



APP 240303002909

**Environmental and Social Scoping Report For the Proposed Drilling of
Boreholes for Water Supply at Lyamukulo and Sikwekwe Villages in Mayuni
Conservancy**



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KfW





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ACRONYMS

CBNRM	Community Based Natural Resource Management
CCFN	Community Conservation Fund of Namibia
CEO	Chief Executive Officer
DEA	Department of Environmental Affairs
DWA	Department of Water Affairs
EA	Environmental Assessment
EAP	Environmental Assessment Practitioner
EC	Environmental Commissioner
ECC	Environmental Clearance Certificate
ECO	Environmental Compliance Officer
EIA	Environmental Impact Assessment
EMA	Environmental Management Act (No. 7 of 2007)
EMP	Environmental Management Plan
ESI	Environmental Social Indicators
ESMF	Environmental and Social Management Framework
FDM	Frequency Domain Electromagnetic
FPIC	Free Prior Informed Consent
GPS	Global Positioning System
GRM	Grievance Redress Mechanisms
HWC	Human Wildlife Conflict
HWC and WC	Human Wildlife Conflict - Wildlife Crime
I&APs	Interested and Affected Parties
ILO	International Labour Organization
IRDNC	Integrated Rural Development and Nature Conservation
ISO	International Standard Organisation
IWRM	Integrated Water Resource Management
KFW	German Development Bank
L	Litre
m³	Cubic

MAWLR	Ministry of Agriculture Water and Land Reform
MEFT	Ministry of Environment Forestry and Tourism
MM	Millimetres
Mm³	Million Cubic
NACSO	Namibian Association of CBNRM Support Organizations
°rc	Degree Celsius
OMDEL	Omaruru Delta
PPE	Personal Protective Equipment
PPP	Public Participation Process
R	Reversible
RD	Red-Dune Consulting CC
SEMP	Social Environmental Management Plan
SM	Site Manager

EXECUTIVE SUMMARY

Many conservancies have observed an increased abundance of wildlife populations which often led to competition for grazing space and competition for scarce resources such as water. The increase in wildlife is unfortunately also accompanied by increased frequency and severity of Human Wildlife Conflict (HWC), resulting in damage to crops, infrastructure, injuries, and loss of life to people and livestock. Climate change is also known to contribute to the shift of wildlife population to areas that were previously not heavily affected by drought, which further exacerbate HWC in communities.

Mayuni Conservancy is located on the eastern bank of Kwando River and its flood plains made the river to be the main source of water both for human and animals. The flood plains are source of reeds for construction materials and thatching grass. The Conservancy is home to a large population of key wild life species such as elephants, leopards, hippos, crocodiles and lions which has created a challenge of “*human-wildlife conflict*”. The most HWC involve crop damages by elephant, hippos and bush pigs as well fatal cases involving loss of human lives has been reported. Livestock loss is mainly caused by Crocodiles, Leopard and Hyenas.

Between 2020 and 2021, the Conservancy inhabitants incurred a total loss of N\$ 283,501.17 including damage to crop field and livestock losses from wildlife. Often, livestock losses occur when animals travels to drinking place / river.

In December 2022, Mayuni Conservancy applied for a Grant to the Community Conservation Fund of Namibia (CCFN) to be supported with alternative drilling water point, a measure, amongst many, that is aimed to mitigate Human Wildlife Conflict (HWC). CCFN, through the project “*Poverty Oriented Support to Community Conservation in Namibia*” is now supporting Mayuni Conservancy with two solar powered boreholes at Lyamukulo and Sikwekwe Villages. The boreholes will serve as a water supply infrastructure to enable safe access to water points for human and livestock. This intervention is in line with the project’s objective of “providing targeted conservancies with the means to address the HWC challenges they face in line with the National Policies of Namibia”.

Section 27 of EMA, has listed the “*Abstraction of ground water*” as an activity that may not be undertaken without Environmental Clearance Certificate. To fulfil this statutory requirements, Red-Dune Consulting CC (RDC) was appointed to develop an Environmental Management Plan (EMP) that would guide drilling and operation of the proposed boreholes at Lyamukulo and Sikwekwe Villages.

The project’s magnitude is relatively small and its potential negative impacts are negligible to; the Kwando river flow, aquatic bio-diversity, bio-physical environment on land and, it has positive impact on socio-economic in addressing *the human-crocodile conflict* and poverty eradication by supporting livestock of the community.

1 INTRODUCTION AND BACKGROUND

1.1 Poverty Oriented Support to Community Conservation in Namibia

The Community Conservation Fund of Namibia (CCFN) is a non-profit Association incorporated under Section 21 of Namibia's Companies Act of 2004. Using a foundation model, the CCFN is mandated to raise funds and manage various financial mechanisms such as endowments, sinking or revolving funds, to ensure the long-term sustainability of Community-Based National Resource Management (CBNRM) activities that are carried out by communal conservancies and other entities with a similar legal mandate.

Box 1. A Conservancy is...

- a legally registered area with clearly defined borders and a constituted management body run by the community for the development of residents and the sustainable use of wildlife and tourism.
- managed by a group elected to serve the interests of all its members.
- a place where residents can add income from wildlife and tourism to traditional farming activities.
- a place where wildlife populations increase as they are managed for productive gain.
- a place where the value of the natural resources increases, enhancing the value of the land.
- a forum through which services and developments can be channelled and integrated.
- zoned for multiple uses to minimize conflict and maximize the interests of all stakeholders.

With financial support from the German Government through the KfW Development Bank, CCFN is implementing a project, "Poverty Oriented Support to Community Conservation in Namibia". The project's main objective is to contribute to biodiversity conservation and rural development through the establishment of sustainable Human-Wildlife-Conflict (HWC) management systems in Namibia's communal conservancies.

The project is (i) working together with CBNRM partners to develop and institutionalize long-term mechanisms and structures that make management of HWC part of the sustainability strategy of CBNRM (ii) providing targeted conservancies with the means to address the HWC challenges they face in line with the National Policies of Namibia.

1.2 Community Based Natural Resource Management

Before Namibia gained its independence in 1990, residents in the communal areas had few rights to use wildlife. Predators and foraging wild animals were regarded as threats due to their destruction of crop fields, human attacks, killing of livestock as well as damaging of infrastructures, especially water infrastructure. In turn, community retaliate by killing wild animals, which gave birth to a concept commonly known as Human Wildlife Conflict and Wildlife Crime (HWC-WC).

After independence, and in line with Article 95¹ of the Namibian Constitution, Namibia has adopted policies, legal instruments, and strategies for addressing HWC-WC. One such strategies is enabling communities and private businesses to benefit from wildlife-based tourism and sustainable natural resource management commonly known as Community-Based Natural Resource Management (CBNRM) which is guided by the National Policy on Community Based Natural Resource Management.

The CBNRM concept is based on the understanding that if natural resources have sufficient value to rural communities, and allow for rights to use, benefit and manage, then appropriate incentives for people to use natural resources in a sustainable way will be created through the establishment of a Conservancy. The CBNRM programme links conservation to poverty eradication through developing the conservation, hunting and tourism industries which in turn contribute to the Gross Domestic Product, employment creation and the improvement of the well-being and social upliftment of rural communities.

1.3 Challenges faced by Conservancies

The CBNRM yielded into remarkable recovery and increase of wildlife populations, including key predator species and internationally threatened or endangered species such as elephant and black

¹ The State to actively promote and maintain the welfare of the people by adopting policies aimed at the maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future.”

rhinoceros². However, this increased wildlife population resulted into their expanded foraging ranges into communal and freehold farming areas resulting in an increased frequency and severity of Human Wildlife Conflict (HWC) especially involving elephants, feline predators, crocodiles and hippopotamus³⁴.

The conflicts include damage to crops, gardens and infrastructure (water points, fences, kraals, boreholes, etc.), loss of life or injuries to people and livestock mortalities. Climate change is known to contribute to shift of wildlife population to areas that are not heavily affected by drought, which further exacerbate HWC & WC.

Wildlife trafficking became a million-dollar criminal enterprise that has expanded to more than just a conservation concern. The increasing involvement of organized crime in poaching and wildlife trafficking threatens peace, strengthens illicit trade routes, and destabilizes economies and communities that depend on wildlife for their livelihoods.

Namibia is not spared from Wild Crime⁵ (WC). Although the country has made remarkable effort in preventing WC, the country is still facing this challenge and requires significant financial resources to address the challenge. Statistics indicate that 27 elephants and 61 rhinos were poached in 2018 while in 2019, 39 live and 65 dead pangolins were seized in 2019. Furthermore, conservancy residents experiencing HWC sometimes engage in retaliatory killing to remove problem animals⁶.

² Republic of Namibia: Revised National Policy on Human Wildlife Conflict Management 2018-2027

³ Brian T. B. J and Jonathan I. Barnes 2006., Human Wildlife Conflict Study Namibian Case Study

⁴ Ailla-Tessa Nangula Iiyambula 2021., Identifying the Spatio-Temporal Distribution and Drivers Of Human-Carnivore Conflict In Epupa And Okanguati Conservancies, Kunene Region Namibia

⁵⁵ Republic of Namibia: Revised National Strategy on Wildlife Protection and Law Enforcement 2021 - 2025

⁶ Project Document: Integrated approach to proactive management of human-wildlife conflict and wildlife crime in hotspot landscapes in Namibia

2 MAYUNI CONSERVANCY

Mayuni Conservancy is a community conservation initiative established in 1999. It is located at Kongola Constituency of the Zambezi Region, along the eastern banks of Kwando River (Figure 1&2). It covers an area of about 151Km² and has a population of approximately 2759 people.

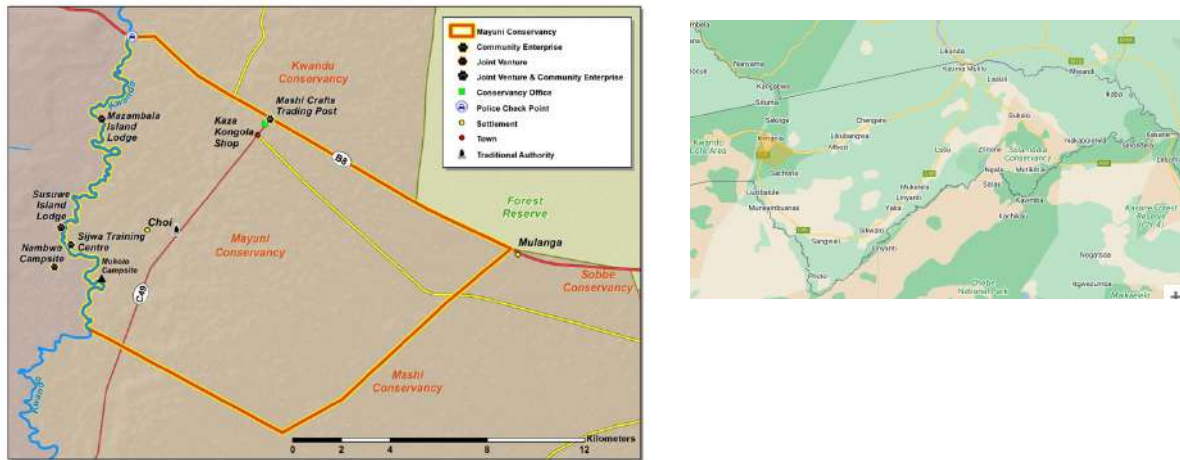


Figure 1: Locality Map of Mayuni Conservancy as demarcated by the Orange polygon

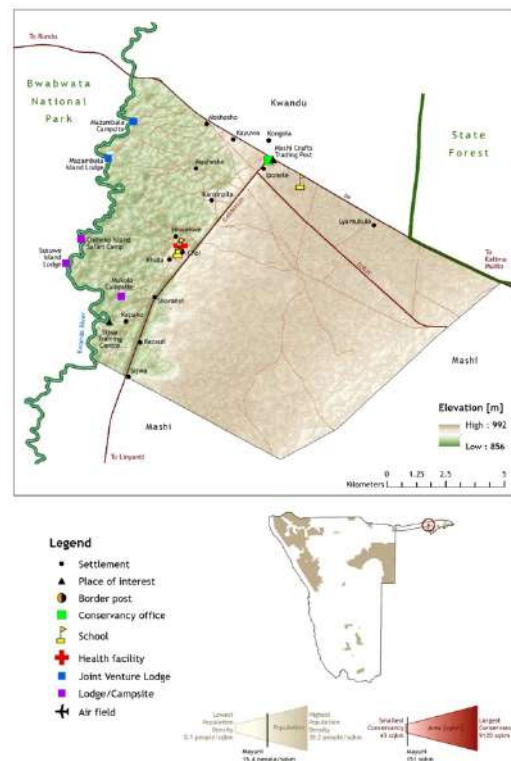


Figure 2: Map of Mayuni Conservancy (Source: NACSO, 2022)

The conservancy lies south of the Trans-Caprivi Highway (B8), which separates it from Kwandu Conservancy in the north. It borders the Bwabwata National Park and Kwando River to the west, Mashi Conservancy to the south through the east and partly with Sobbe Conservancy to east. The proposed boreholes will be drilled at Lyamukulo Village (17.852222 S, 23.419167 E) and Sikwekwe Village (17.855556 S, 23.3736667 S).

2.1 Physical Characteristics

Mayuni lies on flat topography whose landscape is characterised by large area of mopane woodland thick shrubs and tall grass (see **Figure 4** below).



Figure 3. Physical characteristic of Mayuni Conservancy

2.2 Challenges faced by the conservancy / communities in the area

2.2.1 Human Wildlife Conflict (HWC)

The Conservancy is home to a diverse population of key wild life species such as elephants, leopards, hippos, crocodiles and lions. Their interaction with human often result into incidents of Human-Wildlife Conflict (HWC), resulting in damage to crops, infrastructure, injuries, and loss of livestock and human lives. The most HWC involve crop damages by elephant, hippos and bush pigs while livestock loss is mainly caused by Crocodiles, Leopard and Hyenas and fatal cases involving loss of human lives has been reported.

Between 2020 and 2021, the Conservancy Inhabitants incurred a total loss of N\$ 283,501.17 including damage to crop field and livestock losses from wildlife. Often, livestock losses occur when animal travel to drinking place / river.

The Conservancy has raised the challenge of HWC to CCFN and through a grant proposal and requested assistance to develop / establish safer water access point to mitigate the HWC.

2.3 Support from CCFN

With financial support from the German Government through the KfW Development Bank, CCFN is implementing a project, *“Poverty Oriented Support to Community Conservation in Namibia”*. The project’s main objective is to contribute to biodiversity conservation and rural development through the establishment of sustainable Human-Wildlife-Conflict (HWC) management systems in Namibia’s communal conservancies.

In line with the project objectives, CCFN is supporting members Mayuni Conservancy to drill two solar powered boreholes at Lyamukulo and Sikwekwe Villages to ensure safe drinking water points for animal. This intervention speaks to the project’s objective of *“providing targeted conservancies with the means to address the HWC challenges they face in line with the National Policies of Namibia”*.

The project is (i) working together with CBNRM partners⁷ to develop and institutionalize long-term mechanisms and structures that make management of HWC part of the sustainability strategy of CBNRM (ii) providing targeted conservancies with the means to address the HWC challenges they face in line with the National Policies of Namibia, which is of particular relevance to this proposed intervention.

3 STATUTORY REQUIREMENTS

The protection of the environment is enshrined under Article 95l of the Namibia Constitution. The Environmental Management Act (Act No 7 of 2007) (EMA) and its Environmental Impact Assessment Regulation 2012, has listed Water Resource Developments activities not to be undertaken without an Environmental Clearance Certificate (ECC) as follows.

- a) 8.1 The abstraction of ground or surface water for industrial or commercial purposes
- b) 8.2 The abstraction of groundwater at a volume exceeding the threshold authorised in terms of a law relating to water resources.

To fulfil the above statutory requirements, Red-Dune Consulting CC (RDC) was appointed to Develop an Environmental Management Plan (EMP) that would guide drilling and operation of the proposed boreholes at Lyamukulo and Sikwekwe Villages.

In addition to EMA, there are other statutory requirements that would need to be fulfilled. The Ministry of Agriculture, Water and Land Reform as the custodian of the Water Resources Management Act, No.11 of 2013 instructs that a permit must be obtained prior to any borehole drilling activities can be undertaken.

4 TERMS OF REFERENCE

The scope to develop this EMP is guided by the Terms of References as provided in the EIA Regulation 2012, Section 9 (a-b) but, not limited to the following;

⁷ IRDNC

- Provide a comprehensive description of the proposed Project;
- Identify relevant legislation and guidelines for the project;
- Identify potential environmental (physical, biological and social) conditions of the project location and conduct risk assessment;
- Inform Interested and Affected Parties (I&APs) and relevant authorities about the proposed project to enable their participation and contribution;
- Develop an Environmental Management (EMP) that would be a legal guideline for the environmental protection by the project.

5 THE PROPONENT

Mayuni Conservancy is the proponent for this application with financial support from CCFN.

6 PROJECT DESCRIPTION

6.1 Borehole Information

The aquifers in the Zambezi are known to have a thickness of up to 125m, formed by coarse grained, semi-consolidated to consolidated sandstone with underlying layer of basal / brackish to saline water (See Figure 4).

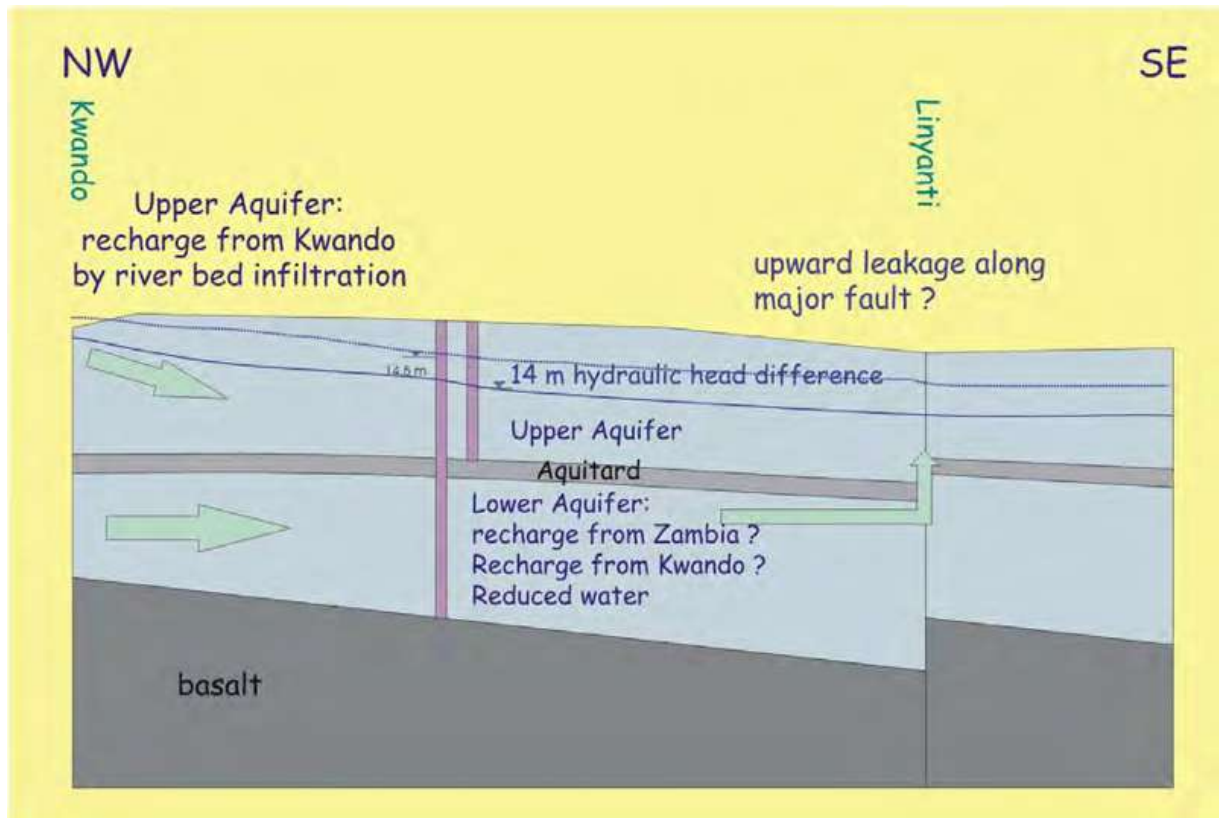


Figure 4. Schematic Concept showing the Structure of the Aquifer System in the Eastern Caprivi (Groundwater Investigations in the Eastern Caprivi Region, Main Hydrogeological Report pp46)

The Groundwater Investigations in the Eastern Caprivi Region 2005 study indicated that, per capita water use in Zambezi is 16 L/day and combined 55 L/day for livestock. With the available information on the village population of 800 people, the water demand would equal to 12,800.00 L/capita/day. At the time of this study, the current total water supply in the entire village was not known.

6.2 Project Alternatives

The EMA requires impact assessment to explore various project alternatives which aims to ensure that a chosen project component does not have significant impact to the environment. Project alternatives ranges from not implementing the project (no go alternative), when the environmental impacts are severe, or there is high degree of uncertainty. Other alternative considers the project site, technology, and equipment to be used. The description of alternatives is given in table 1 below.

Table 1. Project Alternatives

Project Alternative	Description	Advantages	Disadvantages	Alternative adoption
No project	Do not implement the project	None	The HWC will not be mitigated	No
Implement the project	Implement the project	Reduce HWC Improved water supply	None	Yes
Diesel Power Pump	Use of diesel-powered water pump	Cost effective and quick to implement	Difficult to upkeep with fuel supply Diesel is very costly, and communities always don't have the means to buy diesel.	No
Solar Powered Pump	Use of solar powered water pump	Environmentally friendly. Does not require fuel to operate	The borehole operation could be impacted during cloud cover	Yes

7 DESCRIPTION OF THE RECEIVING ENVIRONMENT

7.1 Populational demography

The 2023 population census indicated that Zambezi region has total population of 142 373 people. Overall, 61% of the region population makes up the labour force whereby 62% and 32% of the labour force is employed and unemployed respectively. The region has 8 electoral constituencies as presented in Table 2 below. Mayuni Conservancy is located in Kongola Constituencies.

Table 2. Population distribution in constituencies of Zambezi Region (Census 2023)

Zambezi	142 373
Judea Lyaboloma	8 738
Kabbe North	12 253
Kabbe South	11 345
Katima Mulilo Rural	24 016
Katima Mulilo Urban	46 401
Kongola	12 069
Linyanti	10 425
Sibbinda	17 126

The average household size in the Zambezi Region was 4.4 people/household in 2015⁸, with a relatively young population of approximately 39% of the total population to be less than 15 years old. Officially, employment rate for Zambezi Region is 62%⁸, which is closely like the national average of 63.1%. Most of the employable adults are engaged in the category of agriculture, forestry, and fishing as the main sources of household income. Tourism and wildlife management are an important growing component of the economy, providing jobs through accommodation establishments and conservation work.

⁸ Namibia Statistics Agency.2015. Namibia Household Income and Expenditure Survey Report

7.2 Socio-economic profile

The community of Mayuni Conservancy are mostly subsistence farmers who rear crops and livestock. Tourism is the main income generating activity for the conservancy. The conservancy operates its own Nambwa Campsite on the western side of the Kwando, within Bwabwata and has various joint venture agreement with the local lodges such as Susuwe Island Lodge, Mazambala Island Lodge. Additionally, it generates some of its income from trophy hunting concession. Often, meat from trophy hunting is distributed to residents. The Mashi Craft Centre provides an important opportunity for individual in the conservancy to earn an income.

7.3 Regional Geology and Topography

According to Mendelsohn *et al* 2002, Zambezi region, is formed up of the Kalahari Basin. The Kalahari Basin was formed from the split between Namibia and South America to form a broad coastal plain which is now the Namib Desert. The Kalahari Basin gradually filled up with sand and water borne deposit. These deposits of sands, clay and calcrete formed the Kalahari Group.

The soils are fluvisols that are derived from river deposits, and these loamy soils vary locally in the proportions of clay (distributed in the areas which experience frequent flooding) and sand (found mainly in the non-flood prone areas). While soils are naturally fertile and suitable to a range of crops, the sandy parts have poor soils with rather low nutrient levels, similar to other soils in the Kalahari Sandveld⁹.

Generally, the Zambezi region is flat and sloping toward the eastern direction. This is because, the geology of the area was formed from the filling up of the coastal plain with Namib sand and water borne deposits. Low-lying areas are inundated to varying extents, depending on the level of water in the Zambezi River which is usually high around January to March. Flooding is therefore frequent in the region because of direct rainfall and rise in the Zambezi River from Angolan inflows.

⁹ Mendelsohn, J., Jarvis, A., Roberts, C., Robertson, T. (2002). Atlas of Namibia. A Portrait of the Land and its People. Cape Town (David Philip Publishers; New Africa Books (PTY) Ltd)

The lithology of the aquifer in surrounding areas is not well known. The geohydrology indicates that the aquifers are found in Kalahari Deposits where soils are clayey loam with low infiltration potentials and faced with evaporation rates higher than rainfall which consequently causes low potential of ground water recharge.

7.4 Climate

7.4.1 Rainfall

Generally, Namibia is an arid country, with a large part of country having a climatic condition characterized by high temperatures and, periodic low rainfall. Rainfall decrease from east to west, with Zambezi Region receiving the highest rainfall of 600ml/year to less than 25 ml in the Southwest and West of the country. 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, which vary between 3800 ml per annum in the south to 2600 ml per annum in the north. In many areas, potential evaporation is about five times greater than the average rainfall. Surface water sources such as dams are subject to high evaporation rates. Mayuni conservancy has some of the highest rainfall patterns in Zambezi region are shown in (see **Figure 5**).

The regions' Zambezi region. climatic condition is influenced by the Zambezi River, that of tropical nature with warm to hot temperatures. The warmest temperatures are from September to March, and the coldest between May to August. The dry season fall between April and October while the wet season is falls between November and March.

According to Mendelsohn et al 2002, the average summer temperature is 20°C while during winter the average temperature is 5 °C and the average maximum and minimum annual temperature is 35 °C and 19 °C respectively.

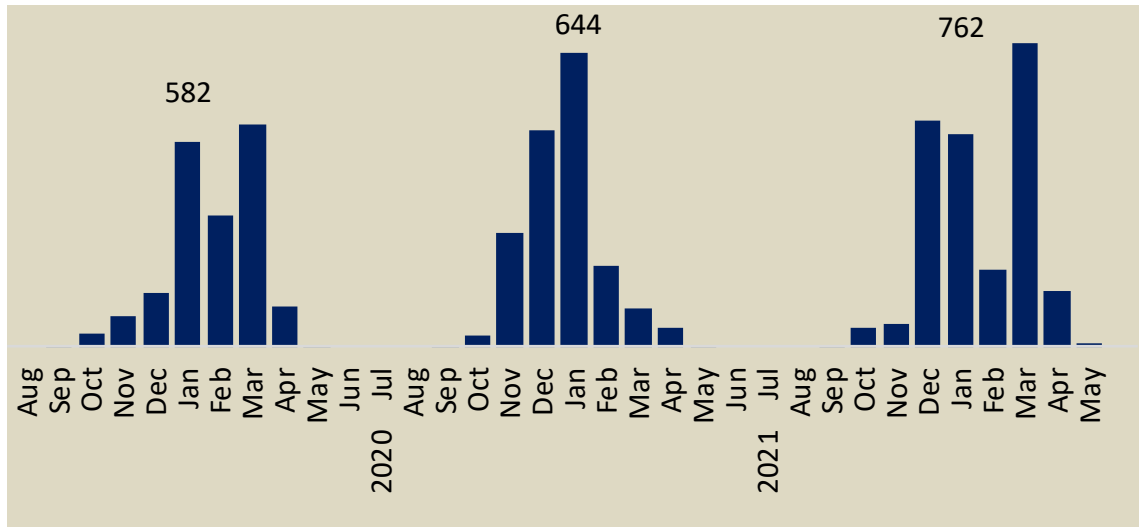


Figure 5. Rainfall trends in Mayuni Conservancy (Source: NACSO,2022)

7.5 Biodiversity

7.5.1 Flora

Zambezi region is the most densely vegetated region in Namibia. Due to its tropical nature, the areas has a tropical forest covered by thick bush, shrubs mature trees which are predominantly Rose Wood and various species of Acacia trees and tall grass in the floodplain while non-flooded areas have trees of mopane (*Colophospermum mopane*), *Burkea Africana* and *Terminalia sericea*.



Figure 6. Think bush and tall grass of Mudumu North Complex at Lyamukulo Village, Mayuni Conservancy (Source: Red-Dune 2024)

Much of the non-floodplain areas indicates signs of bush encroachment, suggesting the need for rangeland management. The Mudumu North Complex where Mayuni Conservancy falls is rich in forest resources that are valuable to both people and wildlife.

The Kwando has created broad floodplains that support dense riverine vegetation. Away from the river, the broad-leaved woodland is composed of a diversity of valuable tree species, interfaced with areas of open grassland. The Kwando River floodplain is dominated by grasslands and swamp vegetation, while much of the woodland on higher ground to the east has been cleared or damaged by frequent fires.

7.5.2 Fauna

The conservancy lies in the heart of the largest conservation area in the world, the Kavango Zambezi Transfrontier Conservation Area (KAZA – TFCA) and is home to a diversity of keystone wildlife species. Major wildlife includes lion, leopard, elephant, buffalo, steenbok, kudu, duiker, lechwe, reedbuck, crocodile, hippo, bushbuck, interesting bird life, tiger fish, catfish, various tilapia fish species in the Kwando River.

7.6 Surface Water

Generally, the primary surface water in Namibia is found in dams in Ephemeral Rivers and Perennial Rivers which have a potential of 200 Mm³ and 1,105Mm³ per annum respectively. The Ephemeral Rivers in the interior flow during the raining season, where western flowing rivers drains into the Atlantic Ocean, Fish River drains into Orange River, Cuvelai system, which is not a defined River system but rather Iishanas or flood plain drains into Etosha Pan and partially contribute to Kavango, Kwando and Zambezi River.

Perennial River, which has permanent flow are all found on the border of the country. Zambezi in the northeast has a mean annual flow of 40,000 Mm³, its flow per second, 180Mm³, is about twice the overall Dams capacity in Namibia at 100Mm³. The Kwando / Linyati / Chobe has an annual

flow of 10,000Mm³, Kunene 5,500Mm³ and Orange River with 11,000Mm³ flow. Mayuni Conservancy mostly depends on the Kwando River for surface water.

7.7 Ground Water

Namibia highly relies on ground water. About 50-60% water is ground water which has a potential yield of 360Mm³. Geologically, the main aquifers are the Karst, Otjwarongo, Omaruru Delta (OMDEL), Lower Kuiseb, Windhoek, Stampriet, Koichab and Ohangwena II. Groundwater quality in much of the Zambezi Region is generally good, especially within 5-20 km from the rivers, which recharge the aquifers.

7.8 Land use

The conservancy is zone into various uses which includes (Fig 7);

- 1) Settlement & Cropping Area
- 2a) Multiple Use: Livestock Priority
- 2b) Multiple Use: Hunting Priority
- 2c) Multiple Use: Tourism Priority
- 3c) Exclusive Wildlife: Tourism
- 3d) Exclusive Wildlife: No Disturbance



Figure 7. Conservancy Zones (Source: NACSO, 2022)

8 THE NEED AND DESIRABILITY OF THE PROJECT

The project is in line with the CBNRM programme toward reducing HWC-WC and contributing to conservation incentives and poverty reduction. In addition, the project contributes to the aim and objective of the Integrated Water Resource Management (IWRM) for Namibia which aims to achieve a sustainable water resources management regime, contributing to social equity, economic efficiency, and environmental sustainability.

9 POLICY AND LEGAL FRAMEWORK

Namibia has devised relevant policies, regulatory frameworks and institutions to ensure the conservation, sustainable use, access and benefit sharing of natural resources, biodiversity and ecosystems in line with international conventions and national legislation. The country is also party to several international treaties, conventions and multilateral agreements, and takes part in various international standards such as UNDP's SES, reviews and processes that are relevant to sustainable management of resources; access to basic rights including a clean environment.

Table 3. Policy and Legal Framework

Legislation	Relevant authority	Applicability
The Namibia Constitution	Government Republic of Namibia	The Namibian constitution is the supreme law of the country and makes provision for environmental protection and sustainable development. Article 95 (1) stipulates that <i>“the state shall actively promote and maintain the welfare of the people by adopting policies aimed at maintenance of ecosystems, essential ecological processes and biological diversity of Namibia; ad utilization of natural resources on a sustainable basis for the benefit of all Namibians, both present and future”</i> .
Environmental Management Act No. 7 of 2007	Ministry of Environment, Forestry and Tourism	To fulfil Article 95 of the Constitution, the Namibian Government enacted the environmental management act No.7 of 2007 that aims to promote the sustainable use of natural resources and provides the framework for the environmental and social impact assessment. The act further demands precaution and mitigation of activities that may have negative impacts on the environment and provision for incidental matters. Furthermore, the act provides a list of activities that may not be undertaken without an environmental clearance certificate.

Legislation	Relevant authority	Applicability
Environmental Assessment Policy (1995)	Ministry of Environment, Forestry and Tourism	<p>The Environmental Assessment Policy for Sustainable development and Environmental Conservation emphasize the importance of environmental assessments as a key tool towards implementing integrated environmental management. Sets an obligation to Namibians to prioritize the protection of ecosystems and related ecological processes.</p> <p>The policy subjects all developments to environmental assessment and provides guideline for the Environmental Assessment. The policy advocates that Environmental Assessment take due consideration of all potential impacts and mitigations measures should be incorporated in the project design and planning stages (as early as possible).</p>
Pollution Control and Waste Management Bill (in preparation)	MEFT, MHSS and others	The Pollution Control and Waste Management Bill, intends to regulate and prevent the discharge of pollutants into the air and water as well as providing for general waste management.
Public Health Act (Act No. 36 of 1919)	Ministry of Health and Social Services	The Public Health Act aims to protect the public from nuisance and 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.
Water Resources Management Act (Act No. 11 of 2013)	Ministry of Agriculture, Water and Land Reform	<p>This Act provides a framework for managing water resources based on the principles of integrated water resources management. It provides for the management, development, protection, conservation, and use of water resources.</p> <p>Therefore, water abstraction should satisfy the provisions of the water act (water abstraction / borehole permit should be applied from the respective ministry).</p>
Water Act No, 54 of 1956	Ministry of Agriculture, Water and Land Reform	This act states that, all water resources belong to the State. It prevents pollution and promotes the sustainable utilization of the resource. To protect these resources, this act requires that permits are obtained when activities involve the following:

Legislation	Relevant authority	Applicability
		<p>(a) Discharge of contaminated into water sources such as pipe, sewer, canal, sea outfall and</p> <p>(b) Disposal of water in a manner that may cause detrimental impact on the water resources</p>
Soil Conservation Act No. 76 of 1969	Ministry of Agriculture, Water and Land Reform	This act promotes the conservation of soil, prevention of soil erosion. Prevent soil salinification.
National Heritage Act No. 27 of 2004	Ministry of Urban and Rural Development	The Act makes provision for the protection and conservation of places and objects of heritage significance and the registration of such places and objects. Part V Section 46 of the Act prohibits removal, damage, alteration or excavation of heritage sites or remains, while Section 48 sets out the procedure for application and granting of permits.
Regional Councils Act, 1992 (Act No. 22 of 1992)	Ministry of Urban and Rural Development	The Regional Councils Act legislates the establishment of Regional Councils that are responsible for the planning and coordination of regional policies and development. The main objective of this Act is to initiate, supervise, manage and evaluate regional development.

10 STAKEHOLDER CONSULTATION

Section 21 of the EIA Regulation requires the undertaking of an Environmental Impact Assessment (EIA) to follow a robust and comprehensive public consultation. This is an important process, because it gives members of the public, especially the Interested and Affected Parties to comment or raise concerns that may affect their socio-economic or general environment because of the project. Further, it solicits crucial local knowledge that the Environmental Assessment Practitioner may not have.

The Public Participation Process (PPP) was focused on members of the conservancy. While competent and or regulatory authority such as Ministry of Environment Forestry and Tourism (MEFT), Ministry of Agriculture Water and Land Reform (MAWLR), were consulted during the project development phase for application for the ECC.

10.1 Meeting at Lyamukulo Village

A community meeting for Lyamukulo Village was held on 15 February 2024 at Lyamukulo village (*Figure 8*).



Figure 8: Community Meeting at Lyamukulo Village, on 15 February 2024 (*Source: Red-Dune Consulting 2024*).

- The meeting was attended by 15 people, 9 women and 6 men including an area facilitator from Integrated Rural Development and Nature Conservation (IRDNC) and the consulting team of Red Dune Consulting (see appendix A).
- Mr. Obicius Siyanga, the conservancy facilitator from IRDNC gave a background of the project and the meeting objectives. He informed the meeting that the proposed development of water points is a result of the conservancy request to be assisted in dealing with the challenge of HWC involving crocodiles. He assured the meeting that, the proposed water development is a community project and no land will be required to be allocated to an individual or an institution.
- Red-Dune presented the meeting objectives, particularly the requirement of the Environmental Social Safeguards (ESS) as outlined in the project's Environmental Social Management Plan (ESMP).
- The meeting was informed that, the proposed water point will be developed with funding from Community Conservancy Fund of Namibia (CCFN) which received funding from the KfW development bank to support communal conservancies to mitigate issues of Human Wild Conflict (HWC).
- KfW require that the money is spent wisely and accounted for to the benefit of the communities and ensure that project implementing agencies observe the highest standard of Environmental and Social Safeguard (ESS) which aims to ensure that the project is environmental and social sustainability.
- The meeting was informed that, the ESS requirement does not support projects if amongst many red-flags, if it involves:
 - Displacement of people
 - Destroying heritage sites
 - Damaging critical biodiversity habitat
 - Causing conflict in the community
- Furthermore, the meeting was informed that, the proposed site must not be on an occupied land.
- The meeting was further informed that the protection of the environment is provided for under the Environmental Management Act (Act No. 7 of 2007) (EMA) and its Environmental Impact Assessment Regulation 2012 where EMA has listed Water Resource Developments activities,

such as drilling of boreholes not to be undertaken without an Environmental Clearance Certificate (ECC).

- To obtain an ECC, a Social and Environmental Impact Assessment has to be undertaken, which is one of the core components of the consultation.
- Lastly the meeting was informed that, a consent letter is one of the requisites for the project to be implemented. This consent letter, called 'Free Prior Informed Consent' (FPIC) represent the community in understanding and agreeing to the proposed water development project. The FPIC was explained to the project as follows;
 - **FREE** refers to a consent given voluntarily and absent of coercion, intimidation or manipulation.
 - **PRIOR** means consent is sought sufficiently in advance of any authorization or commencement of activities.
 - **INFORMED** means that community was well informed about the project and they know all information about the project.
 - **CONSENT** refers to the collective decision made by the rights-holders and reached through the customary decision-making processes of the affected peoples or communities.
- Free Prior Informed Consent was verbally obtained from the meeting by show of hands and a FPIC letter was drafted in the presence of the community, read and signed by the Induna (village headman) (**see appendix B**).
- The community enquired the following;
 - Recommended the boreholes to be near household to ensure security of associated infrastructure especially solar panels.
 - This is not necessary as the borehole will be equipped with a fence to prevent theft and destruction by elephants.
 - The Induna urged for speed implementation of the project, due to high loss of livestock to crocodiles, especially during the dry season.
 - The induna mentioned that most people did not come attend the meeting, as they busy working in their crop fields, she further mentioned that they are well are of the project and welcome it.
- The meeting adjourned, and a site assessment with the community was undertaken.

10.2 Site Assessment

- A site location for the drilling of the borehole and placement of water troughs had already been selected by the community prior to the community engagement.
- **Location:** The site where the borehole will be drilled is located at the centre point of the grazing area of the village. It is currently an open space with no human settlements or crop fields on it. GPS Coordinates 137° SE Longitude 17.852222, 23.419167. The borehole site is accessed from D 3525 gravel road.
- **Surrounding Land Use:** Site is currently used for grazing. There are crop fields and homesteads situated at an approximate distance of about 1 km meters away from the site.



Figure 9: Selected Borehole Drilling Site, Lyamukulo Village on 15 February 2024 (Source: Red-Dune Consulting, 2024).

Vegetation: There are no native or indigenous plants on both sites. The area is surrounded by shrubs, Giant Crowfoot and Camelthorn trees which will provide shade for livestock, **Figure 10.**



Figure 10: Camelthorn trees (on the left) and Giant Crowfoot (on the right) Trees at Lyamukulo Village on 15 February 2024 (Source: Red-Dune Consulting 2024).

10.3 Meeting at Sikwekwe Village

A community meeting for Sikwekwe Village was held on 15 February 2024 at the Indunas House. (Fig 11).



Figure 11: Community Meeting at Sikwekwe Village on 15 February 2024 (Source: Red-Dune Consulting 2024).

- The meeting was attended by 12 people, 9 Female and 9 men (see appendix B).
- A similar approach of presentation was presented by Red Dunes Team as indicated above.
- After presentation, the community welcomed the project.
- The community raised concern of solar panel theft and recommended that the proposed fence should be anti-theft.

10.4 Site Assessment

- A site location for the drilling of the borehole and placement of water troughs had already been selected by the community prior to the community engagement.
- **Location:** The site where the borehole will be drilled is located enroute to the grazing areas,. It is currently an open space with no human settlements or crop fields on it. GPS Coordinates 208° SW Longitude 17.855556 S, Latitude 23.3736667 E.
- **Surrounding Land Use:** Site is currently used for grazing. There are crop fields and homesteads situated at an approximate distance of about 500 m meters away from the site.
- Site access will not require clearing of trees, unless tree branches that protrude in the roads could be trimmed.
- **Vegetation:** There are no native or indigenous plants on both sites. The area is surrounded by shrubs, Giant Crowfoot and Camelthorn trees which will provide shade for livestock, **Figure 12.**



Figure 12: Sikweke borehole site assessment 15th February 2024 (Source: Red-Dune Consulting 2024).

11 IMPACT ASSESSMENT

11.1 Impact Identification

Potential impacts were identified in accordance to the key Environmental Social Indicators (ESI)¹⁰ and using literature review, site assessment and public participation process and experience for Red-Dune Consulting.

11.1.1 Air Environment

Project activities that have potential of creating dust emission such as uncoordinated driving and drilling could deteriorate surrounding air quality from fugitive dust. Excess dust during work could be a health hazard to workers and the surrounding communities.

11.1.2 Noise Environment

Movement of heavy trucks and drill rigs, and drilling activities could produce excessive noise which could be noise nuisance to communities and hearing hazards to workers. Additionally, noise maybe generated from playing loud music or unnecessary hooting and revving of vehicles.

11.1.3 Water Environment

Drilling of boreholes has the potential of polluting underground water resources through oil spills. Additionally, poor underground water management could lead to over-abstraction what may deteriorate ground water.

¹⁰ Guidance Note UNDP Social and Environmental Standards Social and Environmental Assessment and Management July 2022

11.1.4 Biodiversity Environment

On the project risk is that poorly-informed or executed project activities could damage critical habitats and change landscape suitability for threatened species. This could be as a result of clearing of area to make provision for project activities which may lead to destruction fauna habitats.

11.1.5 Land Environment

Land degradation could happen if the movement of heavy vehicle in an area is not coordinated. Furthermore, project activities could produce pollution such as household and industrial, both solid and liquid which could pollute the land environment.

11.1.6 Employees And Community Health and Safety Environment

Occupational health and safety at workplace is a critical component to promote the welfare of the employees and public. The employment opportunities will create new social relationship which has the potential spreading diseases such as HIV-AIDS and workers as susceptible to vector diseases such as malaria. The bush working environment makes workers to be prone to venomous insect and snake bites which may lead to fatalities. Other health risk include workers exposure to excessive noise and dust and injuries.

11.1.7 Heritage and Archaeology Resources

Although this is part of the social environmental, due to its uniqueness and importance, a chance find will be developed. This impacts links to the project risk of activities to potentially damage critical habitats.

11.1.8 Dangerous good

Handling of fuel and lubricants at project sites could casus oil spill and pollute the environment.

11.2 Impact Assessment

11.2.1 Criterial for impact assessment

The criteria used to assess the impacts and the method of determining their significance is outlined below. This process conforms with international best practices and the Environmental Impact Assessment Regulations of Environmental Management Act, 2007 (Government Gazette No. 4878) EIA regulations.

11.2.1.1 Impact Type

Following the impact determination, the impacts are classified into two categories; positive and negative impacts.

Table 4. Impact Type

Impact type	0	No Impact
	+VE	Positive
	-VE	Negative

11.2.1.2 Probability of occurrence

All potential impacts are analysed to determine their likelihood of occurrences after proposed mitigation measures / residual effect after applying the developed mitigation measures.

Table 5. Likelihood occurrence

Likelihood occurrence	1	Improbable (Low likelihood)
	2	Low probability
	3	Probable (Likely to occur)
	4	Highly Probable (Most likely)

	5	Definite (Impact will occur irrespective of the applied mitigation measure)
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11.2.1.3 Confidence level

The level of confidence residual effect¹¹ predictions which depends on the degree of uncertainty associated with the basis of understanding project interaction with the environment, available data/information, and the effectiveness of proposed mitigation. The confidence is determined under three levels Low, Medium and High (**Table 10**). When the uncertainty associated with the residual effect prediction increases, the level of confidence in the prediction becomes lower.

For example, the confidence level of uncertainty residual effect of noise, dust, vegetation disturbances and land degradation impacts by construction activities is high. However, the confidence level of uncertainty residual effect of drilling activities on the impact to heritage / archaeological resources is lower (thus a chance find is often developed as a precaution to mitigate the impact).

Table 6. Confidence level

Confidence level	L	1	Low	The uncertainty residual effect maybe well understood, but the impact severity is not known. Precautional approach mitigation measures based on literatures / world best practises are developed to reduce the impact significance to low levels.
	M	2	Medium	The uncertainty residual effect is partially understood with available information and practical mitigation measures with monitoring program to reduce the impact significance to low levels.

¹¹ Residual impacts refer to those environmental effects predicted to remain after the application of mitigation outlined

	H	3	High	The uncertainty residual effect is well understood and practical mitigation measures are developed to mitigate the impact significance to low levels.
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11.2.1.4 Impact Significance

The residual effect prediction of the impact were rated under 5 categories; negligible=1, Low=2, Medium=3, High=4 and Severe=5.

Table 7. Risk Rating

1	Negligible (Based on the available information, the potential impact is found to not have a significant impact)	N
2	Low (The presence of the impact's magnitude is expected to be temporal or localized, that may not require alteration to the operation of the project)	L
3	Medium (This impact is probable, limited in scale, expected to be of short term / temporary, can be avoided, managed and or mitigated with simple mitigation measures.	M
4	High (The impact is definite, mostly predictable, temporal, can be local, regional or national and in long term and reversible. These are impacts that may affect human rights, lands, natural resources, traditional livelihood, critical ecosystem services. The severity of these impact are more limited than sever impacts.	H
5	Severe (The impact is definite, it has significant adverse impacts on human population and or / the environment which are of large-scale magnitude and or spatial extend such as large geographic area, large number of people or transboundary nature. The impact duration is long term, permanent and often irreversible. Impacts include displacement of human, destruction of critical ecological systems and or cultural and heritage sites etc. The impact could have a no-go implication unless the project is re-designed or proper mitigation can practically be applied.	S

11.2.1.5 Duration of Impacts

Under this criteria, the impact is analysed based on the time at which the impact will last. During construction, most of the impact are immediate and short term.

Table 8. Impact duration

Duration	1	Immediate
	2	Short-term (0-5 years)
	3	Medium-term (5-15 years)
	4	Long-term (more than 15 years)
	5	Permanent

11.2.1.6 Geographical Scale

The impact is further analysed based on its geographical scale or spatial extend. For example, noise pollution from drilling activities will be site specific. Positive impacts such as potential government revenue through taxes and levies will be national, and employment will mainly be regional.

Table 9. Geographical extend of impact

Scale	1	Site specific
	2	Local
	3	Regional
	4	National
	5	International

11.2.1.7 Risk Assessment

The impact significance was determined using a risk matrix (**Table 14 below**). A five-by-five matrix was used where the impact severity was categorised and assigned scores from 1 to 5 as follows: Improbable=1, Low=2, Medium=3, High=4 and Severe=5. Similarly, the likelihood was

assigned scores as follows; improbable=1, Low Likely=2, Probable=3, High Probability=4, Definite=5. The impact rating was determined by multiplying the impact severity and likelihood.

Table 10. Risk assessment matrix¹²

LIKELIHOOD	5 Definite	5 Low	10 Medium	15 High	20 Severe	25 Severe
	4 High Probability	4 Low	8 Medium	12 High	16 High	20 Severe
	3 Probable	3 Low	6 Medium	9 Medium	12 High	15 High
	2 Low	2 Low	4 Low	6 Medium	8 Medium	10 Medium
	1 Improbable	1 Negligible	2 Low	3 Low	4 Low	5 Low
		1 Negligible	2 Minor	3 Medium	4 High	5 Severe
IMPACT SEVERITY / CONSEQUENCE						
		Negligible	Low	Medium	High	Severe

11.3 Mitigation Hierarchy

Best practises call for mitigation measures to follow a mitigation hierarchy that favours (i) avoidance of potential adverse impacts, and where avoidance is not possible, then (ii) minimization and reduction; where adverse residual impacts remain, then (iii) mitigation measures need to be applied, and, as a last resort, (iv) measures to offset impacts that cannot be appropriately mitigated. According to EIS regulations, the objectives mitigations are to;

- Find environmental ways of doing thing
- Promote environmental benefits of the project
- Avoid, Minimise or remedy negative impacts and
- Ensure that residual negative impacts are within acceptable levels,

Further, during consideration of the mitigation measure, the following mitigation hierarchy was followed;

¹² Risk Management Guideline for the BC Public Sector (Province of British Columbia Risk Management Branch and Government Security Office 2012)

- Avoid the negative impact through preventative means,
- Minimise the negative impacts to acceptable low levels and,
- If the above two are not possible, remedy or compensate the impact.

11.4 Potential Negative Impacts of the Project

- Noise pollution from heavy machinery and drilling
- Soil disturbance / land degradation
- Loss of habitat and biodiversity from site preparations and occupation
- Air pollution from vehicle emission and dust emission from drilling activities
- Health and Safety risk
- Risk of pollution from generated domestic solid wastes
- Risk of contamination of ground water from oil, grease and lubricants from heavy vehicles, and drilling activities.
- Poaching

11.5 Potential Positive Impact of the project

- Reduced HWC
- Direct and indirect creation of employment opportunities
- Knowledge and technology transfer.

11.6 Planning Phase: Impact Assessment

To ensure that the project is accepted by the public and avoid possible conflicts, the Zambezi regional council, traditional authorities and affected communities were consulted.

11.7 Siting Phase: Impact Assessment

Typically, before drilling of a borehole, a site assessment undertaken to determine the optimum location for drilling a process called siting of a borehole. This process involve analysis of geohydrology property of the area using two main conventional methods; (i) electrical resistivity and (ii) ground conductivity. These method use Frequency Domain Electromagnetic operated by a highly trained geohydrologist.

During this phase, there will be no evasive activities that could cause harm to the physical environment. To ensure social cohesion with the siting team, it will be required for the locals, particularly the traditional authorities to be informed about the presence of the siting team in the area. This activities is usually undertaken by two people, who will carry hand held FDM. The sited location will be pinned for marking purposes.

11.8 Drilling Phase

Drilling is the major evasive and core environmental threat. This phase involves mobilization and moving of drilling equipment to the drilling site, construction of boreholes protective fence and solar panel platforms. Where necessary, setting up campsite at the drill site with supporting infrastructures such as ablution facilities, household solid waste and other solid waste. During this phase, occupation health and safety risk such as injuries emanating from operating equipment, insect (Mosquito) and snake bites as well as potential oil pollution. Table 11 below outline all potential impacts during drilling phase.

Table 11. Social Environment: Impact Assessment

Project- Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
Employment / Socio- Economic advancement of local	Possible exclusion of locals community from job opportunities. Unfair compensation of workers. It is not anticipated that a significant number of employment will be created during drilling	1. Ensure that all general work is reserved for local people unless in circumstances where specialized skills are required. 2. Fair compensation and labour	+ve	2	2	4	Regional	Life of project	n/a	Low	High

Project- Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
		<p>practice as per Namibian Labour Laws must be followed</p> <p>3. Ensure skill transfer to the locals</p> <p>4. Use local supplier for good and service where possible</p>									

Project- Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
Health and Safety for employees and general public	Job opportunities leads to new social relationship which often spread disease, particularly pandemic such as HIV and AIDS and substance abuse. Hiring off unlicensed employees to operate vehicles and special machinery pose safety risk to themselves, co-workers and public. Additionally, employees are subject to dust and noise pollution as well as other occupational health and safety issues	<ol style="list-style-type: none"> 1. Provide awareness to the employees on dangers of HIV/AIDS, alcohol and drug abuse 2. Provide condoms on site 3. Develop a safety plan 4. Ensure that every employee goes through an induction course about safety to train employees on health and safety. 5. All drivers must be in possession of appropriate driver's licenses 	-ve	2	2	4	Site Specific and Local	Project Duration	n/a	Low	High

Project- Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
		6. Adequate safety signs must be put at designated places. 7. Provide safe wears such as, overalls, safety boots, safety eyeglasses, Hand gloves and hard hat etc to employees 8. Adhere to the Labour act, non-toxic human dust exposure levels may not exceed 5mg/m ³ for respiratory dust and 15mg/m ³ for total dust. 9. Employees must NOT be exposed to									

Project- Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
		<p>noise levels above the required -85dB (A) limit over a period of 8 hours.</p> <p>10. Abide by the Occupational Health and Safety and Labour Act of Namibia and other statutory requirement such as International Labour Practise (ILO)</p> <p>11. Ensure adequate first aid kit on site taking into consideration, insect and snake bites</p>									

Project- Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
		<p>12. Supervisors must undergo an occupational health and first aid course,</p> <p>13. Supply clean drinking water to the site, such as portable water tank;</p> <p>14. Used gendered mobile toilets</p> <p>15. Provide insect repellent, mosquito nets and if necessary immunization to prevent deadly diseases such as malaria.</p>									
Heritage and Archaeology	Potential unearthing of archaeological material	1. Employee must be trained on the	-ve	2	2	4	Site Speci	Const ructio	R	Low	High

Project- Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
	or damaging heritage resources	<p>possible find of heritage and archaeological material in the area;</p> <p>2. Implement a chance find and steps to be taken for heritage and archaeological material finding (Heritage (rock painting and drawings), human remains or artefacts) are unearthed</p> <p>3. Stopping the activity</p>									

Project- Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
		<p>immediately</p> <p>i. Informing the operational manager or supervisor</p> <p>ii. Cordoned off the area with a danger tape and manager to take appropriated pictures.</p> <p>iii. Manager/supervisor must report the finding to the following competent authorities, National Heritage</p>									

Project- Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
		Council of Namibia (061 244 375) National Museum (+264 61 276800) or the National Forensic Laboratory (+264 61 240461).									

Table 12. Bio-Physical Environment: Impacts Assessment

Project- Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
Biodiversity: Flora	Destruction of trees	1. Avoid cutting down mature and protected plant species. 2. Ensure that access roads are rehabilitated after use to enhance revegetation	-ve	2	2	4	Site Specific	Construction / Drilling	R	Low	High
Biodiversity: Fauna	Destruction of animal habitats such as bird nests, poaching, stealing of livestock	1. Do not kill animal, unless such animals pose eminent danger to humans 2. There must be ZERO tolerance to poaching to ensure this, no weapon and traps are allowed on site;	-ve	2	2	4	Regional	Construction / Drilling	R	Low	High
Surface and Ground Water Pollution	Heavy vehicle and machinery may pollute water sources from leakages of oils,	1. Fuelling of heavy vehicle on site must be well coordinated at designated places, 2. Stationary vehicles must be provided with drip tray to capture	-ve	2	2	4	Site Specific	Construction / Drilling	R	Low	High

Project- Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
	hydraulic fluids, lubricants and greases. These pollutants may reach underground water through seepage. Further surface water may be polluted from surface run off soils that is polluted.	oil, lubricants and hydraulic fluids leakages 3. All vehicle and machinery must be well service to avoid leakages 4. Provide and train on oil spill emergency response 5. Servicing of vehicles and machinery must take place at designate places									
Waste Generation	General household pollution and littering such as used oil cans drums, metals,	1. Provide skip bins to collect waste and be disposed of at an approved disposal site 2. Provide labelled household waste drums for household solid waste. 3. Do not burry waste on site	-ve	2	2	4	Site Specific	Life of project	R	Low	High

Project- Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
	and household solid and liquid waste	<p>4. Excavate a small biodegradable waste site that would be dump filled at the end of the project, alternatively, provide mobile toilets that will be disposed at an approved site and ensure separate ablution facilities for men and women.</p> <p>5. Used oil, grease and lubricants cans must be collected in appropriate drums and disposed of at an approved site</p> <p>6. Maintain good housekeeping on site.</p> <p>7. Do not bury waste on site</p>									
Dust Pollution	Land clearing, digging, excavation of trenches, drilling,	1. Movement of heavy vehicles must strictly be restricted on site.	-ve	2	2	4	Local and Site Specific	Immediate	R	Low	High

Project- Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
	movement of vehicles and heavy machinery in site, transportation of material to site, will create fugitive dust which could be a nuisance to the surrounding.	<ol style="list-style-type: none"> Adhere to the minimum speed limit of 30 or 40km/hour when on farm roads. On site where soil is loosened by vehicle movement, apply dust a suppression method such as water spraying. During drilling, use water to suppress the dust 									
Land degradation and pollution	Uncoordinated movement of heavy vehicles and uncoordinated land clearing could lead to soil erosion. Possible	<ol style="list-style-type: none"> Movement of heavy vehicles must be coordinated and restricted to be on access roads Normally, public gravel roads are meant for light vehicles drilling vehicles have the potential to damage the access roads. Hence proper road maintenance must be 	-ve	2	2	4	Site Specific	Life of project	R	Low	High

Project- Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
	spill and leakages of fuel and lubricants from vehicle and machinery could pollute the soil and eventually the ground water resource.	<p>implemented to ensure that the roads are left on good state</p> <p>3. Fuelling of heavy vehicles on site must be well coordinated at designated places</p> <p>4. Servicing of vehicles and machinery must take place at designated sites</p> <p>5. Stationary vehicles must be provided with drip tray to capture oil, lubricants and hydraulic fluid leakages</p> <p>6. All vehicles and machinery must be well serviced to avoid leakages</p> <p>7. Provide and train on oil spill emergency response.</p>									

11.9 Operational Phase

The main activities during the operational phase of the borehole is water abstraction which, if not well monitored could lead to over abstraction and consequently to deteriorating of water quality and potential impacts on vegetation from deepening of water table. The borehole could also cause social conflict whereby community in the surrounding area could claim ownership of the borehole and may prevent other communities from using the borehole. Table 13 below outlines the potential impacts during the operational phase and proposed mitigation measures.

Table 13. Operational Phase Impact Assessment

Project- Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
Reduced Human Wild-Life Conflict	The borehole operation will ensure domestic animals do not drink directly from the river.	1. Animal owners / herders should ensure that animals are made to drink from water points to prevent crocodile attack.	+ve	2	2	4	Site Specific	Life of project	R	Low	High
Increase in community water supply	Besides reducing HWC, the borehole will also make water	1. Aid in increasing water point in the village 2. Reduced distance travel by people	+ve	2	2	4	Site Specific	Life of	R	Low	High

Project- Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
	readily available for household use by the community	to water points 3. Sustainable supply of water during drought									
Over abstraction of underground water	High and unsustainable water abstraction which could affect ground water quality	1. Do not abstract more than what is recommended by the permit 2. Where possible, install automatic measuring gauge to monitor abstraction 3. Monitor water level periodically 3. Carry out periodic pumping yield to assess aquifer sustainability 4. Undertake systematic water quality assessment	-ve	2	2	4	Local	Life of project	R	Low	High
Risk of water infrastructure destruction buy elephants	Elephant are notorious known for damaging water points in search for drinking water	1. Construct an elephant proof fence around the borehole and its supporting infrastructures 2. Build high and thick enough walls that will prevent elephants access to the water tank and solar	-ve	2	2	4	Local	Life of project	R	Low	High

Project- Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
		infrastructures.									
Conflict of water use by villagers	Claim of ownership of water point / borehole by some community members	1. Raise awareness of the intended purpose of the borehole 2. Ensure no one is made to be entitled to owning or have controlling power on who should use the borehole	-ve	2	2	4	Local	Life of project	R	Low	High
Theft of borehole infrastructures	There are reported cases where boreholes infrastructure such as solar panel are stolen	1. Construct theft proof fence to protect solar panels	-ve	2	2	4	Local	Life of project	R	Low	High

12 GRIEVANCE PROCEDURE

The Grievance Procedures will be a process to facilitate for an easy and smooth process in which stakeholders are able to submit their complaints about the project activities or its consequences i) free of charge ii) without fear of retribution iii) anonymously and iv) user friendly channels.

It is important to emphasise that the Grievance Procedure will not address HWC incidents per se, because those are not caused by the Project. Grievances that are eligible are, for instance, cases where a party is disadvantaged as a result of a Project activity, or as a result of negligence on the part of the Project to follow its procedures thoroughly or fairly. Complainants may be by actual or potential beneficiaries of the Project, or any members of the public.

In generally, the grievances process will follow six (6) Grievance Redress Mechanism (GRM) value chain, namely; i) Receive and log grievance, ii) Acknowledge grievance, iii) Assess and Investigate iv) Grievance Resolution, iiv) Sign-off on grievance and iiiv) Monitor and continuously evaluate the effectiveness of the GRM.

Grievances will be addressed through the channels in the institutional structure presented below, in an efficient, effective and consistent manner.

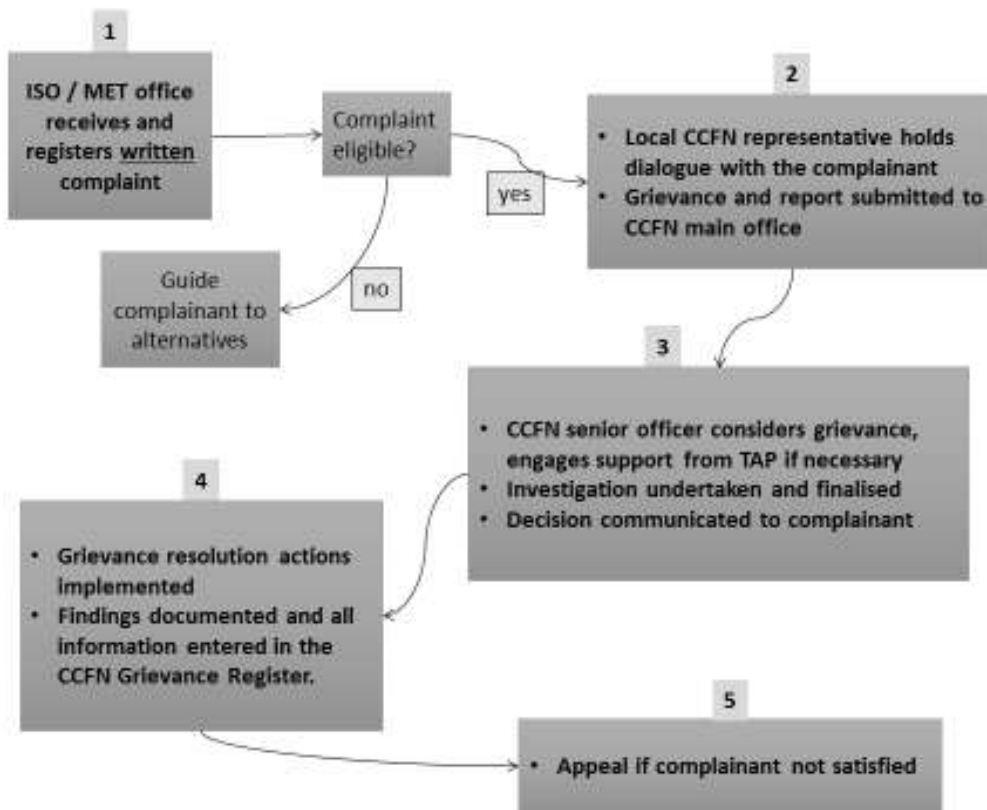


Figure 13. GRM flow chart (Source: ESMF_Poverty Oriented Support to Community Conservation in Namibia)

The eligibility of the grievance will be assessed at the level where it is first received, at a local MEFT / ISO office (Step 1) and the following actions / steps will be undertaken. The grievance will be discussed with the complainant, with the objective of understanding the problem and giving the complainant a fair hearing (Step 2). The local CCFN representative will submit the grievance, and any notes of their own, to the CCFN head office for higher-level input to the issue (Step 2). The CCFN senior officer will investigate the substance of the grievance (Step 3). If necessary, assistance may be sought from the TAP. Further dialogue with the complainant and others affected by the grievance might also be necessary. The CCFN senior officer will compile a written report on the grievance and communicate the outcome to the complainant. Any actions necessary to resolve the grievance will be implemented by the relevant parties, under the direction of the CCFN (Step 4). Resolution of the grievance will be documented and entered into the Grievance Register. Under normal conditions, a grievance will be resolved, and redress actions commenced within 30 days of receiving a complaint. A complainant is permitted to appeal against the decision by the CCFN, to the CCFN CEO (Step 5). In such a

case the CEO must present the grievance and the CCFN decision to the Board, for reconsideration.

13 DECOMMISSIONING AND REHABILITATION PLAN

Decommissioning is normally the reverse of construction where all installed equipment / structure must be removed. Supply of water to the community is aimed to be a life-long intervention unless of a pressing issue that would necessitate decommissioning. Aging equipment that requires replacement should be done by qualified Namibians to ensure smooth operation and constant water supply.

14 CONCLUSION AND RECOMMENDATIONS

14.1 Conclusion

With the available information, the following conclusions were made:

1. The area is known to have high yield aquifer.
2. Over-abstraction of water has been not been reported in the area.
3. The area receives the highest rainfall in the country which increases potential of recharge.
4. HWC is critical in the area, and water is the main contributing factor.

14.2 Recommendations

- It is recommended to the approving authority for the issuance of the ECC.
- Ensure intermittent testing of water quality and obtain necessary fitness approval.

15 ANNEX 1. GROUNDWATER MONITORING PLAN

The purpose of the groundwater monitoring plan is to make sure that suitable procedures are in place to monitor and evaluate the response of the aquifer and the surrounding environment to the abstraction process. Furthermore, the plan is aimed to control the impacts of groundwater abstraction and contaminant loads, and monitoring aquifer response and quality. The proposed procedures shall also serve as an early warning system for over-abstraction.

15.1 Groundwater Quality

It is essential that the quality of groundwater abstracted is monitored on a realistically regular basis, to serve as an early warning of quality changes that may occur due to the abstraction; natural causes; or pollution. Undertake intermittent water quality testing.

15.2 Groundwater Level Measurements

The level of groundwater in the aquifer will serve to inform the water quantity vs the rate of abstraction. This will be critical given low to no recharge due to lower rainfall in the area. This provision is provided for in the monitoring sheet for water meter readings provided by the MAWLR to the borehole operator. It is therefore important that hydrological baseline information of water level is recorded to ensure time-variant collection of data. This type of monitoring becomes effective proof of errors when MAWLR also carries out periodic inspections.

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17 APPENDICES

17.1 Appendix A. Consent letter Lyamukulo Village

15 February 2024

To Whom It May Concern:

Dear Sir / Madam

Subject: Free prior informed consent for the drilling of water point in communal conservancies of Zambezi Region - Mayuni Conservancy - Lyamukulo Village.

The above subject bears reference,

I, Teresia Mubumbulwa in my capacity as the Induna for Lyamukulo Area under Sifanu Sub-Khuta in Mayuni Conservancy fully understand the above mentioned project and its benefit to our community. The proposed project does not interfere with our traditional norms and culture. We welcome it and encourage adequate consultation during the implementation of project activities.

This letter to serve as a Free Prior Informed Consent for the project.

Yours Sincerely,

x 

Induna Teresia Mubumbulwa
081 3256 336
Lyamukulo Area (Sifanu Sub-Khuta)
Mayuni Conservancy



17.1.1 Appendix B. Attendance Register Lyamukulo Village



STAKEHOLDER CONSULTATION FOR ENVIRONMENTAL SCOPING STUDY AND DEVELOPMENT OF ENVIRONMENTAL MANAGEMENT PLAN(S) FOR THE DRILLING OF WATER POINT IN COMMUNAL CONSERVANCIES OF ZAMBEZI AND KAVANGO WEST REGION."

Place: Sabelo village (Lyamukulo) (Mayuni Conservancy)
Date: 15 February
Time: 12:00

No	Name	Gender	Organization	Position	Cell	Email	Signature
1	Engrid Nyambe	F	Red Dunes	Consultant	0816588629	engridnyambe@gmail.com	[Signature]
2	Obiclaus Sinyanga	M	I.R.D.N.E	Facilitator	0813383551		[Signature]
3	Somali Keet Tona	M	Mayuni C	Rep area	0813689180		[Signature]
4	Maani Eric	M	Mayuni	Rep area	0813951808		[Signature]
5	Lusila Sikorisa	M	MPH/NIC	Member	0814740740		[Signature]
6	Dikuseya Viana	M	Mayuni	Member			[Signature]
7	Katama Diani	F	Mayuni	Area rep	0814675876		[Signature]
8	Mubumbulwa Teresa	F	Mayuni	Sub khuta	0813256336		[Signature]
9	Kambwere munda	F	Mayuni	member			[Signature]
10	Mushabangwe	F	Mayuni	member			[Signature]
11	Luambo makunde	F	Mayuni	Member			[Signature]
12	Elias Simona	M	Mayuni	Consultant			

13	Albetina Koldkwe	F		member			[Signature]
14	Ndunda Annah	F					N.A
15	Nangula Amutenya	F	Red Dunes	Consultant	0812024057	nangulae@gmail.com	[Signature]
16							
17							
18							
19							
20							
21							
22							

17.2 Appendix A. Consent letter Sikwekwe Village

15 February 2024

To Whom It May Concern:

Dear Sir / Madam

Subject: Free prior informed consent for the drilling of water point in communal conservancies of Zambezi Region - Mayuni Conservancy: Sikwekwe Village.

The above Subject bears reference,

I, Liembani Dominic L., in my capacity as the Induna for Mapulanga Sub-Khuta in Mayuni Conservancy fully understand the above mentioned project and its benefit to our community. The proposed project does not interfere with our traditional norms and culture. We welcome it and encourage adequate consultation during the implementation of project activities.

This letter to serve as a Free Prior Informed consent for the project.

Yours Sincerely.

[Signature]
Induna Liembani Dominic L.
0812514125
Sikwekwe Village Mapulanga Sub-Khuta.
Mayuni Conservancy



17.2.1 Appendix B. Attendance Register Sikwekwe Village



KFW



MEFF

STAKEHOLDER CONSULTATION FOR ENVIRONMENTAL SCOPING STUDY AND DEVELOPMENT OF ENVIRONMENTAL MANAGEMENT PLAN(S) FOR THE DRILLING OF WATER POINT IN COMMUNAL CONSERVANCIES OF ZAMBEZI AND KAVANGO WEST REGION."

Place: Sikwekwe Village (Mayuni Conservancy)

Date: 15/02/24

Time: 14h30

No	Name	Gender	Organization	Position	Cell	Email	Signature
1	Sigrid Ntembe	F	Red Dunes	Consultant	081 6522 689	sigridn@reddunes.com	[Signature]
2	Liemban, Dominic L	M	Member	Induna	081 2319125		[Signature]
3	Sacky Kasula	M	Mayuni Conservancy	Vice chair	0812016483	Sackykasula@gmail.com	[Signature]
4	Somodi Tona Keop	M	Conservancy	area rep	081 3665180		[Signature]
5	Mlaeni Eric	M	Mayuni C	Area Rep	0813931809		[Signature]
6	Lisaanaiso periso	M	mayuni member	member			[Signature]
7	Liembani M Precious	F	Member	Member	0813961690		[Signature]
8	Milayi Kumanina	M	MEMBER	MEMBER	081236960		
9	OBVIOUS SISOANGA	M	I.R.D.N.C	Facilitator	0813383551		[Signature]
10	Nangula Amutonga	F	Red Dunes	Consultant	0812024059	Nangula@reddunes.com	[Signature]
11	Brian Sibubusa	M	Mayuni	Member	-		[Signature]
12	Sibubusa mwanani	M	Mayuni	member	-		[Signature]