

The Environmental Scoping Assessment for the Proposed Construction and Operation of a Wastewater Treatment Plant and Oxidation Ponds in Opuwo, Kunene Region.

ECC Application Reference: APP- 006189

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EXECUTIVE SUMMARY

The Opuwo Town Council (hereinafter referred to as the Proponent) is planning to construct and operate a new Wastewater Treatment Plant (WWTP) and two Oxidation Ponds in Opuwo, Kunene Region. This initiative arises from the deteriorated state of the existing oxidation ponds, which no longer meet the town's wastewater management needs. The proposed plant is designed to treat approximately 2,284 m³ of wastewater per day on a site measuring about 30 hectares. Wastewater inflows originate mainly from residential households, with additional contributions from commercial and institutional activities. Treated effluent will primarily be reused for irrigation of public spaces, including the soccer stadium and Opuwo Park, thereby contributing to local water reuse strategies. The site is located within the Ombombo Communal Conservancy, which requires that all infrastructure development be managed in an environmentally responsible manner to avoid ecological degradation (Opuwo Town Council, 2024). The proposed location for the wastewater treatment plant is shown in Figure 1. The project is located (-18.010670442 13.854668234) north east of Opuwo Town, in Kunene Region.

The application for the ECC was compiled and submitted to the competent authority (Ministry of Environment and Tourism (MET) as the environmental custodian for project registration purposes.

Upon submission of an Environmental Scoping Assessment (ESA) Report and Draft Environmental Management Plan (EMP), an ECC for the proposed project may be considered by the Environmental Commissioner at the MET's Department of Environmental Affairs and Forestry (DEAF).

Brief Project Description

Planned Activities: Waste Water Treatment Plant

The Proponent intends to adopt a systematic Construction approach to the project as follows:

- **Planning phase** - This is the stage during which the Proponent prepares all the administrative and technical requirements needed for construction of the Treatment Plant and site upgrading. This planning will include the procurement of services such site construction and upgrading contractor.

- **Construction phase** - This is the phase where during which the Treatment Plant and associated infrastructure (oxidation ponds) are constructed and the site is revamped through appointed contractor(s). This will entail the earthworks for the erection of the Plant structures and installation of necessary services, infrastructures, etc., as well as upgrading of the site fencing.
- **Closure (Decommissioning)** - This is the stage at which the Proponent will stop using the site for wastewater (effluent) management, leading to the decommissioning and closure of the facilities. However, this is unlikely that the site operations will cease as there will always be the need for wastewater management in the Town.

Public Consultation

Public Consultation Activities

Regulation 21 of the EIA Regulations details steps to be taken during a public consultation process and these have been used in guiding this process. The public consultation process assisted the Environmental Consultant in identifying all potential impacts and aided in the process of identifying possible mitigation measures and alternatives to certain project activities. The communication with I&APs about the construction of the waste water treatment plant activities was done through the following means in this order to ensure that the public is notified and allowed to comment on the proposed project:

- A Background Information Document (BID) containing information about the proposed activities was compiled and emailed upon request to all registered Interested and Affected Parties (I&APs).
- Project Environmental Assessment notices were published in New Era Newspaper (**01 November 2024 and 08 November 2024**), and The Namibian Newspaper (**01 November 2024 and 08 November 2024**), briefly explaining the activity and its locality, inviting members of the public to register as I&APs and submit their comments/concerns.
- A consultation meeting was scheduled and held at Opuwo Open Market on the 25th of January 2025 at 12h00.
- The issues and concerns raised were noted and used to form a basis for the ESA Report and EMP.

Potential Impacts identified

The following potential impacts are anticipated:

- **Positive impacts:** Socio-economic development through employment creation (primary, secondary, and tertiary employment) and skills transfer; Opens up other investment opportunities and infrastructure-related development benefits; Produces a trained workforce and small businesses that can serve communities and may initiate related businesses; Boosts the local economic growth and regional economic development and; Increased support for local businesses through the procurement of consumable items such as Personal Protective Equipment (PPE), machinery spare parts, lubricants, etc.
- **Negative impacts:** Potential disturbance of existing pastoral systems; Physical land/soil disturbance; Impact on local biodiversity (fauna and flora); Habitat disturbance and potential illegal wildlife and domestic hunting in the area; Potential impact on water resources and soils particularly due to pollution; Air quality issue: potential dust generated from the project; Potential occupational health and safety risks, vehicular traffic safety and impact on services infrastructures such as local roads, vibrations, and noise associated with construction activities may be a nuisance to locals; Environmental pollution (solid waste and wastewater), Archaeological and heritage impact and Potential social nuisance and conflicts (theft, damage to properties, etc.).

The potential negative impacts were assessed, and mitigation measures were provided accordingly.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The potential impacts that are anticipated from the proposed project activities were identified, described, and assessed. For the significant adverse (negative) impacts with a medium rating, appropriate management, and mitigation measures were recommended for implementation by the Proponent, their contractors, and project-related employees.

The public was consulted as required by the EMA and its 2012 EIA Regulations (Sections 21 to 24). This was done via the two newspapers (New Era and The Namibian) used for this environmental assessment. A consultation through a face-to-face meeting with directly affected landowners whereby they raised concerns and comments on the proposed project activities.

The issues and concerns raised by the registered I&APs formed the basis for this Report and the Draft EMP. The issues were addressed and incorporated into this Report whereby mitigation

measures have been provided thereof to avoid and/or minimize their significance on the environmental and social components. Most of the potential impacts were found to be of medium-rating significance. With the effective implementation of the recommended management and mitigation measures, will particularly see a reduction in the significance of adverse impacts that cannot be avoided completely (from medium rating to low). To maintain the desirable rating, the implementation of management and mitigation measures should be monitored by the Proponent directly, or their Environmental Control Officer (ECO) is highly recommended. The monitoring of this implementation will not only be done to maintain the reduced impacts' rating or maintain a low rating but to also ensure that all potential impacts identified in this study and other impacts that might arise during implementation are properly identified in time and addressed right away too.

It is crucial for the Proponent and their contractors as well as to effectively implement the recommended management and mitigation measures to protect both the biophysical and social environment throughout the project duration. All these would be done to promote environmental sustainability while ensuring a smooth and harmonious existence and purpose of the project activities in the community and environment at large.

Recommendations

The Environmental Consultant is confident that the potential negative impacts associated with the proposed project activities can be managed and mitigated by the effective implementation of the recommended management and mitigation measures and with more effort and commitment put into monitoring the implementation of these measures.

It is, therefore, recommended that the proposed activities be granted an ECC, provided that:

- All the management and mitigation measures provided herein are effectively and progressively implemented.
- All required permits, licenses, and approvals for the proposed activities should be obtained as required. These include permits and licenses for land use access agreements and ensure compliance with these specific legal requirements.
- The Proponent and all their project workers or contractors comply with the legal requirements governing their project and its associated activities and ensure that project permits and or approvals required to undertake specific site activities are obtained and renewed as stipulated by the issuing authorities.

- Site areas where activities have ceased are rehabilitated, as far as practicable, to their pre-construction state.
- Environmental Compliance monitoring reports should be compiled and submitted to the DEAF Portal as per the provision made on the MET/DEAF's portal.

Disclaimer

Excel Dynamic Solutions (EDS) warrants that the findings and conclusion contained herein were accomplished following the methodologies outlined in the Scope of Work and Environmental Management Act (EMA) of 2007. These methodologies are described as representing good customary practice for conducting an EIA of a property to identify recognized environmental conditions. There is a possibility that even with the proper application of these methodologies there may exist subject property conditions that could not be identified within the scope of the assessment, or which were not reasonably identifiable from the available information. The Consultant believes that the information obtained from the record review and during the public consultation processes concerning the proposed construction work is reliable. However, the Consultant cannot and does not warrant or guarantee that the information provided by the other sources is accurate or complete. The conclusions and findings outlined in this report are strictly limited in time and scope to the date of the evaluations. No other warranties are implied or expressed.

Some of the information provided in this report is based on personal interviews, and research of available documents, records, and maps held by the appropriate government and private agencies. This report is subject to the limitations of historical documentation, availability, and accuracy of pertinent records, and the personal recollections of those persons contacted.

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LIST OF ABBREVIATIONS

Abbreviation	Meaning
AMSL	Above Mean Sea Level
BID	Background Information Document
CV	Curriculum Vitae
DEA	Department of Environmental Affairs
EA	Environmental Assessment
EAP	Environmental Assessment Practitioner
ECC	Environmental Clearance Certificate
EDS	Excel Dynamic Solutions
ESA	Environmental Scoping Assessment
EMA	Environmental Management Act

EMP	Environmental Management Plan
GG	Government Gazette
GN	Government Notice
I&APs	Interested and Affected Parties
MET	Ministry of Environment and Tourism
MME	Ministry of Mines and Energy
PPE	Personal Protective Equipment
Reg	Regulation
S	Section
TOR	Terms of Reference
WWTP	Waste Water Treatment Plant

DEFINITION OF TERMS

Alternative	A possible course of action, in place of another would meet the same purpose and need of the proposal.
Baseline	Work done to collect and interpret information on the condition/trends of the existing environment.
Biophysical	That part of the environment does not originate with human activities (e.g. biological, physical, and chemical processes).
Cumulative Impacts/Effects Assessment	About an activity, means the impact of an activity that in it 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.
Decision-maker	The person(s) entrusted with the responsibility for allocating resources or granting approval to a proposal.
Ecological Processes	Processes play an essential part in maintaining ecosystem integrity. Four fundamental ecological processes are the cycling of water, the cycling of nutrients, the flow of energy, and biological diversity (as an expression of evolution).
Environment	As defined in the Environmental Management Act - the complex of natural and anthropogenic factors and elements that are

	mutually interrelated and affect the ecological equilibrium and the quality of life, including – (a) the natural environment that is land, water, and air; all organic and inorganic matter and living organisms and (b) the human environment that is the landscape and natural, cultural, historical, aesthetic, economic and social heritage and values.
Environmental Management Plan	As defined in the EIA Regulations (Section 8(j)), a plan that describes how activities that may have significant environments effects are to be mitigated, controlled, and monitored.
Interested and Affected Party (I&AP)	Concerning the assessment of a listed activity includes - (a) any person, group of persons, or organization interested in or affected by the activity; and (b) any organ of state that may have jurisdiction over any aspect of the activity. Mitigate - practical measures to reduce adverse impacts. Proponent – as defined in the Environmental Management Act, a person who proposes to undertake a listed activity. Significant 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.
Fauna	All of the animals that are found in a given area.
Flora	All of the plants are found in a given area.
Mitigation	The purposeful implementation of decisions or activities that are designed to reduce the undesirable impacts of a proposed action on the affected environment.
Monitoring	Activity involving repeated observation, according to a pre-determined schedule, of one or more elements of the environment to detect their characteristics (status and trends).

Nomadic Pastoralism	Nomadic pastoralists live in societies in which the husbandry of grazing animals is viewed as an ideal way of making a living and the regular movement of all or part of the society is considered a normal and natural part of life. Pastoral nomadism is commonly found where climatic conditions produce seasonal pastures but cannot support sustained agriculture.
Proponent	Organization (private or public sector) or individual intending to implement a development proposal.
Public Consultation/Involvement	A range of techniques can be used to inform, consult or interact with stakeholders affected by the proposed activities.
Protected Area	Refers to a protected area that is proclaimed in the Government Gazette according to the Nature Conservation Ordinance number 4 of 1975, as amended
Scoping	An early and open activity to identify the impacts that are most likely to be significant and require specialized investigation during the EIA work. Can, also be used to identify alternative project designs/sites to be assessed, obtain local knowledge of the site and surroundings, and prepare a plan for public involvement. The results of scoping are frequently used to prepare a Terms of Reference for the specialized input into full EIA.
Terms of Reference (ToR)	Written requirements governing full EIA input and implementation, consultations to be held, data to be produced, and form/contents of the EIA report. Often produced as an output from scoping.

1. INTRODUCTION

1.1 Project Background

The Opuwo Town Council (hereinafter referred to as the Proponent) is planning to construct and operate a new Wastewater Treatment Plant (WWTP) and two Oxidation Ponds in Opuwo, Kunene Region. This initiative arises from the deteriorated state of the existing oxidation ponds, which no longer meet the town's wastewater management needs. The proposed plant is designed to treat approximately 2,284 m³ of wastewater per day on a site measuring about 30 hectares. Wastewater inflows originate mainly from residential households, with additional contributions from commercial and institutional activities. Treated effluent will primarily be reused for irrigation of public spaces, including the soccer stadium and Opuwo Park, thereby contributing to local water reuse strategies. The site is located within the Ombombo Communal Conservancy, which requires that all infrastructure development be managed in an environmentally responsible manner to avoid ecological degradation (Opuwo Town Council, 2024). The proposed location for the wastewater treatment plant is shown in **Figure 1**. The project area is located (-18.010670442 13.854668234) north east of Opuwo Town, in Kunene Region.

The challenges faced by Opuwo mirror those of other rapidly growing towns in Namibia, where population growth, urbanization, and climate variability place pressure on sanitation systems. Traditional pond-based systems, though cost-effective and simple, have limitations under semi-arid conditions, including inefficiencies in nutrient removal, odour nuisances, and vulnerability to flooding (Mara, 2004; World Health Organization [WHO], 2006). The current oxidation ponds in Opuwo present health hazards due to broken embankments, uncontrolled animal access, and overflows that pollute nearby environments. As such, the construction of a modern treatment facility supported by new oxidation ponds is not only a compliance requirement but also a public health imperative.

The Opuwo WWTP will adopt new-generation trickling filter technology, a system already recommended for northern Namibian towns due to its adaptability, relatively low operational demands, and ability to consistently produce effluent that meets Namibian General Standards and WHO guidelines for reuse in irrigation (Aquarius Consult, 2018; Spellman, 2014). Experiences from other Namibian localities, such as the Ndiyona wastewater project, demonstrate that investments in robust wastewater treatment infrastructure improve community

health, reduce groundwater contamination, and create opportunities for socio-economic benefits like irrigated agriculture (Dunamis Consulting Engineers, 2020).

1.2 Terms of Reference, Scope of Works, and Appointed EA Practitioner

To satisfy the requirements of the EMA and its 2012 EIA Regulations, The Proponent appointed EDS to conduct the required Environmental Assessment (EA) process on their (Proponent's) behalf, and thereafter, apply for an ECC for the Proposed Construction and Operation of a Wastewater Treatment Plant in Opuwo Town, Kunene Region. There were no formal Terms of Reference (ToR) provided to EDS by the Proponent. The consultant, instead, relied on the requirements of the Environmental Management Act (No. 7 of 2007) (EMA) and its EIA Regulations (GN. No. 30 of 2012) to conduct the study.

The application for the ECC (**Appendix A**) is compiled and submitted to the Ministry of Environment and Tourism (MET), the environmental custodian for project registration purposes. Upon submission of an Environmental Scoping Assessment (ESA) Report and Draft Environmental Management Plan (EMP) (**Appendix B**), an ECC for the proposed project may be considered by the Environmental Commissioner at the MET Department of Environmental Affairs and Forestry (DEAF).

The EIA project is headed by Ms. Iyaloo Nakale, a qualified and experienced EAP. The EAP CV is presented in **Appendix C**.

1.3 Motivation for the Proposed Project

In Namibia, the Environmental Management Act (No. 7 of 2007) and its Environmental Impact Assessment Regulations of 2012 stipulate that certain listed activities require an Environmental Clearance Certificate (ECC) prior to implementation. Among these listed activities are the construction of waste management, treatment, handling, and disposal facilities, as well as industrial and domestic wastewater treatment plants and associated pipeline systems (Republic of Namibia, 2007). Since the Opuwo Town Council is undertaking the construction of a new wastewater treatment facility and oxidation ponds, the project falls directly within these regulated categories.

The ECC process serves as a safeguard to ensure that environmental risks are thoroughly assessed and mitigated before project commencement. It also provides a mechanism for stakeholder consultation and accountability, enabling affected communities to participate in decisions that may influence their environment and livelihoods (Ministry of Environment and

Tourism [MET], 2008). For Opuwo, obtaining an ECC is critical not only for legal compliance but also for ensuring that the wastewater facility aligns with Namibia's broader environmental and water management policies. Securing this certification can enable the Town Council to demonstrate its commitment to sustainable infrastructure development, protection of public health, and conservation of natural resources in the Kunene Region.

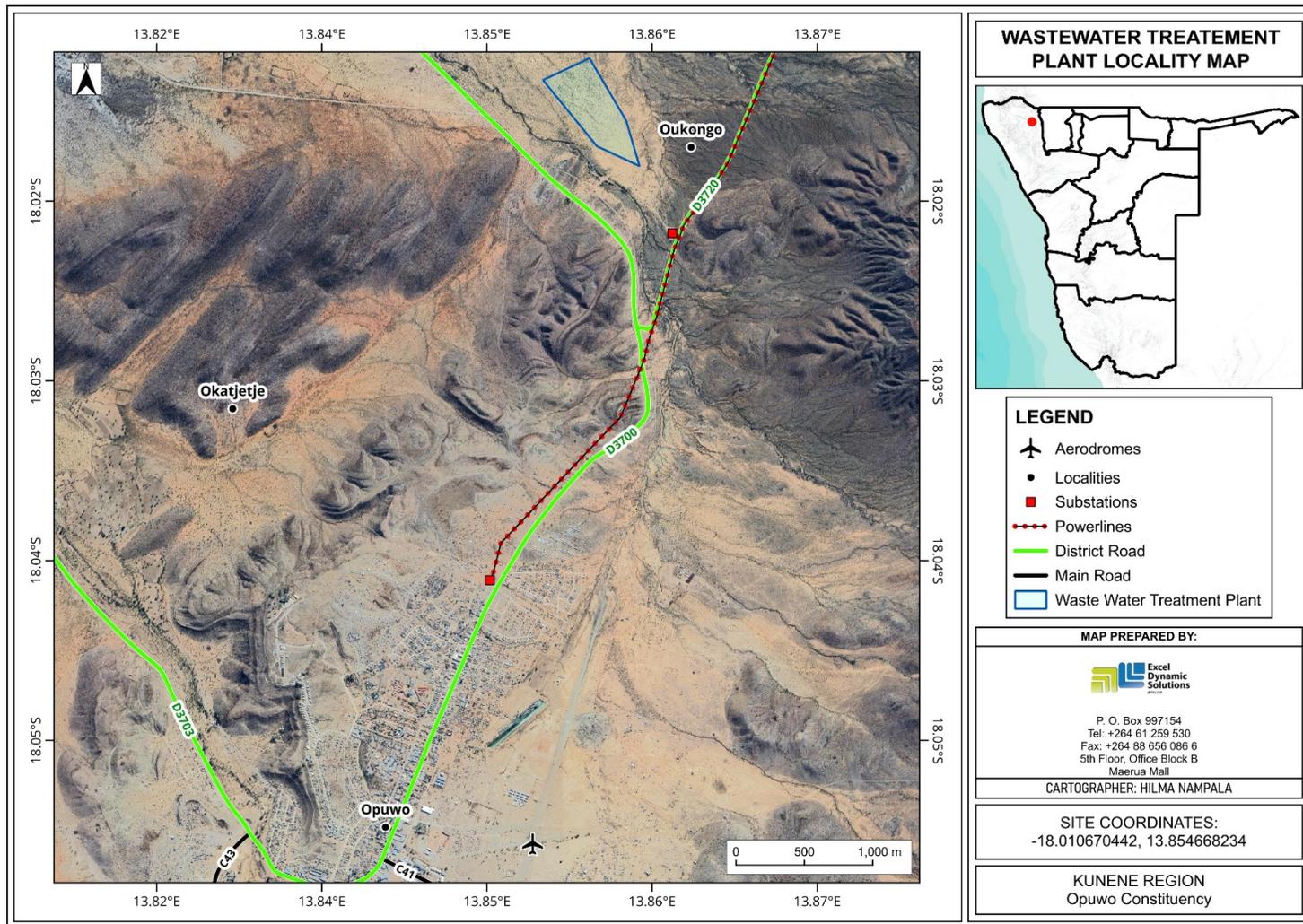


Figure 1: Locality map of the WWT

2. THE DESCRIPTION OF PROJECT ACTIVITIES

This report was developed based on the site visit and assessment, consulted literature, information provided by the Proponent.

Once the ECC is issued, administrative and technical tasks completed, and the Town Council is ready, the construction works, and associated activities will commence. There will be some earthworks to prepare the site for construction and installation necessary services infrastructure and structures required for the Plant and the oxidation ponds.

2.1 Proposed Project Phases

- **Planning phase** - This is the stage during which the Proponent prepare all the administrative and technical requirements needed for construction of the Treatment Plant and site upgrading. This planning will include the procurement of services such site construction and upgrading contractor.
- **Construction phase** - This is the phase where during which the Treatment Plant and associated infrastructure (oxidation ponds) are constructed and the site is revamped through appointed contractor(s). This will entail the earthworks for the erection of the Plant structures and installation of necessary services, infrastructures, etc., as well as upgrading of the site fencing.
- **Closure (Decommissioning)** - This is the stage at which the Proponent will stop using the site for wastewater (effluent) management, leading to the decommissioning and closure of the facilities. However, this is unlikely that the site operations will cease as there will always be the needed for wastewater management in the Town

2.2 Proposed Wastewater Treatment Plant

The proposed wastewater treatment plant (WWTP) for Opuwo is designed to address the urgent need for safe and reliable wastewater management in the Kunene Region. The facility will be constructed on an estimated 30-hectare site and is anticipated to treat approximately 2,284 m³ of wastewater per day (Opuwo Town Council, 2024). Wastewater will primarily originate from residential households, with additional contributions from commercial establishments, institutions, and small-scale industries.

The treatment process will incorporate new-generation trickling filter technology, which has been recommended in Namibia due to its adaptability to semi-arid environments and its

relatively simple operation and maintenance requirements (Aquarius Consult, 2018). Trickling filters are fixed-film biological systems in which wastewater is distributed over a bed of porous media, supporting microbial biofilms that degrade organic pollutants (Tilley et al., 2014). This system offers several advantages over conventional oxidation ponds, including a smaller land footprint, consistent effluent quality, and reduced odour nuisances. Importantly, trickling filters can achieve effluent standards that comply with the Namibian General Standards and the World Health Organization's reuse guidelines (WHO, 2006).

The final treated effluent from the plant will be of sufficient quality to support agricultural irrigation and landscaping in Opuwo. The Town Council plans to use this water to irrigate the soccer stadium, Opuwo Park, and other public green spaces, thereby enhancing community amenities while conserving potable water resources. Similar reuse schemes in Windhoek and other Namibian towns have demonstrated the socio-economic value of integrating wastewater treatment with urban greening and agricultural initiatives (Murray, 2020).

2.3 New Oxidation Ponds

Alongside the new WWTP, the Opuwo Town Council plans to construct two new oxidation ponds. The current ponds are structurally compromised, with broken embankments, a dysfunctional inlet system, uncontrolled access by livestock and frequent overflows that contaminate the surrounding environment. These conditions present both environmental and public health hazards, underscoring the need for complete replacement (Opuwo Town Council, 2024).

The new ponds will be constructed with reinforced embankments, functional inlet and outlet systems, and secure fencing to prevent animal intrusion. Lining of anaerobic and primary ponds, as required by the Directorate of Water Affairs, will be prioritized to reduce seepage and protect groundwater resources (Aquarius Consult, 2018). The ponds will also be designed for improved evaporation efficiency, reducing the risks of odour generation and overflow during rainy periods.

Oxidation ponds remain a valuable component of wastewater management in Namibia due to their low energy demands and resilience in rural settings (Mara, 2004). However, when combined with advanced systems such as trickling filters, they function more effectively as polishing units to ensure high-quality effluent (Crites, Tchobanoglous, & Trussell, 2014). The integration of ponds and trickling filters in Opuwo will thus create a hybrid system, balancing low-cost treatment with advanced performance.

2.4 Resources, Services and Infrastructure

Successful implementation of the WWTP and oxidation ponds will require coordinated planning and provision of resources.

2.4.1 Human Resources

Construction will be undertaken by a contracted engineering company, which will provide its own skilled and semi-skilled workforce. The Opuwo Town Council will, however, prioritize local labour where feasible, ensuring socio-economic benefits for the surrounding community. During operations, the plant and ponds will be managed by Town Council staff, supported by trained operators and maintenance personnel.

2.4.2 Equipment and Vehicles

The project will require small to medium-sized trucks, construction machinery, and support vehicles for transporting personnel, equipment, and materials. Specialized mechanical and electrical equipment will be sourced as part of the WWTP installation.

2.4.3 Utilities

The plant will be supplied with water through NamWater pipelines and local boreholes. Construction machinery will rely on diesel-powered generators, while the operational phase will be connected to the NORED power grid. Provision will be made for standby generators to ensure uninterrupted treatment during power outages (Spellman, 2014).

2.4.4 Health and Safety

All personnel will be required to use Personal Protective Equipment (PPE), including helmets, gloves, safety boots, and reflective vests. A first aid station and firefighting equipment will be installed onsite, supported by regular safety drills and staff training (Spellman, 2014).

2.4.5 Waste Handling

Domestic solid waste generated by personnel will be managed according to Integrated Solid Waste Management (ISWM) principles, with segregation, collection, and disposal at Opuwo's designated landfill (United Nations Human Settlements Programme [UN-Habitat], 2018). Hazardous waste, such as fuels, oils, and chemicals, will be securely stored and transported to licensed hazardous waste facilities. Ablution facilities will be constructed to manage sewage from site workers during both construction and operational phases.

2.4.6 Access and Security

The project site will be accessible via the D3700 road, with a new access road constructed for heavy vehicles and machinery. Security will include 24-hour guards, fencing, and lockable gates to prevent theft, vandalism and unauthorized access.

2.5 Opportunities from the Treated Wastewater

The reuse of treated wastewater presents significant opportunities for Opuwo. The Town Council plans to use the effluent for irrigating recreational facilities, public parks, and sports fields, creating greener public spaces that enhance community well-being. Treated water will also support small-scale agricultural projects, improving local food security and providing opportunities for community-based economic development (Dunamis Consulting Engineers, 2020).

In the context of Namibia's semi-arid climate, wastewater reuse is a strategic approach to water resource management. It reduces dependence on scarce potable water supplies, aligns with the National Water Supply and Sanitation Policy (Ministry of Agriculture, Water and Forestry [MAWF], 2008), and strengthens resilience against drought and climate variability. Moreover, the nutrients retained in treated effluent, such as nitrogen and phosphorus, can serve as valuable fertilizers for crops and landscaping (WHO, 2006).

Through the integration of wastewater reuse into municipal planning, Opuwo can simultaneously address sanitation challenges, enhance urban amenities, and contribute to sustainable development. This holistic approach demonstrates how wastewater treatment, when managed responsibly, can transition from being a liability to becoming a resource for social, economic, and environmental benefit (Spellman, 2014).

3. LEGAL OBLIGATIONS GOVERNING THE PROPOSED ACTIVITIES

Wastewater treatment projects in Namibia must operate within a defined legal and policy framework that regulates environmental protection, water management, public health, and land use. Compliance with these laws is a prerequisite for project approval, implementation, and long-term operation. The following subsections outline the principal national legislation, policies, and guidelines applicable to the Opuwo Wastewater Treatment Plant (WWTP) and oxidation ponds.

3.1 The Environmental Management Act (No. 7 of 2007)

The Environmental Management Act (EMA) provides the overarching legal basis for environmental protection in Namibia. It establishes the need for Environmental Impact Assessments (EIAs) and Environmental Management Plans (EMPs) for listed activities and mandates the issuance of Environmental Clearance Certificates (ECCs) prior to commencement (Republic of Namibia, 2007). Wastewater treatment facilities are explicitly listed under the EIA Regulations of 2012 as activities requiring prior environmental authorization.

For the Opuwo project, compliance with the EMA ensures that environmental and social risks associated with wastewater treatment are systematically identified, mitigated, and monitored. Furthermore, the Act emphasizes the principles of sustainable development, the precautionary approach, and public participation, all of which guide the Town Council's planning and implementation.

3.2 Water Act (No. 54 of 1956) and Draft Water Resources Management Act (2004, 2013)

Although the Water Act of 1956 is outdated, it remains the principal legislation governing water abstraction, pollution control, and wastewater discharge in Namibia. The Act prohibits the discharge of effluents into water sources without a permit from the Department of Water Affairs and Forestry (DWAFF). For Opuwo, this means that all treated wastewater discharges and sludge disposal must comply with discharge standards to prevent groundwater and surface water contamination.

The Draft Water Resources Management Acts of 2004 and 2013, though not fully enacted, emphasize integrated water resources management (IWRM), conservation, and equitable access. The Opuwo WWTP aligns with these principles by promoting water reuse for irrigation and reducing dependence on potable water supplies (Ministry of Agriculture, Water and Forestry [MAWF], 2008).

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

The Public and Environmental Health Act provides the legal foundation for safeguarding community health. It regulates waste management, sanitation, and pollution prevention measures to reduce risks of communicable diseases (Republic of Namibia, 2015). In Opuwo, the deterioration of existing oxidation ponds has led to unsafe conditions, including stagnant water, mosquito breeding, and exposure of residents to untreated effluent.

Implementation of a new WWTP under this Act will directly improve public health outcomes by ensuring safe collection, treatment, and disposal of sewage. It will also align with Namibia's public health objectives of reducing waterborne diseases and minimizing community exposure to hazardous environments.

3.4 Pollution Control and Waste Management Bill (Draft)

Although still in draft form, the Pollution Control and Waste Management Bill seeks to regulate the prevention, reduction, and control of pollution in Namibia. It establishes responsibilities for waste generators, sets penalties for illegal dumping, and introduces provisions for hazardous waste management.

For the Opuwo project, adherence to the Bill's principles will ensure safe storage, transport, and disposal of hazardous materials such as oils, fuels, and chemical additives used in wastewater treatment (UN-Habitat, 2018). The project will adopt Integrated Solid Waste Management (ISWM) strategies to minimize waste generation and maximize safe disposal pathways.

3.5 Namibia Water Corporation Act (No. 12 of 1997)

The Namibia Water Corporation Act established NamWater, which is mandated to supply bulk water to municipalities. While the Opuwo WWTP does not directly fall under NamWater's operations, the Act is relevant because treated wastewater reuse reduces the burden on bulk water supplies. By reusing effluent for irrigation, Opuwo contributes to water conservation in line with NamWater's broader objectives (NamWater, 2019).

3.6 Environmental Assessment Policy (1995)

Namibia's Environmental Assessment Policy predates the EMA but remains influential in guiding EIAs. It emphasizes principles of public participation, accountability, transparency and precaution (MET, 1995). For Opuwo, the policy underscores the importance of involving

stakeholders including residents, traditional authorities and conservancy representatives during the planning and operational phases of the WWTP.

3.7 National Water Supply and Sanitation Policy (2008)

The National Water Supply and Sanitation Policy (NWSSP) aims to ensure equitable access to safe water and adequate sanitation across Namibia. It promotes water reuse, cost recovery, and community participation in sanitation projects (MAWF, 2008). The Opuwo WWTP contributes directly to the goals of this policy by improving sanitation infrastructure and enabling effluent reuse for agriculture and recreation.

3.8 International Guidelines and Standards

While national laws provide the primary regulatory framework, international guidelines are also relevant to wastewater management. The World Health Organization (WHO) sets global standards for effluent reuse in agriculture and landscaping, emphasizing pathogen reduction and safe irrigation practices (WHO, 2006). The Opuwo WWTP will be designed to comply with these standards to protect both public health and agricultural productivity.

The Proponent, therefore, has the responsibility to ensure that the activities as well as the EA process conform to the principles of the EMA and must ensure that employees act in accordance with such principles. **Table 2** below lists the requirements of an EMP as stipulated by Section 8(e) of the EIA Regulations, primarily on specific approvals and permits that may be required for the activities required of the WWTP.

Table 1: Applicable legal requirements and permits to the activities of the WWTP.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Environmental Management Act EMA (No 7 of 2007). <u>Regulated under the Ministry of Environment, and Tourism (MET)</u>	The Act and its 2012 EIA Regulations aims to ensure that the potential impacts of the development on the environment are carefully considered. The Act aims at promoting sustainable management of the environment and use of natural resources.	The EMA should inform and guide this EMP development and its implementation for: -ECC Amendment/Transfer and Renewal: Should the Proponent consider amending/Transferring the Project activities - The ECC needs to be renewed every 3 years (at least 3 months prior to its expiry date). The applications as deem necessary should be made with the Department of Environmental Affairs and Forestry (DEAF) as follows:
Environmental Impact Assessment (EIA) Regulations Government Notice 28-30 (Government Gazette 4878) of February	The Environmental Management Act (EMA) is broad; it regulates land use development through environmental clearance certification and/or Environmental Impact Assessments. For new projects, the Act	

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
2012: <u>Regulated under the MET</u>	<p>requires that projects with significant environmental impacts are subject to an environmental assessment process (Section 27). Regardless to the site, mitigation measures should be developed for implementation during operations.</p> <p>Details requirements for public consultation within a given environmental assessment process (Government Notice No. 30 Section 21). The details the requirements for what should be included in an Environmental Scoping Report (Government Notice No. 30 S8) and an EIA Report (Government Notice No. 30 Section 15).</p>	<p>Office of the Environmental Commissioner: Tel: 061 284 2701</p>
Local Authorities Act No. 23 of 1992: Regulated under the Ministry of Urban and Rural Development	<p>To provide for the determination, for purposes of local government, of local authority councils; the establishment of such local authority councils; and to define the powers, duties and functions of local authority councils; and to provide for incidental matters. This includes the management of waste.</p>	<p>Opuwo Town Council is the responsible Local Authority of the area, and the project Proponent. Regardless, they should ensure that the Site activities follow the Act and its Regulations, as relevant to the project.</p>
Water Act 54 of 1956: <u>Regulated under the Ministry of Agriculture, Water and Land Reform</u>	<p>The Water Resources Management Act 11 of 2013 is presently without regulations; therefore, the Water Act No 54 of 1956 is still in force:</p> <ul style="list-style-type: none"> -Prohibits the pollution of water and implements the principle that a person disposing of effluent or waste has a duty of care to prevent pollution (S3 (k)). -Provides for control and protection of groundwater (S66 (1), (d (ii))). -Liability of clean-up costs after closure/abandonment of an activity (S3 (l)). 	<p>The protection (both quality and quantity/abstraction) of water resources should be a priority. The Town Council should obtain a permit to discharge treated effluent into the environment.</p> <p>These permits include Borehole Drilling Permits, Groundwater Abstraction & Use Permits, and when required, the Wastewater / Effluent Discharge Permits).</p> <p>Division: Water Policy and Water Law Administration Division Tel: (061) 208 715</p>
Water Resources Management Act (No 11 of	<p>Ensure that the water resources of Namibia are managed, developed, used, conserved</p>	<p>Water and Environment Division</p>

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
2013): Ministry of Agriculture, Water and Land Reform (MAWLR)	<p>and protected in a manner consistent with, or conducive to, the fundamental principles set out in Section 66</p> <p>- protection of aquifers, Subsection 1 (d) (iii) provide for preventing the contamination of the aquifer and water pollution control (S68).</p> <p>The Proponent will be required to apply for and renew the Treated Wastewater/effluent Discharge Permit from the Department of Water Affairs (DWA): Directorate of Water Resources Management (Water Environment Division). When issued, Proponent, the Permit should be renewed as required (as stipulated in therein).</p>	
Petroleum Products and Energy Act (No. 13 of 1990) Regulations (2001)	Regulation 3(2)(b) states that “No person shall possess or store any fuel except under authority of a license or a certificate, excluding a person who possesses or stores such fuel in a quantity of 600 litres or less in any container kept at a place outside a local authority area”	<p>The Proponent should obtain the necessary authorisation form the MME for the storage of fuel on-site.</p> <p>Ministry of Mines and Energy: Director – Petroleum Affairs</p>
Pollution Control and Waste Management Bill: Regulated under the MET	The bill aims to “prevent and regulate the discharge of pollutants to the air, water and land” Of particular reference to the Project is: Section 21 “(1) Subject to sub-section (4) and section 22, no person shall cause or permit the discharge of pollutants or waste into any water or watercourse.” Section 55 “(1) No person may produce, collect, transport, sort, recover, treat, store, dispose of or otherwise manage waste in a manner that results in or creates a significant risk of harm to human health or the environment.”	<p>The Proponent and their workers/contractors should continue with the good waste management work (directly or indirectly) to ensure that the waste does not cause environmental threat and degradation.</p> <p>No permit or license required.</p>
Soil Conservation Act (No 76 of 1969): Regulated under the Ministry of	The Act makes provision for the prevention and control of soil erosion and the protection, improvement and conservation of	Duty of care must be applied to soil conservation and management measures must be included in the EMP. This is mainly

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Agriculture, Water and Land Reform (MAWLR)	soil, vegetation and water supply sources and resources, through directives declared by the Minister.	aimed at soil disturbance through unnecessary creation of new tracks and pollution from project related activities.
Public Health Act (No. 36 of 1919): Regulated under the Ministry of Health and Social Services	Section 119 states that “no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.”	The Proponent and all its employees should ensure compliance with the provisions of these legal instruments. This includes the provision of health and safety measures, wearing of Personal Protective Equipment (PPE), Health & Safety Trainings, etc. This includes the safety and health of the Town’s community. No permit or license required.
Health and Safety Regulations GN 156/1997 (Government Gazette 1617): Regulated under the Ministry of Health and Social Services	Details various requirements regarding health and safety of labourers.	
Public and Environmental Health Act No. 1 of 2015: Regulated under the Ministry of Health and Social Services	To provide a framework for a structured uniform public and environmental health system in Namibia; and to provide for incidental matters.	
Road Traffic and Transport Act, No. 22 of 1999: Regulated under the Ministry of Works and Transport (Roads Authority of Namibia)	The Act provides for the establishment of the Transportation Commission of Namibia; for the control of traffic on public roads, the licensing of drivers, the registration and licensing of vehicles, the control and regulation of road transport across Namibia’s borders; and for matters incidental thereto.	The Proponent should consider applying for a formal access road permit to the site. This permit is to be applied from Roads Authority. Tel.: 061 284 7027
Atmospheric Pollution Prevention Ordinance (1976): Regulated under the Ministry of Health and Social Services	This ordinance provides for the prevention of air pollution and is affected by the Health Act 21 of 1988. Under this ordinance, the entire area of Namibia, apart from East Caprivi, is proclaimed as a controlled area for the purposes of section 4(1) (a) of the ordinance.	The project and related activities should be undertaken in such a way that they do not pollute or compromise the surrounding air quality.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
<p>Hazardous Substance Ordinance, No. 14 of 1974: Regulated under the Ministry of Health and Social Services</p>	<p>The ordinance provides for the control of toxic substances. It covers manufacture, sale, use, disposal and dumping as well as import and export. Although the environmental aspects are not explicitly stated, the ordinance provides for the importing, storage, and handling.</p>	<p>The Proponent should handle and manage the storage and use of hazardous substances on site so that they do not harm or compromise the site environment</p>
<p>Labour Act (No. 6 of 1992): Regulated under the Ministry of Labour, Industrial Relations and Employment Creation (MLIREC)</p>	<p>MLIERC is aimed at ensuring harmonious labour relations through promoting social justice, occupational health and safety and enhanced labour market services for the benefit of all Namibians. This ministry ensures effective implementation of the Labour Act No. 6 of 1992, specifically its Regulations, No. 156 Labour Act, 1992: Regulations relating to the health and safety of employees at work</p>	<p>The Proponent should ensure that the construction, operations, and maintenance works, do not compromise the safety and welfare of workers. No permit or license required.</p>
<p>Forestry Act 12 of 2001, Amended Act 13 of 2005</p>	<p>Prohibits the removal of any vegetation within 100 m from a watercourse (Forestry Act S22 (1)). The Act prohibits the removal of and transport of various protected plant species.</p>	<p>Should there be protected plant species, which are known to occur within the project site, these are required to be removed and a permit should be obtained from the nearest Forestry office (Ministry of Environment, Forestry and Tourism (MET) prior to removing them.</p> <p>Director of Forestry Division</p>
<p>The National Heritage Act (No. 27 of 2004): <u>Regulated under the Ministry of Education, Arts and Culture through National Heritage Council (NHC) of Namibia</u></p>	<p>To provide for the protection and conservation of places and objects of heritage significance and the registration of such places and objects; to establish an NHC; to establish a National Heritage Register; and to provide for incidental matters. This impact is likely during site preparation for the construction of the treatment Plant when there is a potential of</p>	<p>Should heritage resources (e.g., artefacts, human remains/bones in the subsurface etc.) are discovered at some point on and /or around the site, these should be reported to the National Heritage Council of Namibia for relocation.</p> <p>Tel: 061 301 903</p>

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
The National Monuments Act (No. 28 of 1969): <u>Regulated under the NHC</u>	inadvertent unearthing and damage of heritage resources such as old and unmarked graves, for instance. The Act extends the protection of archaeological and historical sites to private and communal land and defines permit procedures regarding activities at such sites.	

4. ENVIRONMENTAL BASELINE: BIOPHYSICAL AND SOCIAL

4.1 Climate

Opuwo is situated in the north-western part of Kunene Region, one of the driest parts of Namibia. The climate is classified as semi-arid to arid, with extremely high evaporation rates that exceed 2,500 mm per year, far surpassing average annual rainfall (Dirkx et al., 2008). Rainfall is highly variable in both space and time, averaging between 350 and 450 mm annually. The rainy season occurs from December to March, often in the form of localized, high-intensity

thunderstorms. These rains can cause sudden flash floods in ephemeral streams, although such events are short-lived. The remainder of the year is predominantly dry.

Temperature extremes are common. Summer months (October–March) experience daily maximums above 30°C, sometimes reaching 35–37°C, while winter nights (June–August) can be cool, with minimums below 10°C (Mendelsohn, Jarvis, Roberts, & Robertson, 2009). These climatic conditions create chronic water scarcity and impose significant stress on water supply systems. In such a context, wastewater reuse becomes highly strategic, as it supplements scarce water resources for irrigation, urban greening, and small-scale agriculture.

Climate variability, including recurring droughts, is a defining feature of Kunene. Recent decades have seen more frequent dry spells linked to climate change, reducing grazing capacity and food security in the region (Niang et al., 2014). The construction of a wastewater treatment plant (WWTP) that produces reusable effluent therefore aligns not only with sanitation objectives but also with climate resilience strategies, providing an alternative water source in a drought-prone environment.

4.2 Topography

The Kunene Region is situated in northwestern Namibia, bordering Angola to the north and the Atlantic Ocean to the west. Kastveld is typically found in more elevated or hilly areas within this region. The topography of the proposed site is dominated the Kastveld landscape, The Kastveld landscape consists of rolling hills, rocky outcrops, and valleys, offering a diverse topography. The landscape features a mix of vegetation, including drought-resistant plants and shrubs. Common species may include acacias and other arid-adapted flora. Site elevation averages at 1134 meters above sea level.

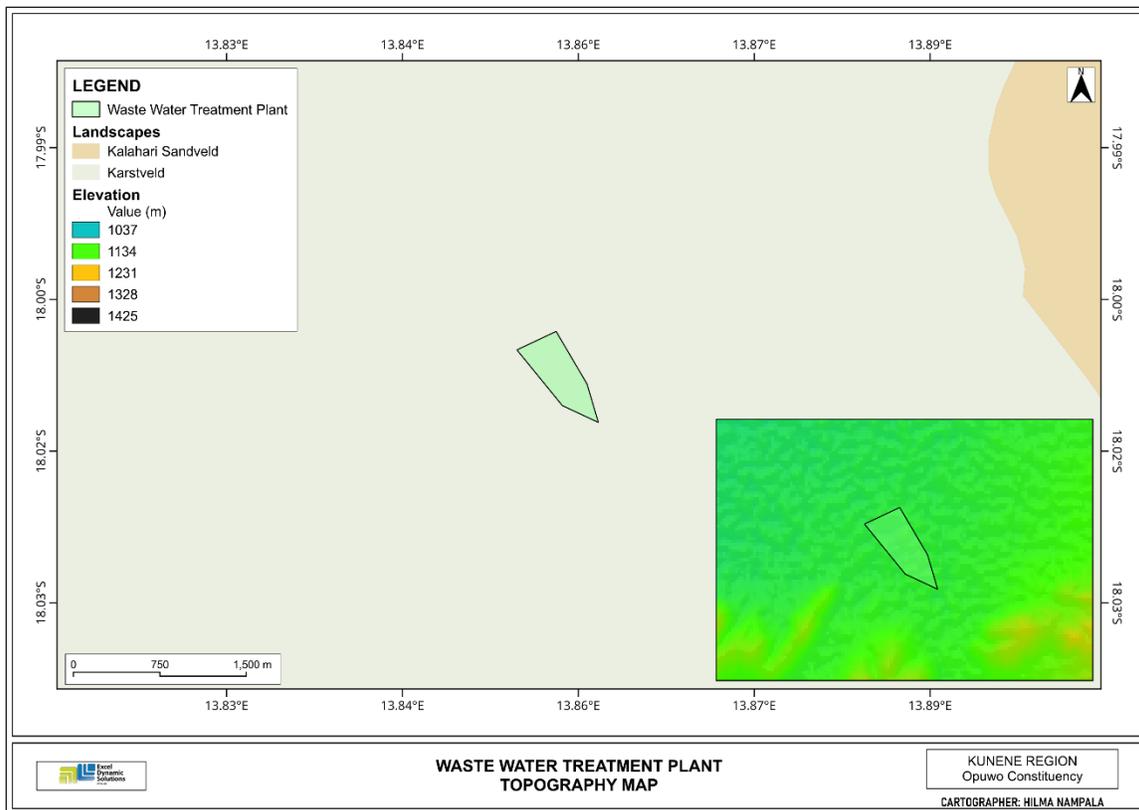


Figure 2: Topography Map of the WWTP site.

4.3 Geology

Geologically, Opuwo falls within the Damara Orogen, a region dominated by metamorphic and igneous rocks including gneiss, schist, and granites (Miller, 2008). These formations date back to the Precambrian and have undergone extensive weathering. Fractures and fault systems within these rocks form localized aquifers that supply groundwater to boreholes.

However, fractured-rock aquifers are vulnerable to contamination due to their shallow depth and limited natural filtration. Seepage from unlined wastewater ponds can quickly infiltrate fractures, spreading contaminants over large distances. This risk is heightened in Opuwo, where groundwater forms a crucial part of the town’s water supply. The project’s design, which includes lined ponds and advanced trickling filter technology, directly addresses this geological vulnerability by minimizing percolation into the subsurface.

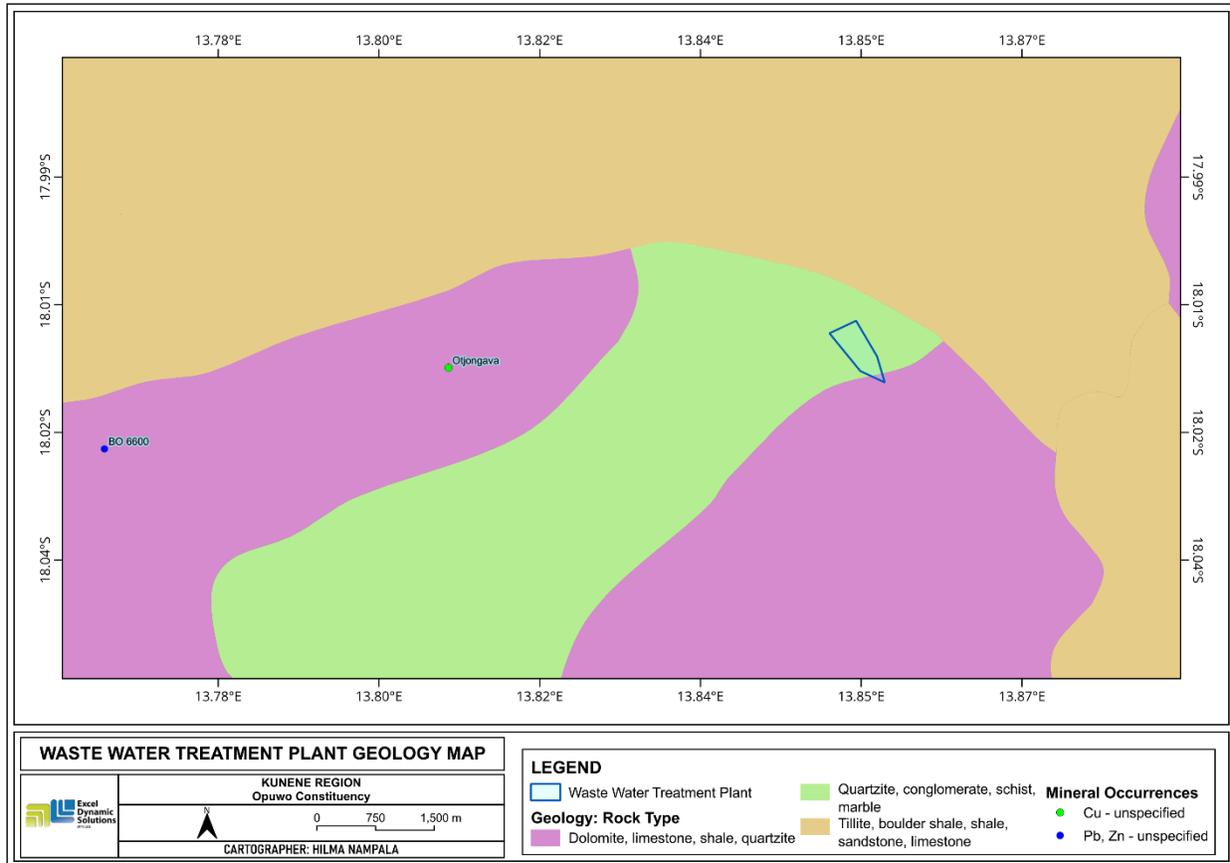


Figure 3: Geology of the WWTP site.

4.4 Soils

The site is dominated by the Petric Calcisols which are a soil order that contains a significant amount of calcium carbonate (CaCO₃) in the profile, which often leads to a high pH (alkaline conditions). Often found in semi-arid to arid regions, typically where limestone or calcareous materials are prevalent

From an engineering perspective, the soils pose two challenges for wastewater management: permeability and stability. Highly permeable soils increase the risk of seepage and groundwater contamination, while poor stability requires reinforced embankments to support pond walls. Mitigation measures include the use of clay or synthetic liners for ponds, compacted embankments and re-vegetation of disturbed surfaces to reduce erosion risk (Crites, Tchobanoglous, & Trussell, 2014).

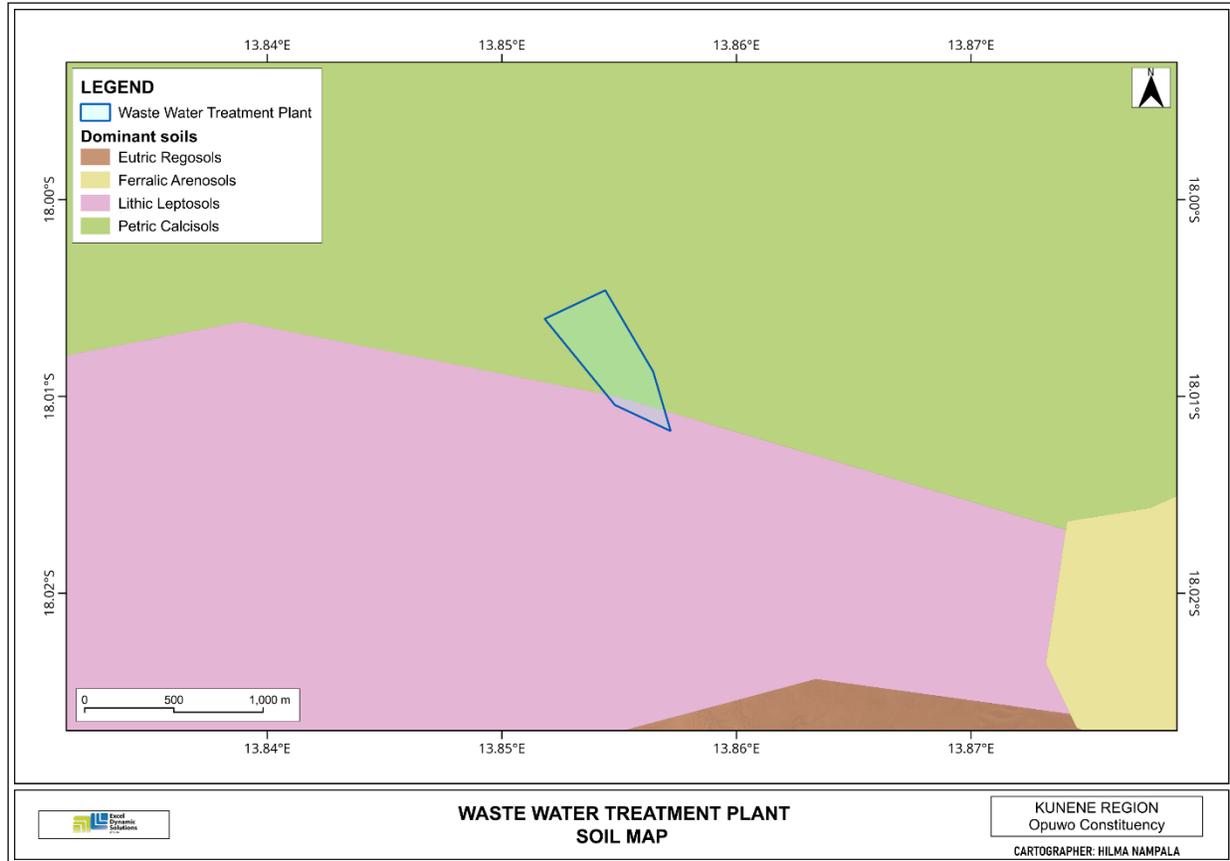


Figure 4: Soil Map of the WWTP site

4.5 Hydrology

Surface Water

There are no perennial rivers near Opuwo. Instead, the area is drained by ephemeral channels that flow briefly after heavy rains. These ephemeral systems are ecologically sensitive because they provide temporary habitats for flora and fauna and contribute to groundwater recharge. The Kunene River, Namibia’s only perennial river in the north-west, is more than 100 km away and not within the project’s direct influence.

The absence of perennial rivers means that Opuwo cannot rely on surface water for domestic or agricultural supply. Protecting ephemeral channels from effluent pollution is therefore essential, as contamination would reduce both ecological and groundwater recharge functions.

Groundwater

Groundwater forms the backbone of Opuwo’s water supply. Boreholes tapping fractured-rock aquifers provide water for domestic use, livestock, and small-scale irrigation.

The project area lies over rock bodies with moderate groundwater potential. However, the groundwater within the site is most likely to flow along porous aquifers. Due to the groundwater potential, the site area is prone to moderate groundwater pollution

These fractured, fissured or karstified aquifers are, however, highly susceptible to contamination because of their limited depth and fractured nature (Christelis & Struckmeier, 2011). Existing oxidation ponds have already raised concerns of groundwater pollution due to seepage and overflow during rainy seasons (Opuwo Town Council, 2024).

The proposed WWTP and properly lined oxidation ponds will significantly reduce these risks. Treated effluent will be reused rather than discharged uncontrolled, and strict monitoring of groundwater quality will be included in the Environmental Management Plan. Compliance with the Water Act (1956) and WHO (2006) reuse guidelines will ensure that the project contributes to safe water resource management.

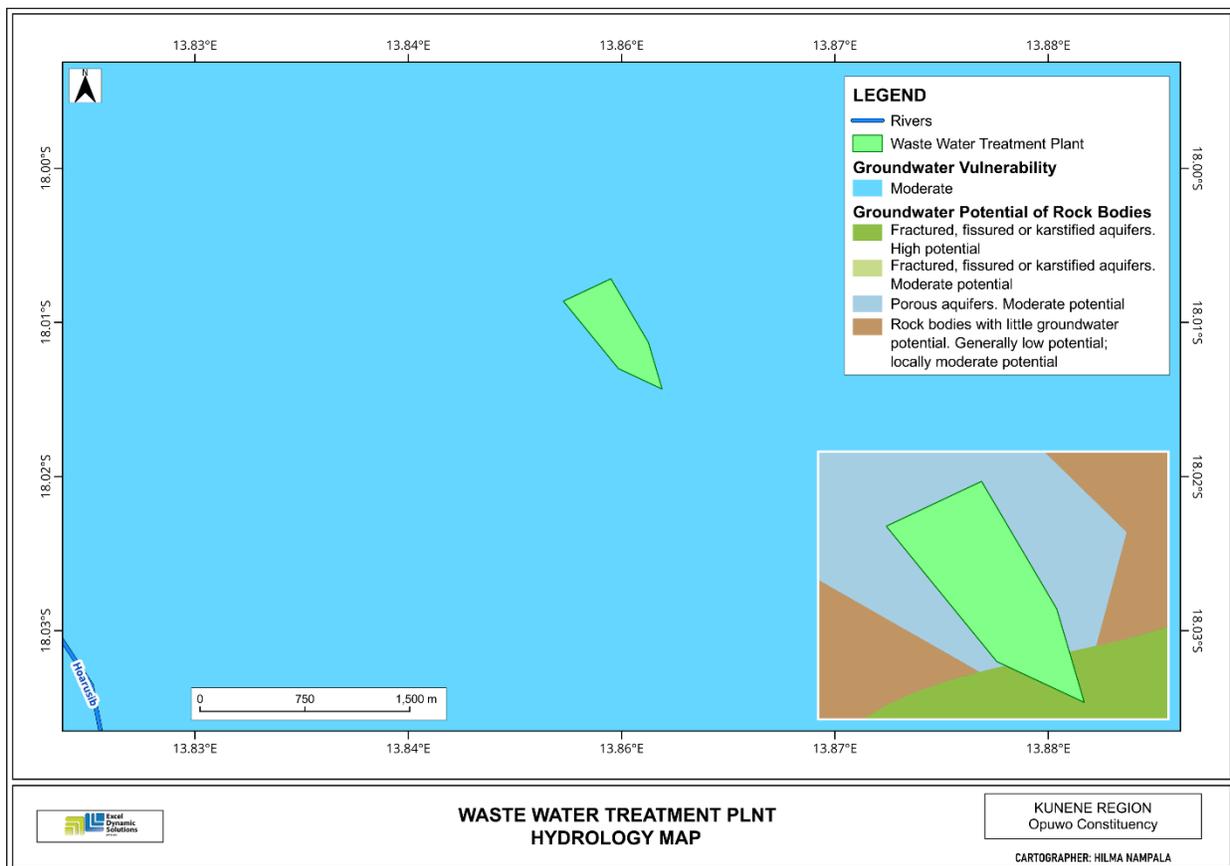


Figure 5: Hydrology Map of WWTP site.

4.6 Flora

Opuwo lies within the Mopane savanna biome, dominated by *Colophospermum mopane* woodlands interspersed with acacia shrublands and grasses. Vegetation cover is generally sparse due to the arid climate, but it provides critical grazing for livestock, which is the backbone of local livelihoods (Curtis & Mannheimer, 2005).

The dominant species include scattered mopane trees, hardy shrubs, and patches of pioneer grasses. While no rare or endemic plant species are known to occur within the site, the wider Kunene Region is recognized for its biodiversity, including unique desert-adapted flora.

Due to the project size, vegetation clearing for the WWTP will therefore have limited ecological impact, but care must be taken to rehabilitate disturbed areas after construction. Landscaping with indigenous species around the WWTP may also contribute to erosion control and aesthetic improvement.

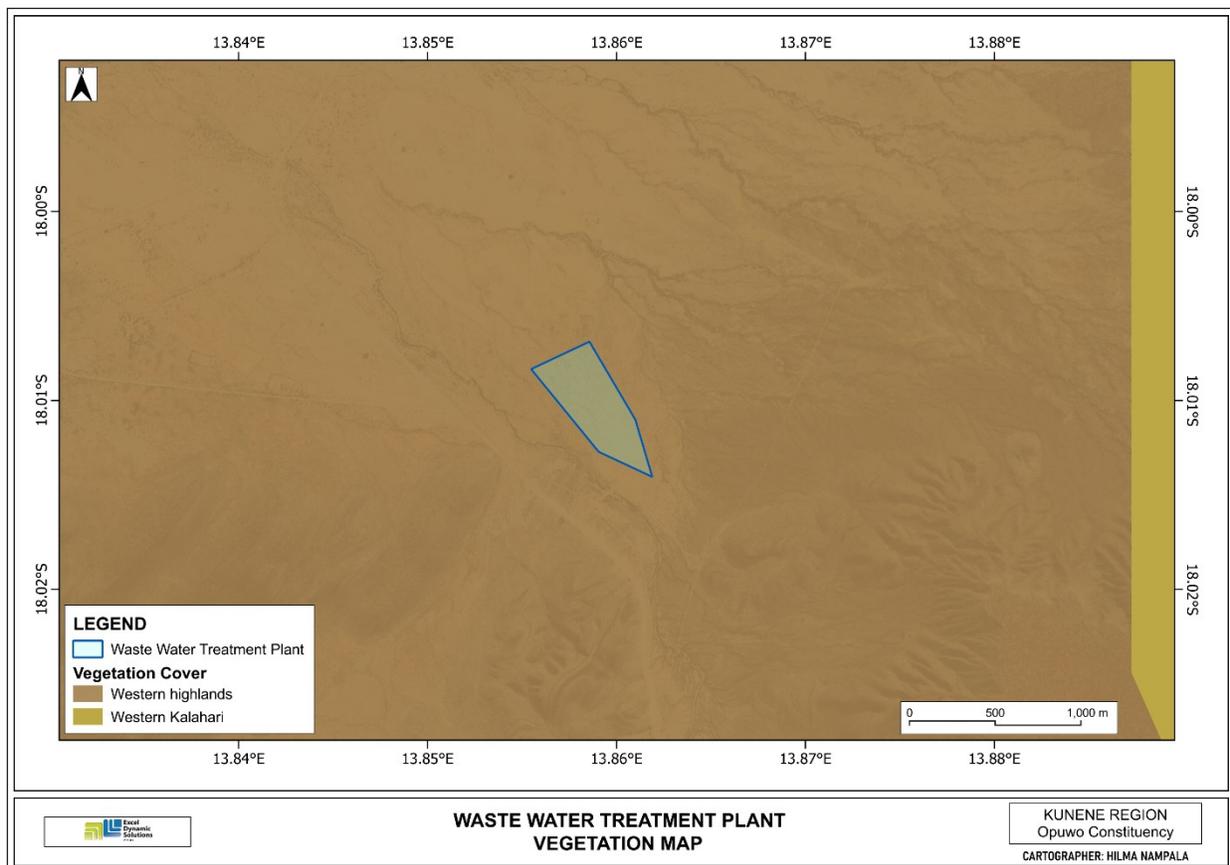


Figure 6: Vegetation Map of the WWTP site.

4.7 Fauna

The Kunene Region is home to a variety of wildlife, including desert-adapted elephants, giraffes, antelopes, and predators such as lions and hyenas. However, these species occur mainly in conservancy and wilderness areas outside Opuwo. The urban and peri-urban setting of the project site is dominated by domestic livestock, rodents, reptiles, and bird species adapted to disturbed environments.

Improperly managed wastewater can create ecological problems such as attracting scavenging birds, supporting mosquito breeding, and contaminating grazing areas. Such risks have been observed at the current oxidation ponds. By contrast, a modern WWTP with controlled effluent discharge and secure fencing will reduce these impacts. In the long term, the facility will contribute to improved environmental health by eliminating uncontrolled wastewater flows that degrades habitats.

4.8 Land Use

Land use in Opuwo is characterized by a mixture of residential housing, institutional facilities, commercial activities and communal grazing land. The proposed WWTP site lies within the Ombombo Communal Conservancy, which is managed for multiple uses including livestock grazing, conservation, and urban development. The site has historically been used for wastewater treatment, meaning it is already disturbed and not suitable for agriculture or conservation purposes.

From a planning perspective, re-establishing the wastewater facility at this site is appropriate because it consolidates sanitation infrastructure in one location while avoiding encroachment on undeveloped land. However, because the site is located within a communal conservancy, the Town Council must engage local stakeholders to ensure that project implementation is consistent with communal land use practices and conservation objectives. In the long term, the reuse of treated wastewater for irrigation will contribute positively to sustainable land management by reducing informal effluent discharges and rehabilitating degraded land.

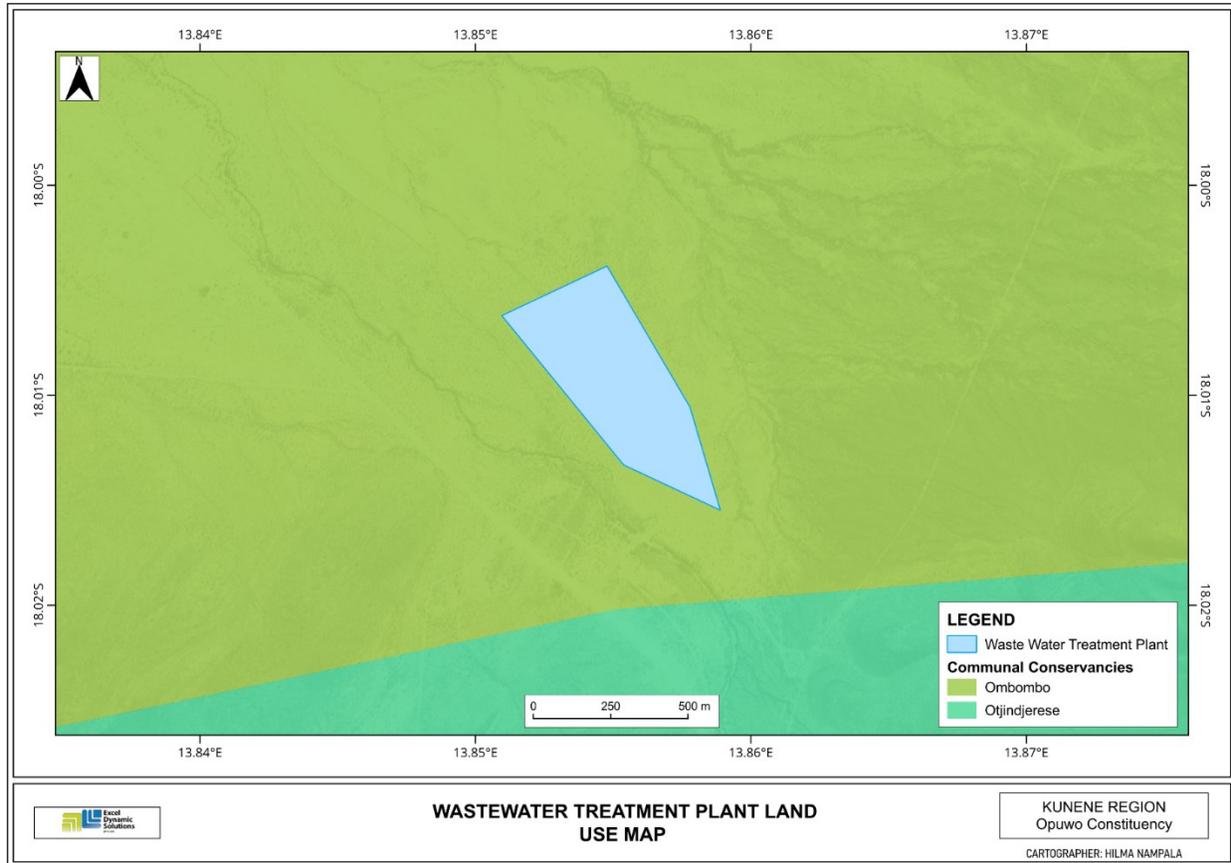


Figure 7: Land Use Map for the WWTP site.

4.9 Socio-Economic Environment

Opuwo is the administrative capital of the Kunene Region and a key service hub for rural communities. According to the Namibia Statistics Agency (2014), the town has a population of over 20,000 people, drawn from diverse ethnic groups including Himba, Herero, Damara, and others. The town hosts regional government offices, schools, a hospital, and commercial services.

The economy of Opuwo is dominated by subsistence livestock farming, supplemented by government employment and small-scale trading. Poverty levels are relatively high, and unemployment remains a challenge, especially among youth. Access to sanitation is limited, particularly in informal settlements, where reliance on pit latrines or open defecation persists. The deteriorated state of the existing ponds exacerbates public health risks, including diarrheal diseases, cholera, and vector-borne illnesses (Republic of Namibia, 2015).

The new WWTP is expected to bring multiple socio-economic benefits. During construction, it will create temporary jobs, with opportunities for local labour and suppliers. During operation, it

will provide permanent positions for plant operators, technicians, and maintenance staff. Furthermore, by producing treated effluent for irrigation, the plant can support urban agriculture, improve food security, and enhance recreational spaces such as the soccer stadium and Opuwo Park. These benefits align with the National Water Supply and Sanitation Policy (MAWF, 2008) and national development goals for improved sanitation and livelihoods.

4.10 Heritage and Archaeology

There are no nationally recognized archaeological sites recorded within the proposed site. However, archaeologically significant resources may be discovered during the construction phase therefore, it is highly recommended that the National Heritage act, 27 of 2004 should be adhered on site, and a qualified archaeologist should always be onsite and/or on standby/call during the construction phase to ensure that no archaeological resources that may be discovered on site are affected/ damaged.

Section 55 (4) of the National Heritage Act, No. 27 of 2004, requires that any archaeological or paleontological object or meteorite discovered is reported to the National Heritage Council as soon as practicable.

5. PUBLIC CONSULTATION PROCESS

Public consultation is an important component of the Environmental Assessment (EA) process. It provides potential Interested and Affected Parties (I&APs) with an opportunity to comment on and raise any issues relevant to the project for consideration in part of the assessment process. Public input assists the Environmental Assessment Practitioner (EAP) in identifying all potential impacts and the extent to which further investigations are necessary. Public consultation can also aid in the process of identifying possible mitigation measures. Public consultation for this scoping study has been done following the EMA and its EIA Regulations.

5.1 Pre-identified and Registered Interested and Affected Parties (I&APs)

Relevant and applicable national, regional, and local authorities and other interested members of the public were identified. Pre-identified I&APs were contacted directly, while other parties who contacted the Consultant after project advertisement notices in the newspapers, were registered as I&APs upon their request. Newspaper advertisements of the proposed activities were placed in two widely read national newspapers in the region (New Era Newspaper and The Namibian Newspaper). The project advertisement/announcement ran for two consecutive weeks inviting members of the public to register as I&APs and submit their comments. The summary of pre-identified and registered I&APs is listed below and the complete list of I&APs is provided in **Appendix D**.

Table 2: Summary of Interested and Affected Parties (I&APs)

National (Ministries and State-Owned Enterprises)
Ministry of Environment and Tourism
Regional, Local, and Traditional Authorities
Kunene Regional Council
Opuwo Town Council
General Public
Landowners /Interested members of the public

5.2 Communication with I&Aps

Regulation 21 of the EIA Regulations details the steps to be taken during a public consultation process and these have been used in guiding this process. Communication with I&APs concerning the proposed development was facilitated through the following means and in this order:

- A Background Information Document (BID) containing brief information about the proposed works was compiled and emailed to registered and Identified Interested and Affected Parties (I&APs);
- Project Environmental Assessment notices were published in the New Era Newspaper (**01 November 2024 and 08 November 2024**), and The Namibian Newspaper (**01 November and 08 November 2024**), briefly explaining the activity and its locality and inviting members of the public to register as I&APs and submit their comments/concerns.
- Public notice to inform members of the public about the EIA process was placed in Opuwo.
- Public meeting was scheduled and held on 25th of January 2025, at Opuwo Open Market at 12h00.

Issues raised by I&APs have been recorded and incorporated in the environmental report and EMP. The summarized issues raised during the public meeting are presented in **Table 4** below. The issues raised and responses by EDS are attached under **Appendix G**.

Table 3: Summary of main issues raised, and comments received during public meeting engagements

Issue	Concern
The odour from the existing ponds is very bad	Social nuisance

6. IMPACT IDENTIFICATION, ASSESSMENT AND MITIGATION MEASURES

6.1 Impact Identification

Proposed developments/activities are usually associated with different potential positive and/or negative impacts. For an environmental assessment, the focus is placed mainly on the negative impacts. This is done to ensure that these impacts are addressed by providing adequate mitigation measures such that an impact's significance is brought under control while maximizing the positive impacts of the development. The potential positive and negative impacts that have been identified from the proposed activities are listed as follows:

Positive impacts:

- Creation of jobs for the locals (primary, secondary, and tertiary employment).
- Producing a trained workforce and small businesses that can service communities and may initiate related businesses.
- Boosting local economic growth.
- Open up other investment opportunities and infrastructure-related development benefits.

Negative impacts:

- Disturbance to grazing areas
- Land degradation and Biodiversity Loss
- Generation of dust
- Water Resources Use
- Soil & Water Resources Pollution
- Waste Generation
- Occupational Health & Safety risks
- Vehicular Traffic Use & Safety
- Noise & Vibrations
- Disturbance to Archaeological & Heritage Resources
- Impacts on local Roads
- Social Nuisance: local property intrusion & disturbance
- Social Nuisance: Job seeking & differing Norms, Culture & values
- Impacts associated with closure and decommissioning of works

7. 2 Impact Assessment Methodology

The Environmental Assessment process primarily ensures that potential impacts that may occur from project activity are identified and addressed with environmentally cautious approaches and legal compliance. The impact assessment method used for this project is following Namibia's Environmental Management Act (No. 7 of 2007) and its Regulations of 2012, as well as the International Finance Corporation (IFC) Performance Standards.

The identified impacts were assessed in terms of scale/extent (spatial scale), duration (temporal scale), magnitude (severity), and probability (likelihood of occurring), as presented in **Table 5**, **Table 6**, **Table 7**, and **Table 8** respectively.

To enable a scientific approach to the determination of the environmental significance, a numerical value is linked to each rating scale. This methodology ensures uniformity and that potential impacts can be addressed in a standard manner so that a wide range of impacts are comparable. It is assumed that an assessment of the significance of a potential impact is a good indicator of the risk associated with such an impact. The following process will be applied to each potential impact:

- Provision of a brief explanation of the impact.
- Assessment of the pre-mitigation significance of the impact; and
- Description of recommended mitigation measures.

The recommended mitigation measures prescribed for each of the potential impacts contribute towards the attainment of environmentally sustainable operational conditions of the project for various features of the biophysical and social environment. The following criteria were applied in this impact assessment:

7.2.1 Extent (spatial scale)

The extent is an indication of the physical and spatial scale of the impact. **Table 5** shows the rating of impact in terms of the extent of spatial scale.

Table 4:Extent or spatial impact rating

Low (1)	Low/Medium (2)	Medium (3)	Medium/High (4)	High (5)
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Low (1)	Low/Medium (2)	Medium (3)	Medium/High (4)	High (5)
The impact is localized within the site boundary: Site only	The impact is beyond the site boundary: Local	Impacts felt within adjacent biophysical and social environments: Regional	Impact widespread far beyond site boundary: Regional	The impact extends National or international boundaries

7.2.2 Duration

Duration refers to the timeframe over which the impact is expected to occur, measured concerning the lifetime of the project. **Table 6** shows the rating of impact in terms of duration.

Table 5: Duration impact rating

Low (1)	Low/Medium (2)	Medium (3)	Medium/High (4)	High (5)
Immediate mitigating measures, immediate progress	The impact is quickly reversible, and short-term impacts (0-5 years)	Reversible over time; medium-term (5-15 years)	Impact is long-term	Long-term; beyond closure; permanent; irreplaceable or irretrievable commitment of resources

7.2.3 Intensity, Magnitude/severity

Intensity refers to the degree or magnitude to which the impact alters the functioning of an element of the environment. The magnitude of alteration can either be positive or negative. These ratings were also taken into consideration during the assessment of severity. **Table 7** shows the rating of impact in terms of intensity, magnitude, or severity.

Table 6: Intensity, magnitude, or severity impact rating

Type of criteria	Negative				
	H- (10)	M/H- (8)	M- (6)	M/L- (4)	L- (2)
Qualitative	Very high deterioration, high quantity of deaths, injury or illness / total loss of habitat, total	Substantial deterioration, death, illness or injury, loss of habitat/diversity or resource, severe alteration or	Moderate deterioration, discomfort, partial loss of habitat/biodiversity or resource, moderate alteration	Low deterioration, slight noticeable alteration in habitat and biodiversity. Little loss in species	Minor deterioration, nuisance or irritation, minor change in species/habitat/diversity or resource, no or very little quality deterioration.

Type of criteria	Negative				
	H- (10)	M/H- (8)	M- (6)	M/L- (4)	L- (2)
	alteration of ecological processes, extinction of rare species	disturbance of important processes		numbers	

7.2.4 Probability of occurrence

Probability describes the likelihood of the impacts occurring. This determination is based on previous experience with similar projects and/or based on professional judgment. **Table 8** shows impact rating in terms of probability of occurrence.

Table 7: Probability of occurrence impact rating

Low (1)	Medium/Low (2)	Medium (3)	Medium/High (4)	High (5)
Improbable; low likelihood; seldom. No known risk or vulnerability to natural or induced hazards.	Likely to occur from time to time. Low risk or vulnerability to natural or induced hazards	A possible, distinct possibility, frequent. Low to medium risk or vulnerability to natural or induced hazards.	Probable if mitigating measures are not implemented. Medium risk of vulnerability to natural or induced hazards.	Definite (regardless of preventative measures), highly likely, and continuous. High risk or vulnerability to natural or induced hazards.

7.2.5 Significance

Impact significance is determined through a synthesis of the above impact characteristics. The significance of the impact “without mitigation” is the main determinant of the nature and degree of mitigation required. As stated in the introduction to this section, for this assessment, the significance of the impact without prescribed mitigation actions is measured.

Once the above factors (**Table 5, Table 6, Table 7, and Table 8**) have been ranked for each potential impact, the impact significance of each is assessed using the following formula:

SIGNIFICANCE POINTS (SP) = (MAGNITUDE + DURATION + SCALE) X PROBABILITY

The maximum value per potential impact is 100 significance points (SP). Potential impacts were rated as high, moderate, or low significance, based on the following significance rating scale (Table 9).

Table 8:Significance rating scale

Significance	Environmental Significance Points	Colour Code
High (positive)	>60	H
Medium (positive)	30 to 60	M
Low (positive)	1 to 30	L
Neutral	0	N
Low (negative)	-1 to -30	L
Medium (negative)	-30 to -60	M
High (negative)	-60<	H

Positive (+) – Beneficial impact

Negative (-) – Deleterious/ adverse+ Impact

Neutral – Impacts are neither beneficial nor adverse

For an impact with a significance rating of high (-ve), mitigation measures are recommended to reduce the impact to a medium (-ve) or low (-ve) significance rating, provided that the impact with a medium significance rating can be sufficiently controlled with the recommended mitigation measures. To maintain a low or medium significance rating, monitoring is recommended for a period to enable the confirmation of the significance of the impact as low or medium and under control.

The assessment of the project phases are done for pre-mitigation and post-mitigation.

The risk/impact assessment is driven by three factors:

Source: The cause or source of the contamination.

Pathway: The route taken by the source to reach a given receptor

Receptor: A person, animal, plant, ecosystem, property, or a controlled water source. If contamination is to cause harm or impact, it must reach a receptor.

A pollutant linkage occurs when a source, pathway, and receptor exist together. Mitigation measures aim firstly, to avoid risk and if the risk cannot be avoided, mitigation measures to minimize the impact are recommended. Once mitigation measures have been applied, the identified risk would reduce to lower significance (Booth, 2011).

This assessment focuses on the three project phases namely, planning, construction and decommissioning. The potential negative impacts stemming from the proposed activities of the project are described, assessed and mitigation measures are provided thereof. Further mitigation measures in a form of management action plans are provided in the Draft Environmental Management Plan.

7.3 Assessment of Potential Negative Impacts

The main potential negative impacts associated with the operation and maintenance phase are identified and assessed below:

7.3.1 Disturbance to the grazing areas

The site is overlying communal land that have livestock and wildlife. The Construction activities such as site clearing, trenching, and drilling can potentially lead to the disturbance of grazing land. This will potentially affect the grazing land available to wildlife, and since the wildlife greatly depends on the little available flora, their livelihood will be impacted.

The effect of construction work on the land (when done over a wider spatial extent), if not mitigated, may hinder grazing areas. Under the status quo, the impact can consider being of a medium significance rating. With the implementation of appropriate mitigation measures, the rating will be reduced to a lower significance. The impact is assessed in **Table 10** below.

Table 9: Assessment of the impacts on grazing areas

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M: -4	M: -3	M: -4	M/H: 5	M: -55
Post mitigation	L/M: -2	L/M: -2	L/M: -4	L/M: 3	L: -24

7.3.2 Land Degradation and Loss of Biodiversity

Fauna: The construction would result in land degradation, leading to habitat loss for a diversity of flora and fauna ranging from microorganisms to large animals and trees. Endemic species are most at risk since even the slightest disruption in their habitat can result in extinction.

The presence and movement of the workforce and operation of project equipment and heavy vehicles would disturb livestock present. The proposed activities may also carry the risk of the potential illegal hunting.

Flora: Direct impact of construction works on flora will mainly occur through clearing for access routes and associated infrastructure. The dust emissions from vehicles may also affect surrounding vegetation through the fall of dust, if excessive. Some loss of vegetation is an inevitable consequence of the development. However, given a moderate abundance of vegetation and site-specific areas on the site, the impact will be localized, therefore manageable.

Under the status, the impact can be of a medium significance rating. With the implementation of appropriate mitigation measures, the rating will be reduced to a low significance rating. The impact is assessed in **Table 11** below.

Table 10: Assessment of the impacts of construction works on biodiversity

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M: -4	M: -4	M: -6	M/H: 4	M: -56
Post mitigation	L/M: -3	L/M: -3	L/M: -4	L/M: 3	L: -30

7.3.3 Generation of Dust (Air Quality)

Dust emanating from site access routes when transporting equipment and supply to and from the site may compromise the air quality in the area. Vehicular movements from heavy vehicles such as trucks would potentially create dust, even if it is not anticipated to be low. Additionally, activities carried out as part of the site works such as drilling would contribute to the dust levels in the air. The medium significance of this impact can be reduced to a low significance rating by properly implementing mitigation measures. The impact is assessed in **Table 12** below.

Table 11: Assessment of the impacts of construction works on air quality

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
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Pre mitigation	M: -3	M: -3	M/L: -4	M/H: 4	M: -40
Post mitigation	L - 2	L - 2	L - 2	L - 1	L - 6

7.3.4 Water Resources Use

Water resources are impacted by project developments/activities in two ways - through pollution (water quality) or over-abstraction (water quantity) or at times both.

The abstraction of more water than can be replenished from low groundwater potential areas would negatively affect the local communities (communal and livestock) that depend on the same low potential groundwater resource (aquifer).

The impact of the project activities on the resources would be dependent on the water volumes required by each project activity. Construction activities use a lot of water, mainly for equipment

The exact amounts of water required for proposed operations would be dependent on the duration of the site maintenance. The construction period is temporally limited, therefore, the impact will only last for the duration of this activities, and ceases upon their completion.

Without the implementation of any mitigation measures, the impact can be rated as medium, but upon effective implementation of the recommended measures, the impact significance would be reduced to low as presented in **Table 13** below.

Table 12: Assessment of the project impact on water resource use and availability

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M/H - 3	L/M - 4	M/H - 4	M - 40
Post mitigation	L/M - 1	L/M - 1	L - 2	L/M - 3	L - 12

7.3.5 Soil and Water Resources Pollution

The proposed activities are associated with a variety of potential pollution sources (i.e., lubricants, fuel, and wastewater) that may contaminate/pollute soils, and eventually, surface and groundwater. The anticipated potential source of pollution to water resources from the project activities would be hydrocarbons (oil) from project vehicles, machinery, and equipment as well as potential wastewater/effluent from construction-related activities.

The spills (depending on volumes spilled on the soils) from machinery, vehicles, and equipment could infiltrate into the ground and pollute the fractured or faulted aquifers on site, and with time

reach further groundwater systems in the area. However, it should be noted that the scale and extent/footprint of the activities where potential sources of pollution will be handled is relatively small. Therefore, the impact will be moderately low.

Pre-implementation of the mitigation measures, the impact significance is medium to high and upon implementation, the significance will be reduced to moderate. The impact is assessed in **Table 14** below.

Table 13: Assessment of the project impact on soils and water resources (pollution)

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 5	M/L - 3	M/L - 3	M - 4	M – 44
Post mitigation	L - 3	M - 3	L - 3	L/M - 3	L – 27

7.3.6 Waste Generation

During the construction program, domestic and general waste is produced on-site. If the generated waste is not disposed of responsibly, land pollution may occur on the site or around the site. The proposed site is in an area of moderate sensitivity to pollution. Improper handling, storage, and disposal of hydrocarbon products and hazardous materials at the site may lead to soil and groundwater contamination, in case of spills and leakages. Therefore, the project program needs to have appropriate waste management for the site. To prevent these issues, any hazardous waste that may have an impact on animals, vegetation, water resources, and the general environment should be handled cautiously. Without any mitigation measures, the general impact of waste generation has a medium significance. The impact will reduce to low significance, upon implementing the mitigation measures. The assessment of this impact is given in **Table 15** below.

Table 14: Assessment of waste generation impact

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	L/M – 2	L/M - 2	M - 6	M - 5	M – 50
Post mitigation	L – 1	L - 1	L - 2	L/M - 2	L – 8

7.3.7 Occupational Health and Safety Risks

Project personnel (workers) involved in the works activities may be exposed to health and safety risks. These may result from accidental injury, owing to either minor (i.e., superficial physical injury) or major (i.e., involving heavy machinery or vehicles) accidents. The site safety of all personnel is the Proponent's responsibility and should be adhered to as per the requirements of the Labour Act (No. 11 of 2007) and the Public Health Act (No. 36 of 1919). The heavy vehicle, equipment, and fuel storage area should be properly secured to prevent any harm or injury to the project workers or local animals.

The use of heavy equipment and the presence of hydrocarbons on sites may result in accidental fire outbreaks, which could pose a safety risk to the project personnel, equipment, and vehicles. It may also lead to widespread veld fires if an outbreak is not contained and if machinery and equipment are not properly stored, the safety risk may be a concern for project workers and residents.

The impact is probable and has a medium significance rating. However, with adequate mitigation measures, the impact rating will be reduced to low. This impact is assessed in **Table 16** below and mitigation measures are provided.

Table 15: Assessment of the impacts of construction works on health and safety

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M/L - 2	M - 6	M/H - 4	M - 44
Post mitigation	L/M - 2	L/M - 2	L - 2	L/M - 2	L - 12

7.3.8 Vehicular Traffic Use and Safety

The site is accessible via D3700 road, Kunene Region. These are some of the main transportation routes for all vehicular movement in the area and provide access to the site and connect the project area to other towns. Traffic volume will therefore increase on these district roads during construction as the project would need delivery of supplies and services on site.

Depending on the project needs, trucks, medium-sized vehicles, and small vehicles will frequent the area to and from the site. This would potentially increase slow-moving heavy vehicular traffic along these roads and add additional pressure on the roads. However, transportation of materials and equipment is expected to occur on a limited schedule and only for the duration of

the project. Therefore, the risk is anticipated to be short-term, not frequent, and therefore of medium significance. Before mitigation, the impact can be rated medium and with the implementation of mitigation measures, the significance will be low as assessed in **Table 17** below.

Table 16: Assessment of the impacts of construction on-road use (vehicular traffic)

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M – 4	M/H - 3	L/M - 4	M/H - 5	M - 55
Post mitigation	L/M – 2	L/M - 2	L - 2	L/M - 2	L - 12

7.3.9 Noise and vibrations

Construction work (especially excavation and grading) may be a nuisance to surrounding communities due to the noise produced by the activity. Excess noise and vibrations can be a health risk to workers on site. The equipment used on site is of medium size and the noise level is bound to be limited to the site only, therefore, the impact likelihood is minimal. Without any mitigation, the impact is rated as of medium significance. To change the impact significance from the pre-mitigation significance to a low rating, mitigation measures should be implemented. This impact is assessed in **Table 20** below.

Table 17: Assessment of the impacts of noise and vibrations from construction works

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	L/M - 2	L/M - 2	M - 6	M/H - 3	M – 30
Post mitigation	L - 1	L/M - 2	L - 2	L/M -2	L - 10

7.3.10 Disturbance to Archaeological and Heritage Resources

The specialist archaeological assessment conducted, indicates that Kunene Region is sensitive and contains archeological/cultural significant sites, and there is a possibility of unveiling/discovering new archeological and/or cultural materials in the proposed project area. If such Materials are found the areas must be mapped out and coordinates taken to establish “No-Go-Areas”, due to their sensitivity and then documented. They may be protected either by fencing them off or demarcation for preservation purposes, or excluding them from any

development i.e., no construction activities should be conducted near these recorded areas through the establishment of buffer zones.

This impact can be rated as medium significance if there are no mitigation measures in place. Upon implementation of the necessary measures, the impact significance will be reduced to a lower rating. The impact is assessed in **Table 19**.

Table 18: Assessment of the impacts of construction works on archaeological & heritage resources

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M/H – 4	M - 6	M/H - 4	M – 52
Post mitigation	L/M - 2	L/M – 2	L - 2	L/M - 2	L - 12

7.3.11 Impact on Local Roads/Routes

This projects are usually associated with the movements of heavy trucks and equipment or machinery that use local roads. Heavy vehicles traveling on local roads exert pressure on the roads and may make the roads difficult to use. This will be a concern if maintenance and care is not taken during or after the construction phase. The impact would be short-term (during construction only) and therefore, manageable.

Without any management and or mitigation measures, the impact can be rated as medium and to reduce this rating to low, the measures will need to be effectively implemented. The assessment of this impact is presented in **Table 20**.

Table 19: Assessment of construction works of local services (roads and water)

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M/H - 4	M – 3	M - 6	M - 3	M – 39
Post mitigation	L - 1	L – 1	M/L - 4	M/L -2	L - 12

7.3.12 Social Nuisance: Local Property intrusion and Disturbance/Damage

The presence of some non-resident workers may lead to social annoyance to the local community. This could particularly be a concern if they enter or damage local private property. The private properties of the locals may include homes, fences, vegetation, livestock, wildlife, or any properties of economic or cultural value to land users. The damage or disturbance to properties may not only be private but local public properties. The unpermitted and unauthorized entry to private property may cause clashes between the affected property (land) owners and the Proponent.

The impact is rated as of medium significance. However, upon mitigation (post-mitigation), the significance will change from a medium to a low rating. The impact is assessed below (**Table 21**).

Table 20: Assessment of the social impact of community property damage or disturbance

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 2	M - 3	M - 4	M/H - 3	M - 27
Post mitigation	L - 1	L - 1	M/L - 4	M/L - 2	L - 12

7.4 Cumulative Impacts Associated with Proposed Activity

According to the International Finance Corporation (2013), cumulative impacts are defined as “impacts that result from the successive, incremental, and/or combined effects of an action, project, or activity (collectively referred to in this document as “developments”) when added to other existing, planned, and/or reasonably anticipated future impacts”.

Like many other similar projects, some cumulative impacts to which the proposed project and associated activities potentially contribute, are the:

- **Impact on road infrastructure:** The proposed activity contributes cumulatively to various activities such as farming activities and traveling associated with tourism and local daily routines. The contribution of the proposed project to this cumulative impact is however not considered significant, given the short duration, and spatial extent of the intended activities.
- **Use of water:** While the contribution of this project will be significant to the town, mitigation measures to reduce the overuse of water during construction are essential.

8 RECOMMENDATIONS AND CONCLUSION

8.1 Recommendations

The potential positive and negative impacts of the proposed activities were identified and assessed and appropriate management and mitigation measures (to negative impacts) were made thereof for implementation by the Proponent, their contractors, and project-related employees.

Mitigation measures for identified issues have been provided in the Environmental Management Plan, for the Proponent to avoid and/or minimize their significant impacts on the environmental and social components. Most of the potential impacts were found to be of medium-rating significance. With effective implementation of the recommended management and mitigation measures, a reduced rating in the significance of adverse impacts is expected from Medium to Low. To maintain the desirable rating, the implementation of management and mitigation measures should be monitored by the Proponent directly, or their Environmental Control Officer (ECO). The monitoring of implementation will not only be done to maintain a low rating but also to ensure that all potential impacts identified in this study and other impacts that might arise during implementation are properly identified in time and addressed right away.

The Environmental Consultant is confident that the potential negative impacts associated with the proposed project activities can be managed and mitigated by the effective implementation of the recommended management and mitigation measures and with more effort and commitment put into monitoring the implementation of these measures.

It is, therefore, recommended that in the case of granting an ECC for this project, the proposed project activities may be granted an ECC, provided that:

- All the management and mitigation measures provided in the EMP are effectively and progressively implemented.
- All required permits, licenses, and approvals for the proposed activities should be obtained as required. These include permits and licenses for land use access agreements to explore and ensure compliance with these specific legal requirements.
- The Proponent and all project workers and contractors must comply with the legal requirements governing the project and ensure that all required permits and or approvals are obtained and renewed as stipulated by the issuing authorities.
- Site areas where activities have ceased are rehabilitated, as far as practicable, to their pre-state.

8.2 Conclusion

It is crucial for the proponents and their contractors to effectively implement the recommended management and mitigation measures, to protect the biophysical and social environment throughout the project duration. This would be done to promote environmental sustainability while ensuring a smooth and harmonious existence and purpose of the project activities in the community and environment at large. It is also to ensure that all potential impacts identified in this study and other impacts that might arise during implementation are properly identified in time and addressed accordingly. Lastly, should the ECC be issued, the Proponent will be expected to be compliant with the ECC conditions as well as legal requirements governing construction and related activities

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