Tortoise Environmental Consultants(TEC)
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ENVIRONMENTAL MANAGEMENT PLAN (EMP)

APPLICATION FOR ENVIRONMENTAL CLEARANCE CERTIFICATE FOR THE PROPOSED CONSTRUCTION OF OMUPOPO GWOMAKILIKILI EARTH DAM IN OSHAALE SHOONIME VILLAGE, OSHANA REGION

AUGUST 2024

Prepared for:

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DOCUMENT INFORMATION		
Title	Environmental Management Plan – ECC application for the proposed construction of Omupopo Gwomakilikili earth dam in Oshaale Shoonime Village in Oshana region	
ECC Application Reference number	**APP- 004577**	
Listed Activity	**ACTIVITY 8: Water Resource Development:** • 8.5 Construction of dams, reservoirs, levees and weirs. • 8.8 Construction and other activities in water courses within flood lines. • 8.9 Construction and other activities within a catchment area.	
Location	Oshaale Shoonime Village, Oshana Region	
Proponent	Oshana Regional Council Leo Shoopala Street, Oshakati East Private Bag 5543, Oshakati +264 65 22 88 200 info@Oshanarc.gov.na	
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1 EAP – Environmental Assessment Practitioner

ACRONYMS

BID	Background Information Document
DEA	Department of Environmental Affairs
DSR	Draft Scoping Report
EA	Environmental Assessment
EAP	Environmental Assessment Practitioner
ECC	Environmental Clearance Certificate
ECO	Environmental Compliance Officer
EIA	Environmental Impact Assessment
EMA	Environmental Management Act (No. 7 of 2007)
EMP	Environmental Management Plan
I&APs	Interested and Affected Parties
MEFT	Ministry of Environment, Forestry and Tourism
ORC	Oshana Regional Council
PPE	Personal Protective Equipment
SM	Site Manager
TEC	Tortoise Environmental Consultancy

TABLE OF CONTENT

TABLE OF FIGURES

LIST OF TABLES

1. INTRODUCTION

1.1. ECC Application

Namibia is the driest country in southern Africa. The country's climatic condition is characterized by high temperatures and periodic low rainfall. The country experiences high climatic variability in the form of persistent droughts, unpredictable and highly variable rainfall patterns, temperatures, and scarcity of water. High solar radiation, low humidity and high temperatures lead to very high evaporation rates, about five times greater than the average rainfall. Resulting in low rainfall, therefore, lack of water is one of the key limitation factors to Namibia's development.

Proposed earth dam location: GPS coordinates: Latitude: -18.31492 & Longitude: 15.68287

1.2. Environmental versus Economic Development

Namibia's economy is highly dependent on a healthy environment, and striking a balance between meeting demands for economic development and maintaining biological diversity remains a priority. Therefore, it is of utmost importance that the environment and development sectors work together and identify synergies in order to ensure that natural resources are utilized in an acceptable and sustainable manner.

The aim of undertaking environmental assessments is therefore to guide the sustainable utilization of natural resources and to mitigate negative impacts that would otherwise compromise environmental integrity and future ecosystem benefits.

The primary purpose of the earth dam is to harvest and store water during rainy season. Namibia, being a predominantly arid country, experiences erratic rainfall patterns with long dry spells. The dam will help to collect rainwater runoff, storing it for future use during dry seasons or droughts. The stored water can be utilized for various purposes such as agricultural irrigation, livestock, and human consumption. In Namibia, where access to water resources can be limited, especially in rural areas, such dams play a vital role in providing a reliable water supply for communities and agriculture.

1.3. Environmental Management Plan (EMP) Context

This document constitutes the Environmental Management Plan (EMP) for the proposed construction of an earth dam in Oshaaleshoonime village in Oshana region.

1.4. What is an EMP?

The Environmental Management Plan (EMP) is a tool used to mitigate potential environmental risks associated with the proposed project / activity, and provides a risk management strategy and logical framework for implementation of the proposed earth dam construction activities, in order to mitigate potential environmental and social impacts identified during the EIA process, in accordance with the provisions of the Environmental Management Act (Act No.7 of 2007), EIA Regulations of 2012 and any other relevant / applicable legislation.

As a result, the EMP recommends mitigation measures in order to ensure that the recommended proposed earth dam construction and associated activities are conducted in an environmentally friendly manner, and in accordance with the provisions of the Environmental Management Act and EIA regulations.

Furthermore, the EMP outlines specific roles and responsibilities for role-players against which they can be evaluated and non-compliance is punishable.

1.5. Purpose of the EMP

The purpose of the EMP is to identify potential environmental and social impacts associated with the operation of the proposed earth dam construction , in-order to ensure compliance to the EMA.

The aim of the EMP is to ensure that the activities undertaken during the construction of the proposed earth dam are conducted in accordance with the following:

i. Environmental Management Act (No. 7 of 2007),
ii. EIA regulations of 2012 (GN: 30), and
iii. Best environmental practices (benchmarks)
iv. Any other applicable legislation *(as presented in Table 3.1 to 3.3)*

The EMP provides environmental guidelines to be followed throughout the lifespan of the existing proposed earth dam construction and comprise of the following:

a) Environmental Aspects,
b) Management Objective,
c) Mitigation Measures / Actions Required,
d) Monitoring Indicators, and
e) Party Responsible

1.6. Objective

The objective of the EMP is to prevent / minimize (where possible), unacceptable and adverse environmental, social or economic impacts that may arise from the continuation of the proposed earth dam construction . Overall, the EMP aims to prevent any negative impact/s (real, potential or perceived) that may result from the proposed earth dam construction .

1.7. EMP Scope

The EMP does not only focus, and it is not limited to the boundaries of the proposed earth dam site , but it includes the bigger picture, and serve as the guiding tool to protecting the natural, bio-physical and socio-economic environment on both the specific site in the surrounding area. The bigger picture is important because, some impacts may not be confined to the margins of the proposed earth dam site .

1.8. Possible adjustments to the EMP

The EMP is an open-ended document and maybe considered inconclusive. In other words, the EMP should allow room for adjustments if new information becomes available at a later stage, in which new / additional mitigation measures may become necessary.

The necessity of possible adjustments to the EMP at a later stage may be attributed to:

a) Lack of information at the time of drafting the initial EMP,
b) Evolution or addition of new activities, or
c) Unintended omission of potential impacts during the initial EIA scoping exercise and development of the initial EMP.
d) Development of industry best practice.

This implies that, in-addition to the information contained herein, any other relevant information that may surface during the construction operations, through internal monitoring or auditing by the Environmental Compliance Officers (ECOs), can be added to the EMP (evolution of activities), and such changes or inclusions will be binding to the proponent and all contractors / sub-contractors.

1.9. Implementation Framework and Accountability to the EMP

For effective implementation of the EMP, the Institutional roles are presented below. However, the specific roles and responsibilities are defined and broken down as presented in Sections 4 and 5, respectively.

Table 1-1: Role players, Institutional Framework

Role-player	Company / Institution	Role
Proponent	Oshana Regional Council (ORC)	Compliance to the EMP
Environmental Consultant	Tortoise Environmental Consultants (TEC)	Development of the EMP
Environmental Compliance Officer/s (ECO)	Ministry of Environment, Forestry & Tourism (MEFT) – Department of Environmental Affairs (DEA)	Monitoring Compliance to EMP: ➢ Un-announced spot checks, ➢ Corrective measures, warning, penalties / fines, license suspension, etc
Public	Interested and affected parties (I&APs)	Report to the ECOs, any activity of environmental concern (e.g Pollution, safety risks, etc)

2. PROJECT INFORMATION

2.1 Project Location

Oshaale Shoonime village is located in Oshana Region.

As indicated in figure 1 & 2, no trees will be cut down for the construction of the earth dam. Furthermore, the proposed site is suitable for this purpose as it is in a flood plain.

Figure 2-1: Proposed construction site.

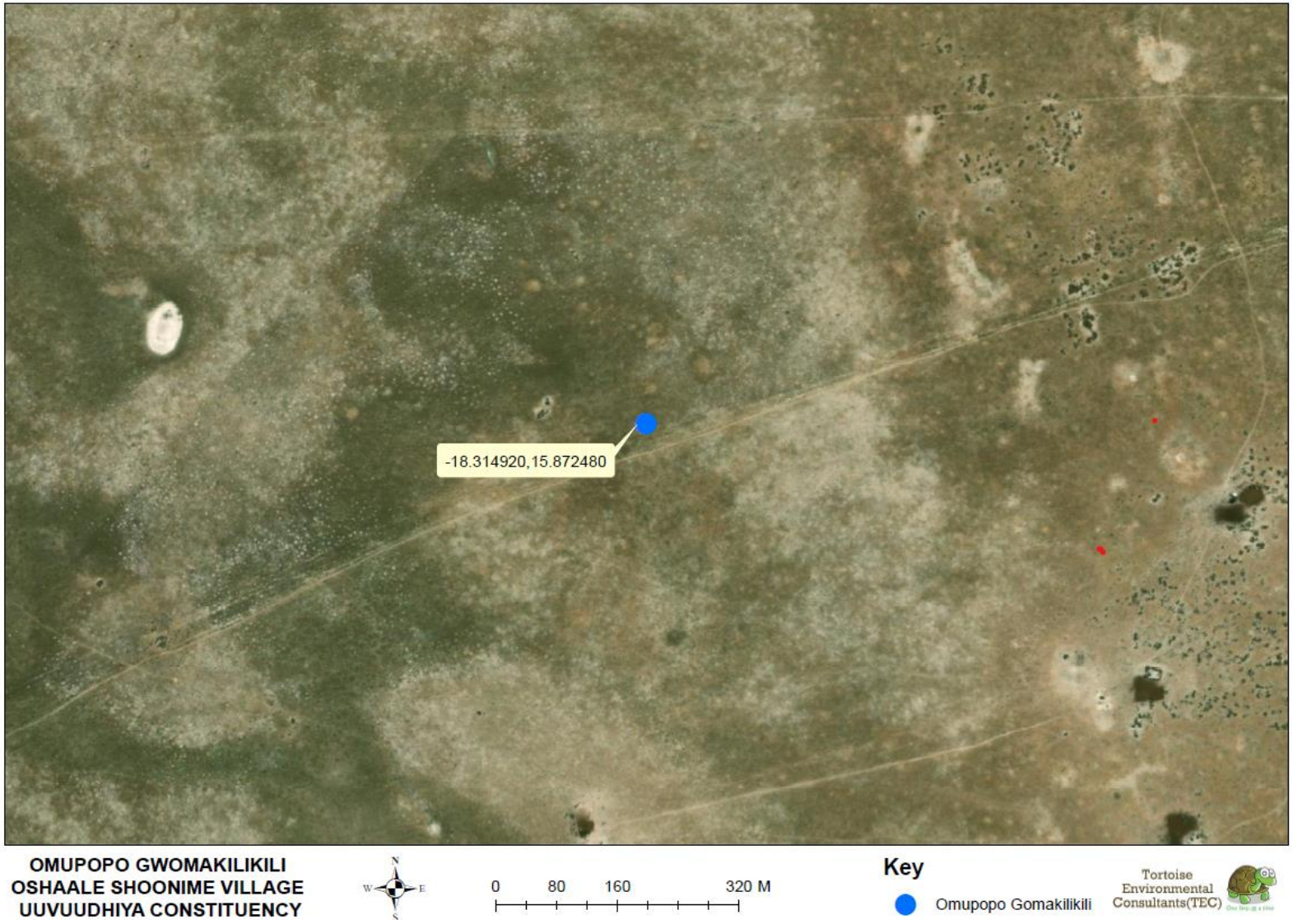

Figure 2-2: Site map showing the proposed construction site

2.2 Biodiversity and ecology of the area

2.2.1 Flora and fauna

The proposed site is in a flood plain with mainly glass and not trees. Land use in communal area is mainly for communal farming which involves farming with domestic animals such as Goats, Cattle and Donkeys and cultivating Omahangu crops. Thus, the impact of the project on biodiversity is negligible.

The presence and varieties of plants within a region are shaped by the soil type, geological features, and the prevailing rainfall patterns. In Oshana, the vegetation biome predominantly falls under the Tree-and-shrub Savannah category, characterized by the Cuvelai drainage and Mopane shrubland. However, for this specific site no trees will be cut down.

2.2.2 Climatic Conditions (rainfall and wind)

Oshana is one of the warmest regions in Namibia with average daily maximum temperatures of 33°C. It falls within a zone characterized by the highest solar radiation, measuring between 6.2-6.4 kWh/m3/day, primarily due to the region's elevated position in north-central Namibia (TEC, 2023). Classified as semi-arid, Oshana receives an average annual rainfall ranging from 300 to 450mm. However, rainfall in this region is notably erratic, leading to both occasional floods and frequent droughts in recent times. The period between 2013 to 2016 marked one of the most severe droughts of the past decade, significantly impacting food security (TEC, 2023).

2.2.3 Geology and Soil

The area displays a predominantly flat terrain, lacking mountain ranges or deep canyons. Its soil composition belongs to the Kalahari Group, consisting of deposits comprising sands, clays, and calcretes, as identified by Mendelsohn et al. (2003). This particular soil type exhibits low fertility owing to its limited capacity to retain nutrients, consequently resulting in restricted potential for cultivating crops (TEC, 2023). To enhance the fertility of such soil, the common practice involves the application of fertilizers or manure to enhance crop production.

2.2.4 Topography and Hydrology

The northern central of Namibia is referred to as the Cuvelai-Etosha Basin. A significant portion of the region boasts an exceptionally level landscape, gradually descending from an elevation of approximately 1150 meters above

sea level. The expansive Cuvelai wetland spans from southern Angola into the north-central parts of Namibia, ultimately ending at the Etosha Pan, which serves as the lowest point for the water drainage network within this basin (Green Gain Consultants, 2021).

There are no perennial rivers in Oshana, “iishana” are the main surface water sources. These water channels remain dry for most of the year but are susceptible to significant flooding (efundja) during the rainy season, largely attributed to the region's flat topography, as noted by TEC (2023). The flooding is not solely a result of local rainfall; it also stems from substantial rainfall in higher rainfall zones upstream in Angola.

2.3 Description of the proposed earth dam construction

2.3.1 Earth dam design

The dam will be 3.7m deep with a compacted slope fall of 1:3 as indicated in figure 2.4.

The proposed earth dam will be surrounded by a perimeter fence and there will be a gate to prevent animals from entering the proposed earth dam construction area.

Overall, the earth dams will be constructed as per the following guidelines;

- The walls will be trimmed to a slope of 1:3 and compacted. This slope enables smooth water run-off that prevents erosion and reduce risk of wall collapse.
- The base will be compacted to achieve a high degree of impermeability that will prevent water loss through leaching.
- The mouth of the dam will face the drainage direction to enable smooth inflows.
- A permanent drainage structure, such as rock buttress (Figure 3) will be constructed to enhance smooth inflows which will not cause soil erosion and formation of gullies.
- A shallow entry point will be constructed for safe water collection and an entry point for animals.

Figure 2-3: Rock buttress illustration

Figure 2-4: Illustration of the 1:3 slope fall

Overall, the earth dams will be constructed as per the following guidelines;

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ii. The base will be compacted to achieve high degree of impermeability that will prevent water loss through leaching.
iii. The mouth of the dam will face the drainage direction to enable smooth inflows.
iv. A permanent drainage structure, such as rock buttress (Figure 4) will be constructed to enhance smooth inflows which will not cause soil erosion and formation of gullies.
v. A shallow entry point will be constructed for safe water collection and an entry point for animals.

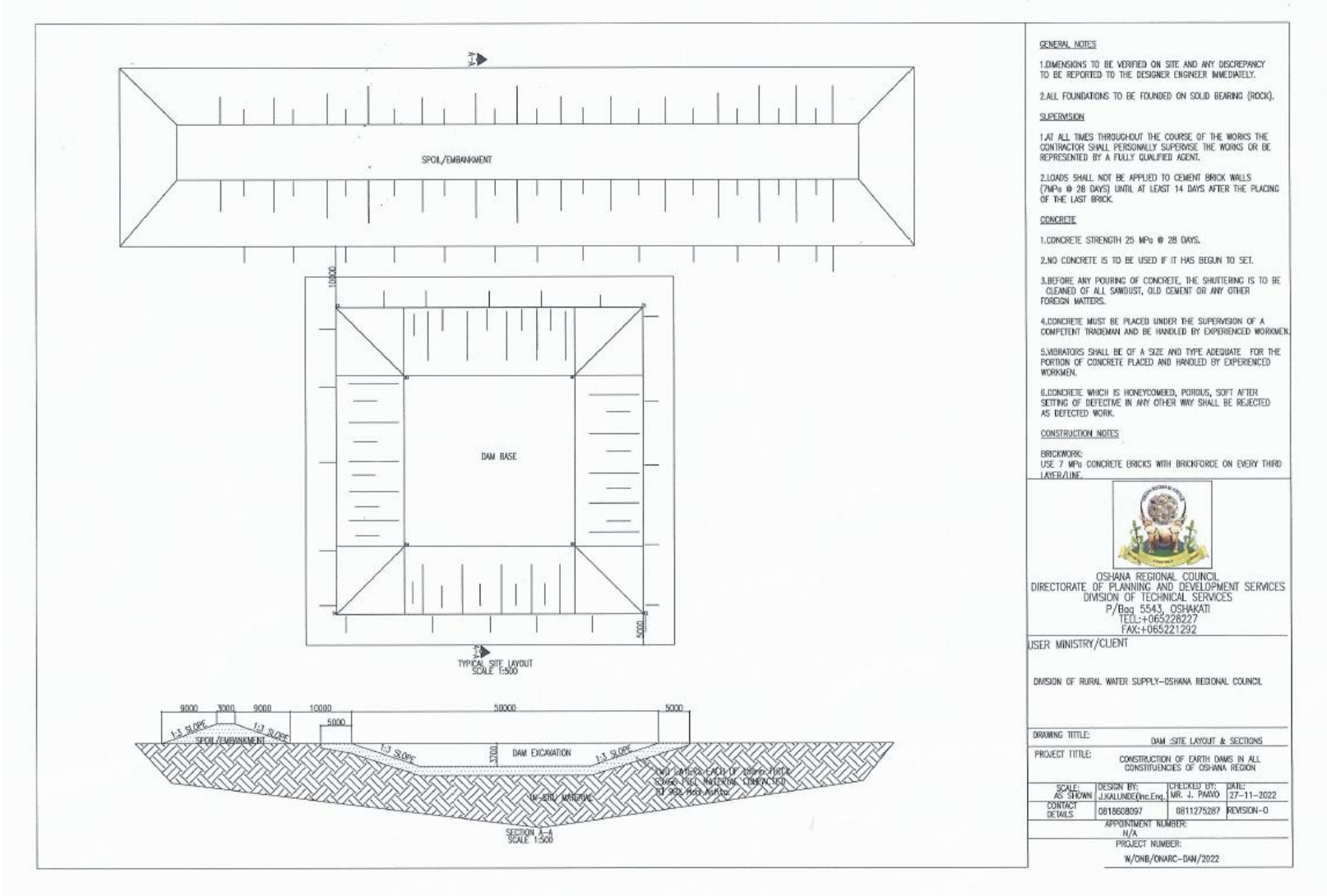

Figure 2-5: Earth Dam Design

3. COMPLIANCE AND LEGAL FRAMEWORK

This chapter outlines the regulatory framework applicable to the proposed earth dam construction . Table 3.1 provides an overview of applicable policies, plans and strategies and Table 3.2 provides a list of applicable national legislation.

3.1 Compliance to the EMP

The EMP is binding to the proponent, and all contractors / sub-contractors. This implies that each and every entity that may have any kind of engagement or involved in / with the activities of the proposed earth dam construction should comply with the EMP throughout the project lifespan. Non-compliance may have serious consequences e.g License withdrawal.

3.2 Environmental Management Act (No.7 of 2007)

Section 27 of the Environmental Management Act 2007 (Act No. 7 of 2007) (EMA) provides a list of activities that may not be undertaken without an Environmental Clearance Certificate (ECC) (herein referred to as: listed activities). The proposed earth dam construction the following listed activities.

The EMP should conform to the provisions of the Environmental Management Act (EMA), Act No. 7 of 2007 and EIA regulations of 2012 (Government Notice: 30).

The EIA Regulations defines a '*Management Plan*' as:

"…a plan that describes how activities that may have significant impacts on the environment are to be mitigated controlled and monitored."

3.3 EMP Requirements

Table 3-1: EMP Requirements as outlined in Section 8 of the EIA Regulations

Requirement
(j) a draft management plan, which includes – *(aa) information on any proposed management, mitigation, protection or remedial measures to be undertaken to address the effects on the environment that have been identified including objectives in respect of the rehabilitation of the environment and closure;*

(bb) as far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of the activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and

(cc) a description of the manner in which the applicant intends to modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation remedy the cause of pollution or degradation and migration of pollutants.

3.4 Listed Activities

Listed Activities may not be undertaken without an Environmental Clearance Certificate (ECC), and hence an Environmental Impact Assessment (EIA) is required.

As the organ of state responsible for management and protection of its natural resources, the MEFT: DEA is committed to pursuing the principles of environmental management. The EMA provides a list of activities that require an EIA and the proposed construction of an earth dam is among the listed activities or activities that may not be conducted without at ECC. The purpose of listed activities for projects is to ensure that the associated impacts on the environment are carefully considered.

The proposed earth dam construction triggers a number of Listed Activities as set out in the Environmental Management Act, 2007 (Act No. 7 of 2007) (herein referred to as the EMA) and the Environmental Impact Assessment Regulation, 2007 (No. 30 of 2011) (herein referred to as the EIA Regulations).

Table 3-2: Listed Activities triggered by the proposed project.

Activity	**Applicability**
Activity 8: Water Resource Development: • 8.5 Construction of dams, reservoirs, levees and weirs. • 8.8 Construction and other activities in water courses within flood lines. • 8.9 Construction and other activities within a catchment area.	An earth dam will be constructed for the purpose of water harvesting.

3.5 Extended developmental and Legal Framework

In addition to the EMA and the Environmental Assessment Policy, there exists a host of legal and policy documents and guidelines that must be considered when undertaking an EIA as indicated in table 3.3, below. The proponent has the responsibility to ensure that the proposed earth dam construction conform to all other National developmental plans and legal framework.

Table 3.3: Policies, Plans and Strategies

Policy / Plan	Relevance	Applicability to the Proposed Project
5th National Development Plan (NDP) and Vision 2030	Outlines the country's National Development Plans (NDPs), in line with the Harambee Prosperity Plan (HPP) and vision 2030	The proposed project is a development that forms part of the bigger picture of achieving economic progression, social transformation and environmental sustainability. Agriculture as a pillar for social well-being, through food production, household income and improved livelihoods

Table 3-4: Other Legal Instruments / National Statutes

National Statutes	Relevance	Applicability to the Proposed Project
Environmental Assessment Policy (1995)	Promotes Sustainable development and Environmental Conservation emphasize the importance of environmental assessments as a key tool towards environmental sustainability	Environmental Protection

National Statutes	Relevance	Applicability to the Proposed Project
Soil Conservation, 1969 (Act 76 of 1969) and the Soil Conservation Amendment Act (Act 38 of 1971)	Makes provision for the prevention and control of soil erosion	Monitor and apply the soil conservation mechanisms
Public Health Act (Act No. 36 of 1919)	Advocates for Public Health and safety	Protective clothing
The Occupational Safety and Health Act No. 11 of 2007	Advocates for employee and public safety, health	In the working context “SAFETY” implies “free from danger”
National Heritage Act, No. 27 of 2004.	The Act provides provision of the protection and conservation of places and objects with heritage significance.	Refer to handling procedures presented in the Scoping Report

4. ROLES AND RESPONSIBIILTIES

This section outlines the roles and responsibilities of the key personnel responsible for the day to day management of activities to ensure effective implementation of the EMP.

4.1 Roles and Responsibilities

Assignment of responsibilities is necessary to ensure that key procedures are followed. Ultimately, the overall responsibility for the implementation of the EMP lies with the proponent (ORC).

To ensure accountability, it is necessary to assign responsibilities. The key role-players for project implementation are;

a) The **Environmental Compliance Officer (ECO)** representing the Ministry of Environment, Forestry and Tourism (MET), or an appointed independent environmental officer, who is responsible for monitoring and auditing.

b) **The Proponent**: **(ORC)**.

c) **The Site Manager** the person responsible for the management of the existing proposed earth dam construction project.

4.1.1 The Environmental Compliance Officer (ECO):

The ECO refers to the party responsible for the environmental monitoring and auditing to ensure that the provisions of the EMP are complied with.

The ECO shall have adequate environmental knowledge to understand and interpret the EMP and pertaining environmental aspects associated with the project. The specific tasks of the ECO are as follows:

- To undertake all monitoring and auditing activities in-order to ensure compliance with the EMP.
- Conduct inspections and monitoring at reasonable intervals (e.g. every month, quarterly or annually), throughout the duration of the project. Depending on the risks, some projects may require regular inspections.
- Issue compliance or non-compliance orders to the proponent, contractors / sub-contractors.
- Compile compliance Reports pertaining to any non-compliance incident/s, and a Rehabilitation Report following the conclusion a specific activity.

- Liaise closely with all key stakeholders i.e. the Site Manager and the Environmental Commissioner.
- Provide guidance on any environmental management issues, incidents or emergencies that may arise throughout the project lifespan.
- Assist in providing recommendations for remedial action in the event of non-compliance.
- Auditing or monitoring activities may involve investigation, as well as structured observation, measurement, and evaluation of environmental data over a period of time.

4.1.2 The Proponent:

The proponent, hereinafter referred to as ORC, shall assume overall responsibility to ensure implementation of the EMP and will be held accountable against the remedial measures outlined herein. It is recommended that the client should appoint a Site Manager who will be responsible for monitoring of daily operations.

The specific responsibilities of The Proponent are as follows:

- Appoint a Site Manager (SM) to oversee the daily onsite activities.
- Liaise closely with the SM and ECO on any environmental management issues, incidents or emergencies.
- Ensure that all activities on and around the site are conducted in accordance with the requirements of the EMP at all times.
- Ensure that all sub-contractors and visitors to the site are conversant with the requirement of the EMP, relevant to their roles on site.
- Shall develop a **communication strategy** between The Proponent, Project Manager, workers, the ECO and any other relevant stakeholder.
- Shall develop an **organisational structure** to ensure that:

  - There are clear channels of communication;
  - There is an organisational hierarchy for effective implementation of the EMP; and
  - Conflicting or contradictory instructions are eliminated;
  - Ensure that all instructions and official communications regarding environmental matters shall follow the organisational structure as determined
  - Ensure that that EMP requirements are assigned to specific people / positions with the capacity and experience required for implementation.

4.1.3 The Site Manager:

The **Site Manager (SM)** should:

- Ensure that each team recruited to work at the sites, adheres to the EMP;
- Ensure that a **copy of the EMP is kept on site at all times and as it may be requested by authorities conducting spot checks at any time**.
- Ensure that all staff attend an induction session before commencement of any work on site and that they are adequately informed of the requirements of the EMP;
- Take special care to prevent irreversible damage to the environment

4.2 Instructions

All instructions and official communications shall follow the organisational structure as determined by the Proponent. Based on the adopted structure, it is essential that responsibilities outlined are assigned to specific parties with adequate capacity and experience required to implement the EMP.

4.3 Disciplinary Actions

The EMP is a legally binding document. Non-compliance with the EMP may result in disciplinary action being taken against the Proponent. Such actions may take the form of;

- Financial penalties, Legal action, fines, and/or Suspension of work.

The disciplinary action shall be determined according to the nature and extend of the non-compliance, and exact penalties are to be weighed against the severity of the incident.

5. POTENTIAL IMPACTS AND MITIGATION MEASURES

5.1 Approach to mitigation measures

To enable a systematic approach to impact identification, specifics aspects have been identified and for each aspect, specific mitigation measures have been recommended Table 5. It is important to note that this EMP is for the construction of an earth dam in Oshaaleshoonime village, Oshana region.

Figure 5-1: EMP Impact Identification Section and Associated Aspects

EMP Implementation / Potential Impact Category	Specific Aspects
A. Staff Induction	EMP Provisions (Do's and Don'ts)
	HIV / AIDS
	Communication Channels
B. Operational Phase	Access Roads
	Site Demarcation
	Notice Board
C. Environment and Pollution	Vehicle emissions
	Oil Spills
	Soil Erosion
D. Health and Safety	Safety at Work Place
	Dust
	Noise
E. Socio Economic	Employment opportunities for locals
	Drug and Alcohol abuse
	Working hours
	HIV / AIDS
F. Cultural Heritage	Heritage resources / artefacts

SECTION A: STAFF INDUCTION

Aspect	Objective	Proposes Mitigation Measures	Monitoring Indicator	Party responsible
Staff induction	To ensure that all staff / employees are conversant with the requirements of the EMP	• Induction for all staff / employees on the provisions of the EMP before work commencement, covering but not limited to: environmental awareness, emergency response, Reporting of incidents, HIV/AIDS awareness, alcohol and substance abuse, and Safety, Health and Environment (SHE) measures • Staff operating equipment (such as loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with their tasks • Quarterly induction reviews	Induction Minutes and Attendance Register, Signed by each and every staff member Staff members appointed at a later stage should also undergo induction Quarterly minutes	Site Manager
	Punitive measures for staff, to ensure compliance	• Adopt a disciplinary system to discipline staff for non-compliance, such as littering, speeding, safety risk both to themselves and to others, not using ablution facilities, etc.	Number of fines/warning issued daily/Monthly	Site Manager
	Availability of the EMP on site for ease of reference	• Ensure that a copy of the EMP is kept on site and accessible to team leaders	Availability of EMP on site and accessibility to team leaders	Site Manager
Communication	To ensure effective communication throughout the project lifespan	• Develop a communication strategy (Chanel and medium of communication) • All correspondence should be written and signed off by witnesses (e.g. Site manager) • The contact numbers for the Site Manager or Site Foreman must be available onsite (displayed) in case of emergencies.	Communication Strategy Letters, e-mail, Notices, Minutes	Site Manager

SECTION B: OPERATIONAL PHASE

Aspect	Objective	Action Required	Monitoring Indicator	Party responsible
Access Roads	Prevent driving all over the place	• Access road are established already • New roads may only be established if extremely necessary (An amendment to the EMP must be done) • Access roads should be repaired and maintained at acceptable standards • All driving must strictly be on access roads		Site Manager
Site Demarcation	Contain all project activities within the site boundaries	• The construction site must be clearly demarcated by means of pegs/markers at all corners of the site and along its boundaries (where practical).	Site Demarcation	Contain all project activities within the site boundaries
General Notice Board	To notify and warn the public of the project activities	• A general notice board is on site, and must be well maintained	Notice Board – Visible and Clear	Site Manager

SECTION C: ENVIRONMENT AND POLLUTION

Aspect	Objective	Action Required	Monitoring Indicator	Party responsible
Vehicle emissions	Reduce greenhouse gas (GHG) emissions from poorly maintained or malfunctioning equipment (vehicles / machinery	• All vehicles and equipment shall be kept in good working condition and serviced regularly (in accordance with the servicing frequency of the specific machinery), in order to prevent leakage and emission of poisonous smoke etc. • Switch off engines when vehicle is not operations	Vehicle servicing records Reports of smoke emissions from machinery	Site Manager
Oil Spills	Manage oil spills and leak from heavy vehicles and Machinery	• Provide drip trays to prevent potential oil leakage • Re-fuelling of machinery (e.g excavator / front loader) must be done at appropriate site with impermeable concrete bunding • There must be an immediate spill response kit on site and ff an oil spill occurs, collect the contaminated soil, store in drums and dispose at appropriate waste disposal site (e.g. ORC disposal site)	Observation of soil contamination	Site Manager
Soil Erosion	To mitigate soil erosion	• Only use the existing access road to and from the site, do not form other tracks • Implement continuous rehabilitation measures.	Physical Observation	Site Manager
Solid Waste	To prevent littering, pollution, contamination of water and general environmental health hazards	• All waste produced on site should be contained and disposed as required by law. • There must be sufficient temporally ablution facility at the site for designated for males and female.	Scattered waste, Littering and any other unsightly waste at the site (eyesore)	Site Manager

SECTION D: HEALTH AND SAFETY

Aspect	Objective	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
General Safety at Work Place	Ensure that the safety of workers is not compromised and adhere to the Health and Safety Regulations, Government Notice 156/1997 (GG 1617)	• Develop a Health and safety Plan (should be part of the induction) • Ensure that every employee goes through a safety induction; • Employees must be equipped with all necessary Personal Protective Equipment (PPE). These includes, Helmet, Overall, Safety Shoes, Safety Glasses, Gloves, Welding shield, Earmuff etc; • Provide first aid kits to operators; • Only qualified personnel must be allowed to operate special machinery (e.g earthmoving machinery) • Adequate safety signs must be displayed on site.	Health and Safety included and reflected in the Induction Minutes Adequate protective gear for all staff Availability of the first aid kit onsite Record of warnings Visible safety signs on site	Site Manager
Dust	Mitigate dust and noise impacts to both employees and the public	• Provide dust masks and ear muffs to all employees operating in a dusty or noisy environment • Reduce vehicle speed on gravel roads • All vehicles transporting sand or gravel should be covered with a tarpaulin, or any other suitable material, and, • Industrial speed limits of 30 – 40km/h must be maintained	Incident Report Public Complains	Site Manager
Noise		• Employees must NOT be exposed to noise levels above the required -85dB (A) limit over a period of 8 hours. Should the noise level be higher than 85dB		

Aspect	Objective	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
		(A), the employer must implement a hearing conservation program such as noise monitoring; • Provide worker with earmuffs • Vehicles and machines must be well serviced to avoid unnecessary noise emission • Limit the movement of earth moving machinery and heavy vehicles (tipper trucks) to daylight: 06:00AM – 18:00 PM		
Ablution	Reduce health risks and environmental pollution	1. Ensure adequate, hygienic (clean) and user friendly ablution facilities for all staff. 2. Inspect ablution facilities regularly	availability, cleanliness and hygienic ablution facilities	Site Manager

SECTION E. SOCIO ECONOMIC ASPECTS

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
Employment opportunities for Locals	Promote benefits to the local community	• Recruit locals for unskilled labour • Where possible, procure materials from local suppliers	Employee structure and proportion of local employment	ORC
Alcohol and Drug use	Prevent alcohol and drug use at work	• Ban and warn the employees against the use of alcohol and drug at work • Provide awareness on the dangers and health impacts of alcohol and drug use	Drunk / Misbehaving employees Monitor presence of alcohol at work	Site Manager
Working hours	Adhere to the Labour Act No. 11 of 2007	• Operate within the prescribed working days and hours as per the Namibian Labour laws and regulations	Verification of working hours against the labour Act	Site Manager
HIV / AIDS	Provide HIV / AIDS awareness to employees	• The Ministry of Health and Social Services provides free condoms to all public amenities and health care centers. • Arrange for HIV awareness for employees;	Availability of condoms at work Minutes for induction course	Site Manager

SECTION F. HERITAGE AND ARCHAEOLOGY

Aspect	Objective	Action Required	Monitoring Indicator	Party responsible
Heritage Resources / artefacts	Reduce the impacts borehole drilling and associated earthworks on heritage resources / artefacts	1. Heritage remains or artefacts discovered on site must be reported to the National Museum (+264 61 276800) or the National Forensic Laboratory (+264 61 240461). 2. No artefacts must be removed or be interfered with prior to authorisation from the Namibian National Heritage Council (NHC) 3. Recovery of heritage remains or artefacts discovered and removal thereof should be directed by the National Museum	Sighting report/s of heritage resources / artefacts	Site Manager

6. CLOSURE AND REHABILITATION PLAN

Socio-economic development is very important for our livelihood and provides services, income and employment opportunities, and hence activities such as water harvesting are vital and necessary for development. However, such developmental activities should be conducted in a thoughtful and forward-looking manner. In other words, developmental activities should consider the future land use after such activity has come to an end. Therefore, to ensure that the land remains valuable for other land uses in the future, rehabilitation should be part and parcel of such developmental activity right from the beginning and throughout the project lifespan.

Creating a closure plan for an earth dam involves a series of steps and considerations to ensure that the closure process is executed safely, efficiently and with minimal environmental impacts.

The aim of the rehabilitation plan is to ensure soil conservation, prevent soil erosion, reduce safety risk (safety for both animals and people, particularly children) and to ensure that the site does not become an eye shore.

6.1 What is Rehabilitation?

Rehabilitation is the process of repairing and taking all the necessary actions to limit, minimize and mitigate the damage caused by the developmental activity, in-order to make the land suitable for other uses or to simply beautify the affected area (so that it does not become an eyesore). Rehabilitation can also be referred to as the measures taken to repair damaged environments (example refilling of excavated pits with the overburden, removal of waste construction material, cleaning up pollution etc.).

6.2 Designing a Rehabilitation Plan

A rehabilitation plan refers to a set of steps or measures to be taken in-order to ensure that negative impacts associated with the development at hand are mitigated. This however requires prior planning and integration of rehabilitation activities throughout the project lifespan. Meaning, rehabilitation measures should be taken right from the beginning of the project.

The environmental characteristics of an area where a project is located plays a vital role in designing a rehabilitation plan. The plan should therefore be tailored to the specific characteristics and environmental considerations of that particular site.

Table 6-1: Closure and rehabilitation plan

Activity	Implementation / Measures
Staff awareness of the closure plan	Staff must be well inducted of the closure plan during operation and implement progressive rehabilitation.
Fencing off the area	During operation the earth dam must be fenced off to prevent health and safety risk
Site Clean up	All foreign material brought during the operation must be removed. There must not be burying of waste material in the pit. All contaminated soils must be removed and disposed of to appropriate site.
Process of water harvesting and avoiding pill ups	Provision must be made, such as cut-off drain for the permanent drainage to ensure smooth run-off. The cut off drain would be appropriate for each dam, where a deliberate drainage structure would be designed to collect storm water flow into the pit and block out all other materials and waste that comes with the water.
Waste material / Overburden	Some waste may result from the construction activities but not to produce huge amount of excess overburden. However, those that are produced must be used for construction or given to the community in case they have use for it as most of it will be sand and rocks.
Compaction of disturbed surrounding	The surrounding disturbed area from the movement of heavy vehicle must be compacted to prevent run off and wind erosion. The compacted soil must be shallowly ripped to allow regrowth of vegetation.

Access roads	As described above, all access road that were made for this operation and are no longer necessary, must be rehabilitated. The surface of these roads must be ripped to enable regrowth of vegetation.
Safety	The above-mentioned rehabilitation may not be adequate to eliminate safety risks. Hence after the removal of the fence, it is recommended that an earth bund of at least 1m high on the periphery of the earth dam must be constructed. This would also aid in preventing soil erosion.

7. CONCLUSION

The EMP has been developed in accordance with the information gathered during site assessment, consultations with the client and literature review upon which potential environmental impacts and appropriate mitigation measure were determined.

The EMP recommends that interim measures be implemented by ORC to continue with the proposed earth dam construction. The activities must be undertaken in an environmentally friendly manner, and in accordance with the provisions of the Environmental Management Act (Act No. 7 of 2007) and EIA regulations (GN: 30 of 2012). Evaluation of the identified technologies to be implemented as long-term measures must be undertaken guided by financial feasibility.

In-addition, the aim of the EMP is to prevent any environmental fatal flaws that may arise from the construction and operation of the proposed earth dam in order to ensure legal compliance. Non-compliance against the EMP is punishable.

Specific responsibilities have been assigned to individuals in-order to ensure that the EMP is implemented effectively. The key role-players should:

- ***Read*** the EMP (particularly the Site Manager) and ensure that they are fully conversant with provisions of the EMP,
- If need be, ***Ask for clarity*** from the relevant authority (MEFT: DEA),
- Ensure implementation of the recommended mitigation measures, and
- Communicate defaults / challenges to MEFT: DEA as soon as possible.

It is recommended that the ORC monitors and conduct periodic and unannounced EMP audits throughout the proposed project lifespan, in-order to ensure compliance in-accordance with the mitigation measures prescribed in the EMP.

8. REFERENCES

Tortoise Environmental Consultants. (2023). Strategic Environmental Assessment of the Integrated Land-use Plan for the Oshana Region, Namibia