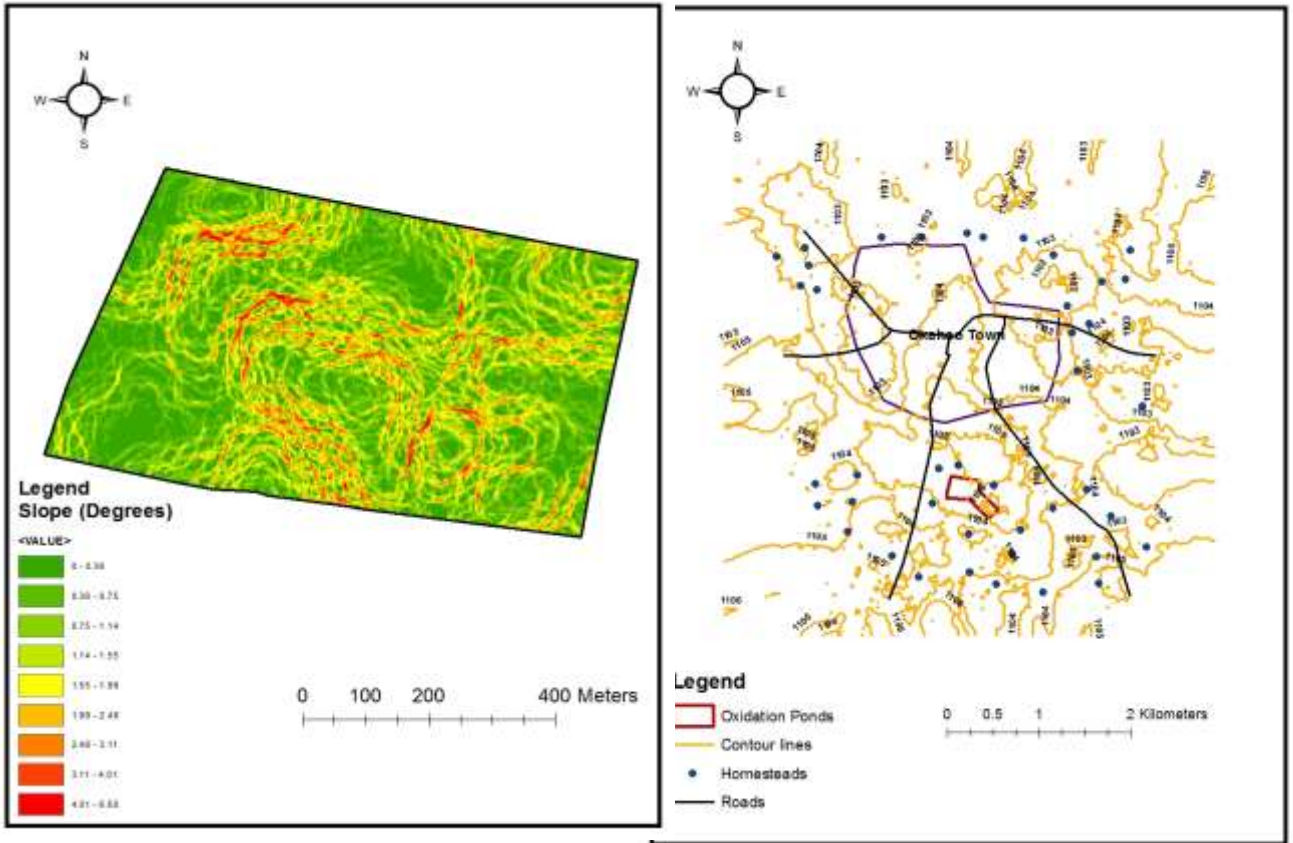
- **Topography of the area and surrounding**

The topography of the Okahao is characterised by a combination of high and low-lying areas intersected by shallow water courses. The town is located between 1000-1100 m of altitude and a very flat area with a difference between the higher areas and the more low-lying areas of only 2.0m. The flat shallow depressions or *Oshanas* fills up with surface water during the rainy season. The *Oshanas* also receives and keep water from heavy rainfalls that are occasionally experienced in this part of the country.



**Figure 5: Topographic overview of Okahao area**

There are many houses and business located in low lying areas and often flooded by heavy rain falls because rainwater stands still in and around due to the lack of an appropriate drainage system in place to facilitate the rapid evacuation of the water (Tamayo. *et al*, 2011).

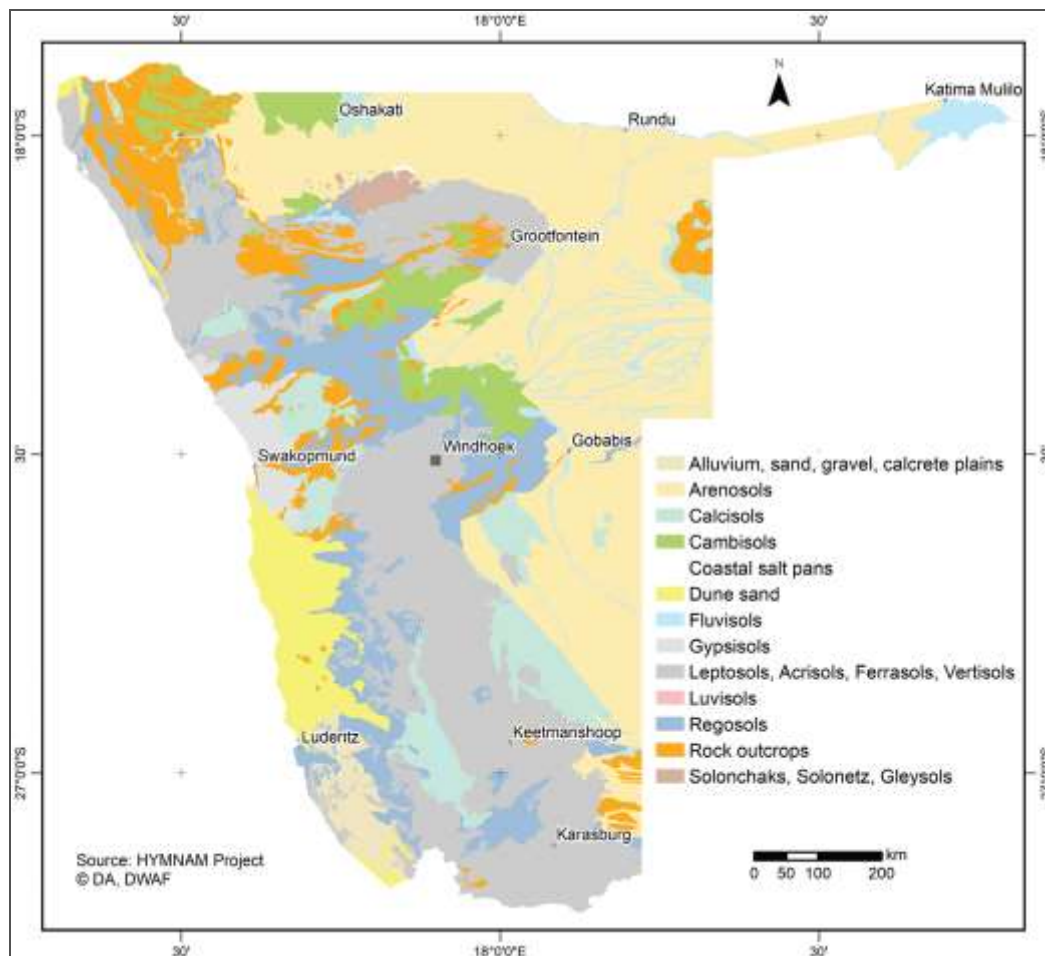


**Figure 6: Slope and contour line of the site**

The slope of the site is made of combination of high to very low-lying areas. This ranges from 100m-250m. The contour lines of the area are circulating in and around the site depicting a very stable slope.

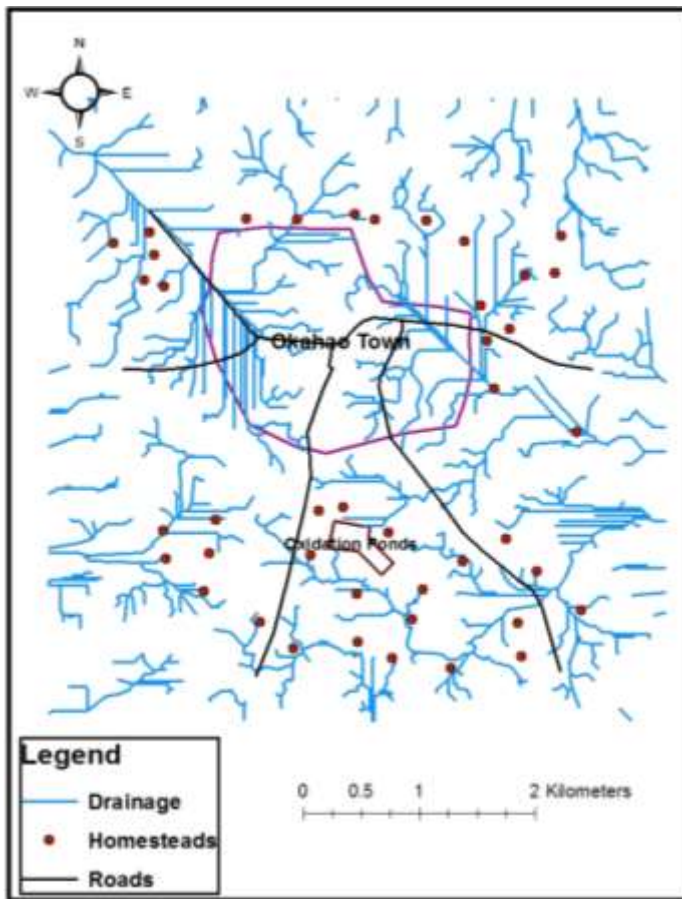
- **Soil and Geology**

The soil of Okahao is dominated by deep Kalahari and Namib sand that mostly occur in the formation of sands and other sedimentary materials, while the clay sodic sands dominate in the Oshanas. The soil type classification is termed to be favourable for crop cultivation and plant grow in general, and this is determined by its physical properties to the nature of water retention, lower salinity and high nutrient level. In principle, the soil comprises of mosaic soil type such as clay and average salty clay. This determines that the main soil dominance is *Eutric Cambisols* that characteristic by its definition on consistency, colour and structure. On extent, it is found in the depression of low-lying areas of the landscape, and typically contain accumulations of calcium carbonate. These soils are potentially fertile, but iron and zinc occurrence might be at lower-level concentration sometimes (Mendelssohn, 2002).



**Figure 7: Soil map of Namibia**

- **Surface water and Drainage**



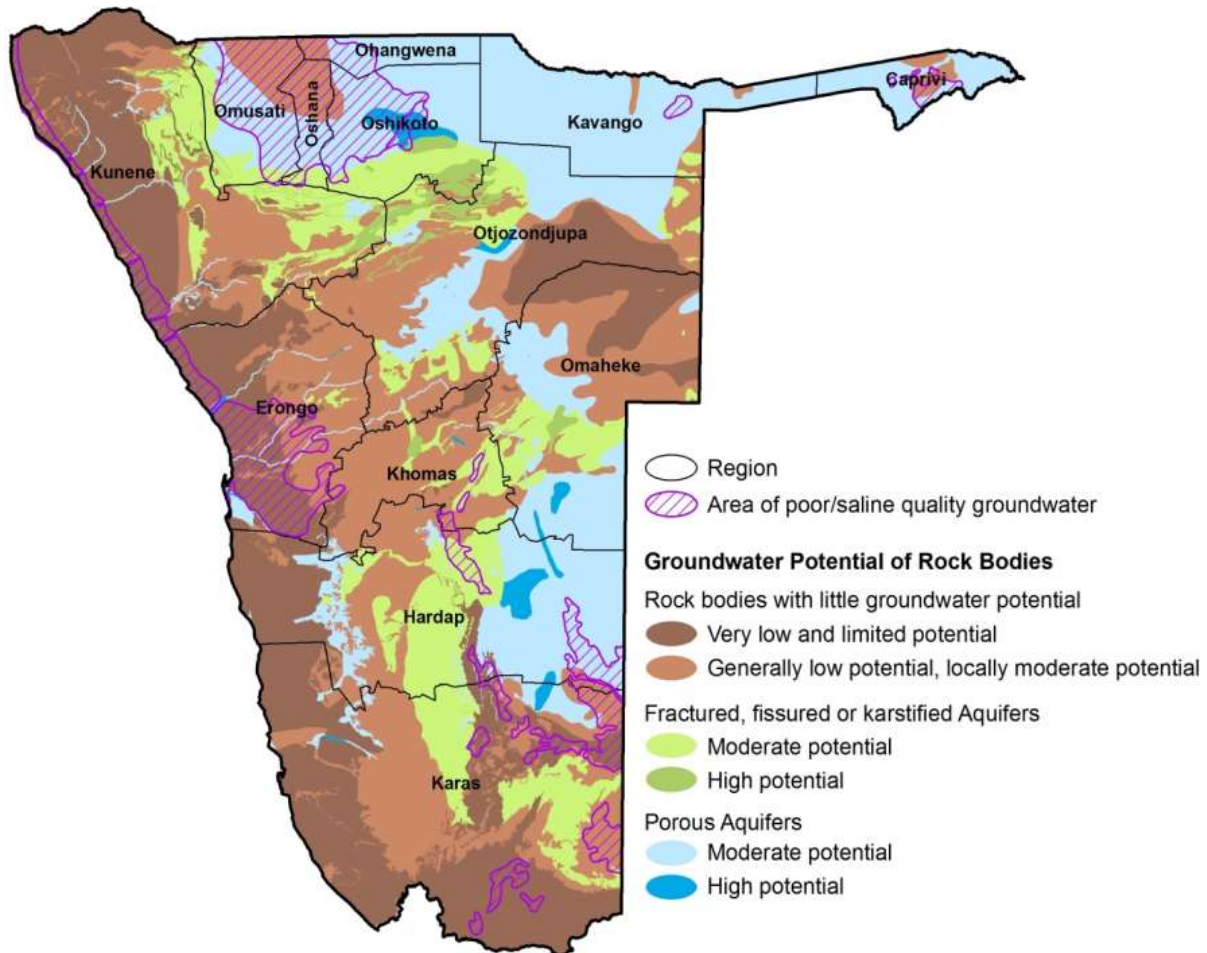
**Figure 8: Drainage of the site**

These (*Oshana*) are usually recharged by flood waters that flow from the highlands of the neighbouring Angola and flowing toward Etosha pan. The endorheic drainage to Etosha Pan is the most important hydrological system in the northern region, it comes from the Cuvelai basin from Angola, and it is responsible of the extremely floods in these entire regions also with heavy rain fall average. These seasonal flows provide fishing grounds, renew pasture and recharge ground water supplies.

The site is made of combination of drainage lines running in and around the site. Given the drainage situation, it is highly probable that there is a seepage of water into the soil especially at the low-lying areas.

- **Groundwater resources**

According to the national hydrogeological map, the Okahao area is part of the Cuvelai-Etosha groundwater Basin. Most of the land surface of this basin is very flat dipping from some 1150m above sea level (m.a.s.l) in the north-east to 1 080m.a.s.l in the Etosha Pan, which is the largest pan in Namibia. All groundwater within the basin flows towards the Etosha Pan, due to the structure of the basin and because as the pan deepest point, is the base level of the groundwater flow system.

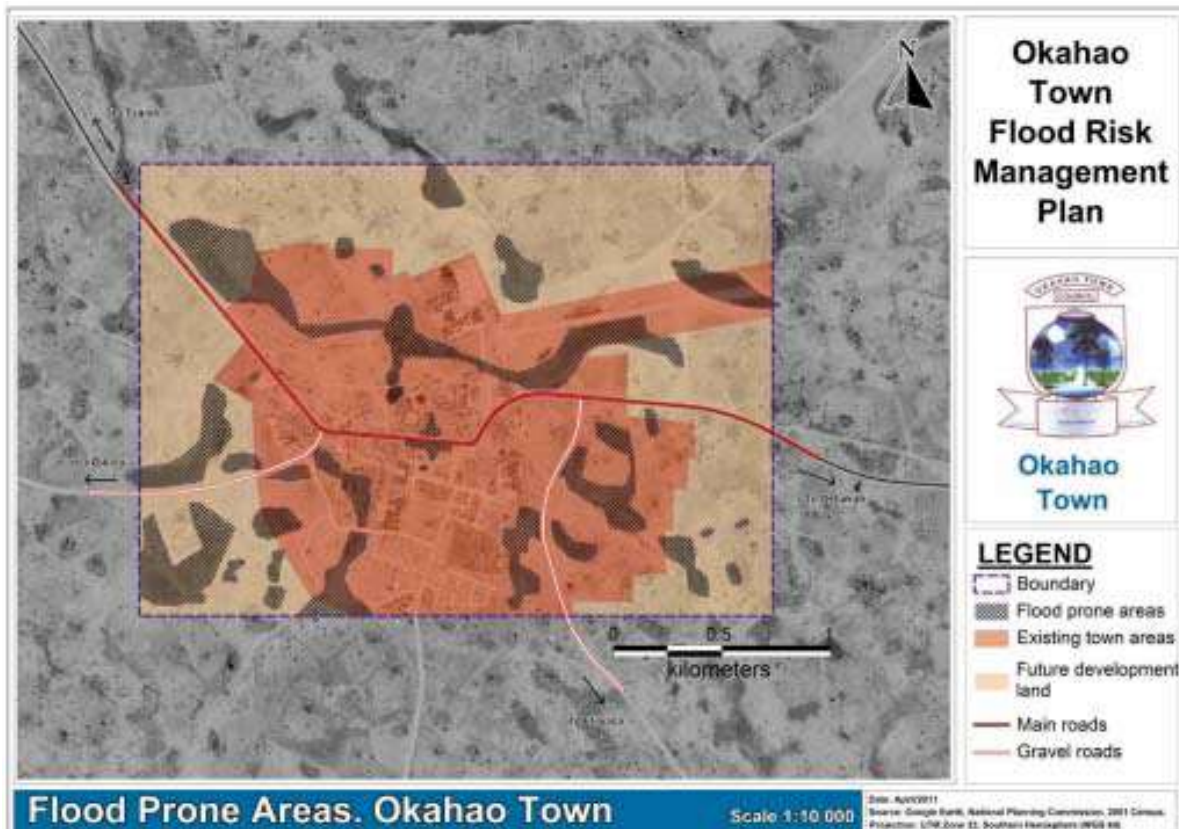


**Figure 9; Hydrogeological map of Namibia**

According to the Directorate of Water Resource Management (DWRM), the Okahao area is characterised by the Oshana Multi Layered Aquifer System, constituting unconsolidated to semi consolidated sand and gravel and locally *calcrete*. The groundwater in the area is found at the depth of up to 20 m. The ground water found in shallow discontinuous aquifers (Perched Aquifers) are utilized by the local communities by means of hand dug wells, while deeper groundwater reaching depths of 197m are mostly saline to hyper saline and are virtually unusable due to the presence of dissolved solids derived from the rocks in which the water is stored.

- **Flood risk vulnerability**

According to the Flood Risk Assessment of 2011, the town of Okahao is not affected directly by the floods but specifically by the heavy rain falls. The rainwater stands still, due to the lack of an appropriate storm water system in place to facilitate the rapid evacuation of the water.



**Figure 10: Flood risk assessment of Okahao town**

As can be seen in the Map above, the areas mostly affected by flood are located at the north of the main road Tsandi-Oshakati and east part of the town thus they are in general more low-lying areas with some islands higher than the rest of the area.



## 5.2 Socio-economic profile of Okahao

The information for the socio-economic assessment were obtained from the Town Council's LED, personal observations, as well as from views expressed during public meeting and direct interviews with affected communities.

- About the town

Okahao is one of the newly proclaimed Local Authority in Omusati Region, northern part of Namibia. It is situated in the Ongandjera tribal area 73 kilometres west of Oshakati on the main road MR123 (Outapi - Tsandi –Okahao) and is the district capital of the Okahao electoral constituency.

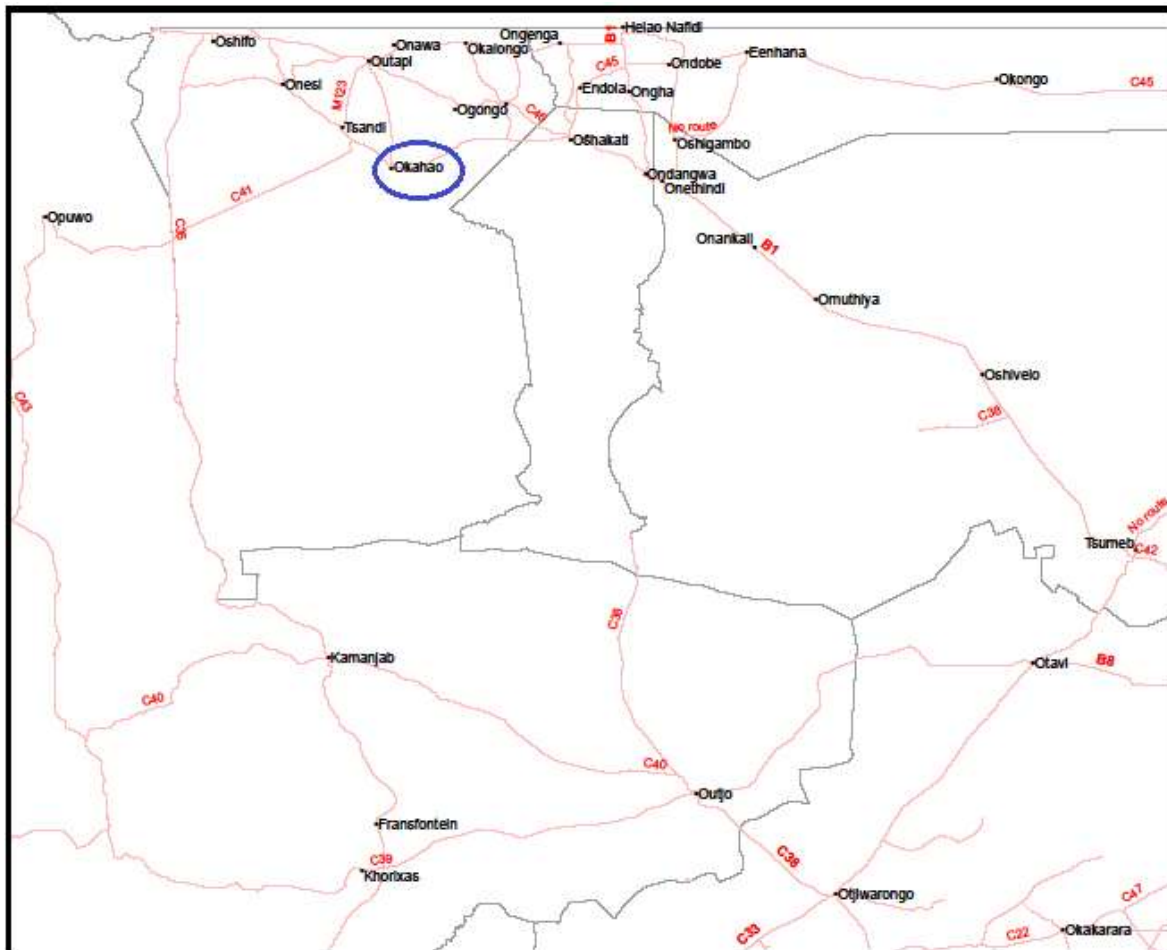


Figure 11: Location map for Okahao town

- Town History

Okahao is a historical place that is unique in its own right. As a locality, Okahao was a village for the families of Ongandjera Kings. The place was therefore considered occupied with ancestral sanctification. Okahao is also home to Christianity in Ongandjera, as it is here where the ELCIN Finish Missionary set up a centre during the early years of spreading the Christian gospel. It is an emerging town that is strategically located urban centre with various economic development potentials (Local Economic Development Strategy, 2012).

Politically, the town of Okahao is governed by a town council that currently has seven political office bearers, headed by the Worship Mayor. The administration consist of the Chief Executive Officer (CEO) and two main departments which execute the duties of the Council, namely; Department of Finance, Human Resources and Administration, and the Department of Planning Technical Services and Environment (Local Economic Development Strategy, 2012; Okahao Town Council, 2015).

- Demographics of Okahao

According to the Population Census of 2011, the population of the Okahao electoral constituency was at 17,548 people of which 1,600 people reside in the town. Although, the urban population of Okahao is very small the actual number of people served by the town is high due to migration of people from nearby constituencies. The majority (51%) of the population are people at the age between 15-59 years old. This same group of people also represent the labour force of Okahao constituency of which 63% are employed while 37% are unemployment (Population Census, 2011). The Town is developing rapidly with regard to services provided by the Town Council and the growth of the population (Okahao Town Council, 2023).

- Local Economic Development context

The Town has good infrastructure and services (road networks, telecommunications, postal services, schools, hospitals, safety and security services and basic urban services i.e., water, sewer, electrical reticulation and shopping complexes). These services are mainly constructed in all three townships. Agriculture, (mainly crop and animal husbandry) is the most important sector in the area and is practised mainly on a subsistence basis. However, of late the Okahao town has become an important centre for livestock trading where animal is sold both live and as meat. Other important economic sectors are such as retailers, transport, and tourism (Okahao Town Council, 2023)

With regards to the road network, the Okahao town is linked to the national transport node infrastructure. Okahao is also connected to main growth centres within Okahao constituency and neighbouring constituencies. The most important road networks include Oshakati-Okahao-Tsandi-Outapi, Okahao-Omakange-Okahao-Omutambo Gwomawe roads, these roads connect the extreme western end of the east west tourist route from northern east to Etosha, National Park and would enable the tourist access via Okahao to Kunene (Ruacana waterfalls as well as Epupa falls) these infrastructures provide a good foundation for any economic investments. The telephonic and mobile communication infrastructures are well established.

The main employer are the Ministry of Education, Ministry of Health, Social Services and Rehabilitation, Ministry of Safety and Security, Ministry of Agriculture and Forestry, Ministry of Youth and Sport and Culture, Okahao Town Council, NAMPOST, Okahao Constituency Office and the Local Business Sector.

- Sanitation and Hygiene situations

Okahao receives a supply of potable water from Namwater. The main source is a pipeline coming from Ruacana to a dam and treatment plant located in the central area of the town. The distribution system initiates from a water tower located in the Namwater site, to a reticulated network that covers most of the occupied land on the south zone and some parts of the north zone. The town is having a sewerage system that covers most of the urban area, consisting in a reticulated collection network and four (4) pump stations distributed throughout the town area. The final destination of the collected residuals is an oxidation pond located on the south part of the town, outside of town boundaries. All formal residential areas are connected to the town sewage system while septic tanks are found at some informal settlement and nearby villages.

- Education and Community services

Okahao is home to six schools which includes two Secondary schools (Etalaleko and Shaanika Nashilongo Secondary School), one combined school (Nangombe Combined School), one primary school (Okahao Primary School), one private school and a kindergarten. There is also a community library, a Police station, a prison and several government ministries (MAWF, MoHSS, MLR and MWT) in the town (Okahao, 2016; LED, 2012).

- Public Health Services

The town is served with a district hospital with specialised doctors on duty around the clocks. The district hospital is fully fledged with outpatient department, as well as the pharmacy, radiography, dental clinic, laboratory, eye clinic, a communicable disease control (CDC) department. The hospital was renovated and upgraded to the tune of N\$27 million. The town is also served with two PHC clinics, pharmacies and private medical centres for general and dental expertise operating during the day (Okahao Town Council, 2016; MoHSS, 2004).

There are no major health risks reported in the town and surrounding except some cases of malaria, Tuberculosis which are reported at times. The Ministry of Health and Social Services runs various programmes such, Immunization, Community Based Health Care (CHBC), Food and Nutrition, Vector Borne Disease Control program and many more. Through these programmes, the Ministry provide education, information and materials for the control and prevention of spread of diseases and promote general public health in the community. Lastly the Ministry has an updated Health Information System (HIS) which keeps all health-related statistics (MoHSS, 2004).

- The affected community and land users

The affected community is the village of Oshuukwa which is surrounding this project. The village consists of more than 20 homesteads of which more than ten (10) are within 300m radius of the project and are directly affected by the sewage ponds. The livelihoods of the area can be described as agro-silvo-pastoral. The land-use activities in the area include substance farming with crop production i.e. mahangu, millet and animal husbandry of sheep, goat, cattle and poultry as the main activities.

## 7. ANTICIPATED IMPACTS

### 7.1 Introduction

The EIA of the project activities is determined by identifying the environmental aspects and then undertaking an environmental risk assessment to determine the significant environmental aspects. The term “environment” is used to describe the total integrated environment, which includes aspects of the natural, economic, and social environment.

#### Impacts rating scales

In assessing the impact of the proposed development, four rating scales were considered. Each issue identified was evaluated in terms of the most important parameter applicable to environmental management. These include the extent, intensity, probability, and significance of the possible impact on the environment and whether such effects are positive (beneficial) or negative (detrimental). The rating scales used are as follows.

**Table 4: Impact rating scales**

CRITERIA	DESCRIPTION			
EXTENT	<b>National (4)</b> The whole country	<b>Regional (3)</b> Omusati Region and neighbouring regions	<b>Local (2)</b> Within a radius of 2 km of the development site.	<b>Site (1)</b> Within the development site
DURATION	<b>Permanent (4)</b> Mitigation either by man or natural process will not occur in such a way or such a period that the impact can be considered transient	<b>Long-term (3)</b> The impact will continue/last for the entire operational life of the development but will be mitigated by direct human action or by natural processes thereafter.	<b>Medium-term (2)</b> The impact will last for the period of the project phase, whereafter it will be entirely negated	<b>Short-term (1)</b> The impact will either disappear with mitigation or will be mitigated through a natural process in a span shorter than the construction phase
INTENSITY	<b>Very High (4)</b> Natural, cultural, and social functions and processes are altered to extent that they permanently cease	<b>High (3)</b> Natural, cultural, and social functions and processes are altered to extent that they temporarily cease	<b>Moderate (2)</b> The affected environment is altered, but natural, cultural, and social functions and processes continue albeit in a modified way	<b>Low (1)</b> The impact affects the environment in such a way that natural, cultural, and social functions and processes are not affected
PROBABILITY	<b>Definite (4)</b> The impact will certainly occur	<b>Highly Probable (3)</b> Most likely that the impact will occur	<b>Possible (2)</b> The impact may occur	<b>Improbable (1)</b> The likelihood of the impact materializing is very low
SIGNIFICANCE	Is determined through a synthesis of impact characteristics. Significance is also an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.			

**Table 5: Description of the significance of impacts**

<b>Low impact</b>	A low impact has no permanent impact of significance. Mitigation measures are feasible and are readily instituted as part of a standing design, construction, or operating procedure.
<b>Medium impact</b>	Mitigation is possible with additional design and construction inputs.
<b>High impact</b>	The design of the site may be affected. Mitigation and possible remediation are needed during the construction and/or operational phases. The effects of the impact may affect the broader environment.
<b>Very high impact</b>	Permanent and important impacts. The design of the site may be affected. Intensive remediation is needed during construction and/or operational phases. Any activity which results in a “very high impact” is likely to be a fatal flaw.
<b>Status</b>	Denotes the perceived effect of the impact on the affected area.
<b>Positive (+)</b>	Beneficial impact
<b>Negative (-)</b>	Deleterious or adverse impact.
<b>Neutral (/)</b>	The impact is neither beneficial nor adverse
It is important to note that the status of an impact is assigned based on the status quo. Therefore, not all negative impacts are equally significant.	
<b>Significance Rating Scale</b>	
Points 1-4 Insignificant/low	
Points 5-8 Significant /Moderate	
Points 9-12 Very significant/High.	
Points 13-16 Highly significant /Very high	

The significance of each impact has been rated before and after mitigations measures. The implementation of mitigations is expected to reduce the significance of impacts using at least two (2) scales.

### 7.3 Potential Impacts During Planning and Design Phase

The first step in avoiding and preventing any possible negative impacts during the construction, operation, maintenance, and decommissioning phase, should start with the planning and designing phase. Below are issues that should be considered during the planning and design phase.

- Locality of treatment plant infrastructure
- Treatment technology
- Treatment capacity

## 7.4 Potential Impacts During Construction Phase

The anticipated negative impacts during the construction phase of the proposed wastewater treatment plant will affect both the biophysical and socio-economic settings of the receiving environments as explained below.

### **a) Negative impacts to the natural environment**

- Vegetation clearance
- Disturbance to local fauna
- Soil contamination
- Dust and air pollution
- Waste generation
- Risks of groundwater contamination

### **b) Negative impacts on the socio-economic environment.**

- Impacts to adjacent land users
- Public Health and Safety impacts
- Occupational health and safety hazards
- Impacts of laydown areas, and temporary camps
- Visual and aesthetic impacts



**Table 6: Potential Impacts during Construction phase**

Potential Impacts	Ratings (before mitigation/measures)				Significance		Mitigation measures
	Extent	Duration	Intensity	Probability	Without measures	With measures	
<p><b>Vegetation clearance</b></p> <p>Construction of the new WPT infrastructure may result in clearance of local vegetation</p>	1	1	1	1	4	2	✓ Only vegetation directly affected by the construction activities may be cleared.
<p><b>Disturbance to local fauna</b></p> <p>Construction activities has potential to cause disturbances to th local occurring fauna i.e. domestic animals, ground-burrowing animals</p>	1	1	1	1	4	2	✓ Construction site must be fenced of and disturbances should be limited to the construction site
<p><b>Soil contamination</b></p> <p>Contamination of soil may occur as a result of leaks and spills from vehicles and equipment</p>	1	1	1	2	5	4	<ul style="list-style-type: none"> <li>✓ Vehicles with leaks should be fitted with drip trays.</li> <li>✓ Contaminated sand must be removed and disposed of as hazardous waste.</li> </ul>
<p><b>Dust and Noise</b></p> <p>To be generated from demolishing works might constitute a nuisance. This will be limited to the project site.</p>	1	1	1	1	4	4	<ul style="list-style-type: none"> <li>✓ Work should be limited to daytime hours.</li> <li>✓ Provide measures to control dust and noise.</li> </ul>
<p><b>Waste generation</b></p>	1	1	1	2	5	3	✓ Building rubble and other general waste should be

The activities will generate different types of waste.							disposed of appropriately at Okahao disposal site. ✓ Steel and metals should be taken to local Scrapyards in the nearest town if any.
<b>Risks of groundwater contamination</b>  Groundwater contamination may occur through the contamination of topsoil or through direct contamination from spills	1	1	1	1	4	2	✓ Spills and leaks should be contained and contaminated sand should be cleaned up and disposed of at the Okahao dumpsite.
<b>Public health and safety impacts</b>  The safety of the community living in proximity of the site and the employees could be compromised by workplace hazards.	1	1	1	1	4	2	✓ Erect warning signs at the construction work site. ✓ The site should be fenced off and out of bounds. ✓ Prohibition and access restricted signs should be displaced at the site.
<b>Occupational health and safety hazards</b>  Construction activities are associated with numerous health and safety risks. The risks can be aggravated by lack of know-how or skills.	1	1	1	1	4	2	✓ All employees should receive training in their respective jobs. ✓ All employees should be equipped with appropriate Personal Protective Equipment (PPE). ✓ There should be a safety representative for the

							construction workers
<p><b>Impacts of laydown areas, and temporary camps</b></p> <p>The placement of temporary construction camps and workshop is very crucial, as poorly placed camps could result in various environmental and land use impacts.</p>	1	1	1	2	5	3	<p>✓ Temporary construction camos should be placed on areas approved by the Town Council and should be fitted with sufficient ablution facilities.</p>
<p><b>Visual and aesthetic impacts</b></p> <p>Visual intrusion may occur from construction camps, waste (litters)</p>	1	1	1	1	4	2	<p>✓ The construction site should be always kept clean and tidy.</p> <p>✓ Cement should be mixed in enclosed areas.</p>

## 7.5 Potential Impacts During Operation and Maintenance Phase

The anticipated negative impacts during the construction phase of the proposed above and below ground pipelines will affect both the biophysical and socio-economic settings of the receiving environments as explained below.

### **c) Negative impacts to the natural environment**

- Potential contamination of the environment
- Danger of chemicals
- Waste generation
- Risks of groundwater contamination

### **d) Negative impacts on the socio-economic environment.**

- Land use effects
- Public health and Safety impacts
- Smells and Odor
- Occupational health and safety hazards

**Table 7: Potential Impacts During Operation and Maintenance Phase**

Potential Impacts	Ratings (before mitigation/measures)				Significance		Mitigation measures
	Extent	Duration	Intensity	Probability	Without measures	With measures	
<p><b>Potential contamination of the environment</b></p> <p>Contamination of the environment may occur as result of overflows of untreated sewage</p>	1	2	2	1	6	4	<p>✓ There must be a proper emergency plan to deal with uncertainties that may occur.</p>
<p><b>Danger of chemicals</b></p> <p>The treatment of wastewater requires the use of chemicals i.e., HTH or Chlorine that are dangerous the to the public and employees alike, especially if not properly stored or used incorrectly.</p>	1	1	1	1	4	4	<p>✓ All chemicals should be handled and used in accordance with the respective Material Safety Data Sheet (MSDS).</p> <p>✓ Employees should be trained in the use of chemicals and also provided with proper PPE.</p>
<p><b>Waste generation</b></p> <p>The operation of the WTP will generate different types of waste from screening, office operation, spills, and material spoils.</p>	2	1	1	1	5	3	<p>✓ General waste should be disposed of at Okahao disposal site.</p> <p>✓ All hazardous waste should be collected and disposed of separately to Walvis Bay or Windhoek landfill sites.</p>
<p><b>Risk of groundwater</b></p>	1	1	2	2	6	4	<p>✓ The ponds holding purified</p>

<p><b>contamination</b></p> <p>Groundwater contamination may occur through discharge of untreated or poorly treated effluent into the environment or percolation from sewage ponds.</p>							<p>effluent must be lined.</p> <p>✓ Only effluent treated at the required standard should be discharged into the environment</p>
<p><b>Land use effects</b></p> <p>The operational and maintenance activities may result in</p>	1	1	1	2	4	2	<p>✓ There must be a proper channel of handling complaints and grievances.</p>
<p><b>Public health and Safety impacts</b></p> <p>The presence of open ponds may pose safety and health risks to the public.</p>	1	1	1	1	4	2	<p>✓ The site should be out of bounds to the community.</p>
<p><b>Smells and Odors</b></p>	1	1	1	1	4	2	<p>✓ The smell and bad odor are expected to be reduced</p>
<p><b>Occupational health and safety hazards</b></p> <p>The operation of the WTP can give rise to a number of occupational health and safety risks</p>	1	1	1	1	4	2	<p>✓ Employees should receive training with regards to the job and potential risks</p> <p>✓ Employees should be provide with appropriate PPE.</p>
<p><b>Public Health and Safety risks</b></p> <p>The safety of the community living in proximity of the site may be compromised.</p>	2	1	1	1	5	4	<p>✓ The site should be fenced off and out of bounds.</p> <p>✓ All employees should be equipped with appropriate</p>

								<p>PPE.</p> <p>✓ Prohibition and access restricted signs should be displaced at the site.</p>
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## **8. RECOMMENDATIONS AND CONCLUSION**

The objective of the Scoping Phase was to establish the baseline of the proposed development and to solicit input from stakeholders and Interested and Affected parties to define the range of the impact assessment and determine the need to conduct any specialist study. It is believed that this objective has been achieved and adequately documented in this report. All possible environment aspects have been adequately assessed and necessary control measures have been formulated to meet statutory requirements. These measures have been presented in the Environmental Management Plan for this project and appended to this report.

### **8.1 Assumptions and Conclusions.**

- It is assumed that all information provided by the Town Council, and Stakeholders as well as by Interested and Affected Parties is deemed valid and correct at the time it was provided.
- The proposed Wastewater Treatment Plant is well received by the residents and stakeholders alike; thus, no objections were received during the consultation process.
- This scoping assessment is limited only to current project and current land use and thus any changes or upgrading of the project and its surrounding will trigger changes to this scoping report and the EMP.
- The proposed upgrading of the existing oxidation ponds to a Wastewater Treatment Plant is a move in the right direction by the Okahao Town Council, thus it will address the capacity problems which result into overflowing of untreated sewage into the open environment.
- The proposed WTP by trickling filter system is deemed appropriate for the Okahao town and will solve existing problems such as the *foul smell, mosquitoes, snakes, birds* that are associated with the current Oxidation ponds.
- The final effluent produced from the envisaged WTP will be of required standards and can be used for limited agricultural activities i.e., landscaping, ornamental or animal feed production.



## 8.2 EAP Recommendations

To the proponent

- The Okahao Town Council shall implement various mitigation measures as outlined in the EMP, conduct monitoring monthly and submit Annual Environmental Reports to the competent authority during the validity of the ECC (3years).
- It must be noted that most of the proposed mitigation measures will require cost for proper implementation, thus the Town Council should consider budgetary planning in order to implement such measures and avoid or mitigate the negative impacts of the project.
- The Town Council should appoint an Environmental Control Officer (ECO) who shall be fully responsible to oversee the implementation of the Environmental Management Plan (EMP).
- Environmental training and awareness on the content of the EMP shall be provided to all contractors, sub-contractors, employees, and all parties involved in the management of the oxidation ponds. This should be done by the ECO in consultation with the EAP.
- The ECO should ensure regular complacence monitoring of the WTP operation and ensure compliance to the conditions of the Wastewater Discharge Permit

b). To the Authorities (DWA and MEFT/DEA)

- To this end, it is recommended that the Environmental Commissioner approves the findings of this assessment and recommendations therein, consider issuing the **Environmental Clearance Certificate for the Construction, Operation and Maintenance of the Okahao Wastewater Treatment Plant** with the necessary conditions as outlined above and, in the EMP.,

## 9. REFERENCES

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- Government Gazette. No.5367 Promulgation of Water Resource Management Act, 2013 (Act No. 11 of 2013 of Parliament), 2013, Windhoek, Republic of Namibia.
- Mendelsohn, J., Jarvis, A., Roberts, C., & Robertson, T. 2002. Atlas of Namibia. New Africa Books (Pty) Ltd: Cape Town.
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- Tamayo V, et al, Flood risk management Plan, 2011. Ministry of Regional, Local Government, Housing and Rural Development
- Local Economic Development (LED), Okahao, 2012
- Omusati Regional Profile, 2010, Omusati Regional Council

## **10. APPENDICES**

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Appendix A: Copy of the Wastewater Discharge Permit

Appendix B: Proof of Consultation

Appendix C: Preliminary Design Report

Appendix D: EMP