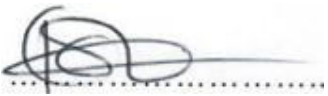


APP: 230926002153

**Environmental Management Plan For The Proposed Drilling of a Borehole
for Water Supply at Twyfelfontein World Heritage Site, Uibasen
Twyfelfontein Conservancy, Kunene Region**



DOCUMENT INFORMATION

DOCUMENT STATUS	Final
PROJECT TITLE	Proposed drilling and installation of a borehole to supply water for Twyfelfontein World Heritage Site and the nearby communities
CLIENT	Uibasen Twyfelfontein Conservancy
LOCATION	Uibasen Twyfelfontein Conservancy, Kunene River, Kunene Region
DATE	24 September 2023
AUTHOR:	Mr. Ipeinge Mundjulu Red-Dune Consulting CC 
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ACRONYMS

CBNRM	Community-Based Natural Resource Management
CCFN	Community Conservation Fund of Namibia
DEA	Department of Environmental Affairs
EA	Environmental Assessment
EAP	Environmental Assessment Practitioner
ECC	Environmental Clearance Certificate
ECO	Environmental Compliance Officer
EIA	Environmental Impact Assessment
EMA	Environmental Management Act 2017 (Act No. 7 of 2007)
EMP	Environmental Management Plan
HWC	Human-Wildlife Conflict
HWC-WC	Human-Wildlife Conflict- Wildlife Crime
MAWLR	Ministry of Agriculture Water and Land Reform
MEFT	Ministry of Environment, Forestry and Tourism
MOHSS	Ministry of Health and Social Services
MOL	Ministry of Labour
Mm³	Million Cubic
PPE	Personal Protective Equipment
RDC	Red-Dune Consulting
SM	Site Manager
WC	Wildlife Crime
WHS	World Heritage Site

EXECUTIVE SUMMARY

Uibasen Twyfelfontein Conservancy is situated in the north-western part of Kunene Region. It is one of the smallest communal conservancies, compared to most conservancies in Namibia; and a population of approximately 400 inhabitants. The conservancy is endowed with tourism potential, ranging from the renowned rock engravings at the Twyfelfontein World Heritage Site and natural attractions.

The National Heritage Council (NCH) of Namibia, is mandated by the Heritage Act of 2004 (Act No 27 of 2004) *“To provide for the protection and conservation of places and objects of heritage significance and the registration of such places and objects; to establish a National Heritage Council; to establish a National Heritage Register; and to provide for incidental matters”*. With this mandate, the NHC manages the Twyfelfontein World Heritage Site, which is one of the significant tourist attraction in the conservancy.

Due to the arid environment, the Twyfelfontein World Heritage Site does not have water, instead water is brought to the site by the employees. This limits tourism potential of the site in terms of infrastructure development, which would contribute to the conservancy income thereby creating an incentive of conservation by conservancy members.

The CCFN, through the project *“Poverty Oriented Support to Community Conservation in Namibia”* is therefore supporting NHC and the conservancy to establish a solar powered borehole that will supply water to Twyfelfontein Heritage Site.

The Environmental Management Act (Act No 7 of 2007) (EMA) and its Environmental Impact Assessment Regulation 2012, has listed the abstraction of groundwater at a volume exceeding the threshold authorised in terms of a law relating to water resources as a listed activity that may not be undertaken without an Environmental Clearance Certificate. To fulfil this statutory requirement, CCFN appointed Red-Dune Consulting CC (RDC) to Develop an Environmental Management Plan (EMP) for drilling of the boreholes.

The regional geology and aridity are however challenging in term of groundwater potential. Groundwater in the region is found in fractures and faults underlain by granite and meta-sediments with low yield of water. The risk of over-abstraction in these fractured ‘aquifers is high and common in the region. Consequently, adequate ground water monitoring is required.

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 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.”

1.3 Challenges faced by Conservancies

The CBNRM Programme culminated into remarkable recovery and increase of wildlife populations, including key predator species and internationally threatened or endangered species such as elephant and black rhinoceros². However, this increased wildlife population resulted in them expanding foraging and hunting footprints that extends 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 indicates that 27 elephant and 61 rhino were poached in 2018 while in 2019, 39 live and 65 dead pangolin were seized in 2019. Furthermore, conservancy residents experiencing HWC sometimes engage in retaliatory killing to remove problem animals⁶. Other WC reported includes poaching wildlife such as Gemsbok, Springbok, Kudu, Giraffe etc., to sell meat and for own consumption. The drivers of HWC and WC are complex and interlinked and to address these twin challenges, a concerted integrated approach to HWC and WC is required.

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.

⁵ 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 UIBASEN TWYFELFONTEIN CONSERVANCY

2.1 Location

Uibasen Twyfelfontein Conservancy is located in Khorixas Constituency of the Kunene region -about 100km west of Khorixas town. It is amongst the smallest conservancy covering an area of 286 km².

The proposed borehole is located south-east of the conservancy near the Twyfelfontein World Heritage Site (-20.583299°S, 14.373226°E) (Fig 1). Hence it is aimed to supply water to the Twyfelfontein World Heritage Site.



Figure 1. Location of Uibasen Twyfelfontein Conservancy

The conservancy is zoned into four designated land use zones, these are Exclusive Wildlife, Farming and Settlements, Joint Management Area; and Tourism and Wildlife (Figure 2). The proposed borehole is located in the Tourism and Wildlife zone.

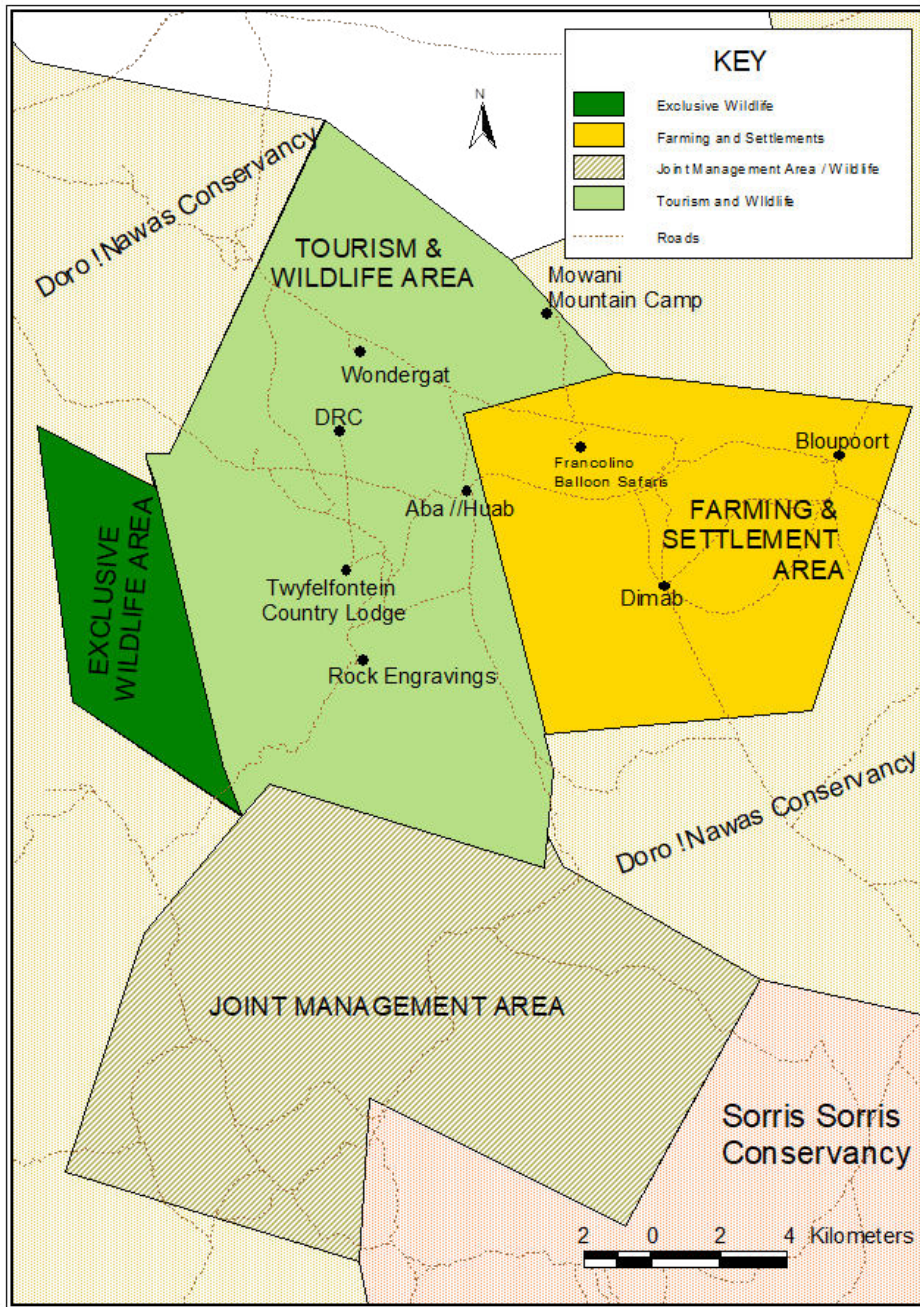


Figure 2. Map showing land use zones in Uibasen Twyfelfontein Conservancy (NACSO, 2019)

2.2 Population Demography

Historically, Uibasen Twyfelfontein Conservancy was inhabited by the hunter-gathers and Khoikhoi descendants that made rock carvings and art. The conservancy is currently only home to approximately 400 residents. Owing to its harsh desert environment, the area is sparsely populated

as it is not suitable for crop farming activities. The potential of Twyfelfontein area is made of three aspects, the history and artwork, archaeology and tourism potential.

As portrayed in the landscape pictures below, most areas of the conservancy are uninhabitable due to aridity and water scarcity.



Figure 3. General landscape of Uibasen Twyfelfontein Conservancy

2.3 Challenges faced by the Conservancy Community

2.3.1 Water Resource

Generally, Namibia is one of the hottest and driest country in Sub-Saharan Africa. The country has high climatic variability in the form of persistent droughts, unpredictable, low, and variable rainfall patterns leading to scarcity of water⁷. Persistent extreme drought conditions caused government to declare national emergencies in 1992/1993, 1995/1996, 2012/2013, 2013/2014, 2015/2016, and 2018/2019. The 2019 drought was recorded to be worst in 90 years, agriculture production was at its lowest and affected the livelihood of many people.

Kunene Region is one of the most affected region by drought in the country. The region's rainfall is highly sporadic ranging from 50mm – 400mm per year which increases from the western part of the region to the eastern part.

⁷ Namibia Fourth National Communication to the United Nations Framework Convention on Climate Change. Windhoek: Ministry of Environment Forestry and Tourism, March 2020.

Overall Uibasen Twyfelfontein Conservancy has a dry harsh climatic desert condition, and the inhabitants often experience water availability challenges.

Twyfelfontein World Heritage Site is specially affected by water scarcity such that the employees resorted to transporting water in container for use by the tourists that visit the World Heritage Site. The limited water resources hampers the National Heritage Council from enhancing the site to increase returns from tourism.



Figure 4. The borehole will be drilled along an ephemeral stream nearby the heritage site



Figure 5. Twyfelfontein World Heritage Site

2.4 Support from Community Conservation Fund of Namibia (CCFN)

The National Heritage Council (NHC) is the national custodian of heritage resource in the country which operates the Twyfelfontein World Heritage site. The NHC intent to upgrade the site which would require a reliable source of water supply. With limited resources, NHC approached the CCFN to support with drilling a borehole and its associated infrastructure near the Twyfelfontein World Heritage Site. The borehole is intended to supply water to the heritage site and to other tourism establishment in the area in order to maximize tourism potential of the area which, in turn will yield more returns for the conservancy.

It is against this background that CCFN, through the project “*Poverty Oriented Support to Community Conservation in Namibia*” is supporting NHC in the Uibasen Twyfelfontein Conservancy to drill a borehole to supply water to Twyfelfontein World Heritage Site. This intervention speaks to the project’s main objective of contributing to biodiversity conservation. The enhancement of tourism through water supply will improve benefit from tourism activities which in turn will be an incentive towards wildlife and environmental protection by the conservancy community.

2.5 Statutory Requirements

The protection of the environment is enshrined under Article 95l of the Namibia Constitution and the Environmental Management Act 2007 (Act No 7 of 2007) (EMA). Section 27 of EMA, has listed activities that may not be undertaken without Environmental Clearance Certificate (ECC) Table 1.

Table 1. Identified listed activities concerning the proposed project.

Activity	Applicability
Water Resource Developments 8.1 Abstraction of ground water at a volume exceeding the threshold authorized in terms of a law relating to water resources	The proposed borehole will supply water to the heritage site as well as the nearby community, hence the threshold will be exceeded.

The construction of water pipelines for bulk supply	Pipelines will be installed to supply water to the World Heritage Site
---	--

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 borehole to be established at Twyfelfontein World Heritage Site.

3 TERMS OF REFERENCE FOR THE EMP

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;

- 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.

4 PROJECT DESCRIPTION

4.1 Drilling a Borehole

The site where the borehole is to be located is situated along an ephemeral stream that is near the world heritage site. The proposed site has not yet been sited to determine borehole specification. However and of importance is that, the regional geology is composed of highly metamorphosed rocks such as marble and quartzitic bands with low water yielding capacity found at average depths of 70m deep.

4.2 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 2 below.

Table 2. Project Alternatives

Project Alternative	Description	Advantages	Disadvantages	Alternative adoption
No project	Do not implement the project	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Continued water scarcity • Loss of potential income to the Conservancy 	No
Implement the project	Implement the project	<ul style="list-style-type: none"> • Improved water supply 	<ul style="list-style-type: none"> • Increased benefits from the upgraded World Heritage Site • Increased incentive to protect wildlife 	Yes
Diesel Power Pump	Use of diesel-powered water pump	<ul style="list-style-type: none"> • Cost effective and quick to implement 	<ul style="list-style-type: none"> • Not environmentally friendly • Noise pollution for the tourism zoned area 	No
Solar Powered Pump	Use of solar powered water pump	<ul style="list-style-type: none"> • Environmentally friendly 	<ul style="list-style-type: none"> • None 	Yes

5 DESCRIPTION OF THE ENVIRONMENT

5.1 Site Description

Generally Twyfelfontein area has one of the highest number of camp site, if not the highest per square kilometre in the country due to the attractive characteristic of Twyfelfontein and Desert Elephant in the areas. There are 7 camp site in the radius of about 12 kilometres.



Twyfelfontein, locally known as |Ui-|Ais, in *Damara Nama*, is a site of ancient rock engravings. According UNESCO, Twyfelfontein has one of the largest concentrations of rock engravings in Africa. The site forms a coherent, extensive and high-quality record of ritual practices relating to hunter-gatherer communities for over 2,000 years. The area is

also home to the petrified forest, which is known to be a deposit of large tree trunks that have "turned to stone" through a process of diagenesis. The Petrified forest is declared a National monument in Namibia since 1950.

The proposed site for drilling is at an open valley, sparsely covered by grass and next an ephemeral river (fig 6 &7).



Figure 6. Landscape of the project site



Figure 7. Elephant dung, a sign that they do frequent the area

5.2 Regional Geology and Topography

The regional geology was formed by series of eruptions from volcanic fissures deposited extensive lava fields across what later became the edge of south- western Africa known as Gondwanaland around 120 million years ago. The metamorphic gneiss complexes and granites which underlie the eastern two-thirds of the conservancy are amongst the oldest in Namibia⁸⁹. Metamorphic rocks such as marble and quartzitic bands occur in the western part of the Kaokoveld. The eastern part of the area comprises of mountain range of carbonate rock types such as dolostone and limestone of Otavi Group. The local geology is thin loose sands known to formed as result of weathering of surrounding rocks and brought in by nearby rivers.

The areas has varied topography characterized by undulating mountainous terrain and flat valleys.

5.3 Regional Hydrogeology

The study area falls under Northern Namib and Kaokoveld hydrogeological region located in north-western Namibia (Fig 8). Its north-eastern dolomitic mountain ridges represent the eastern rim of the Cuvelai Basin. In the south it is bordered by the Ugab River and the Brandberg. From

⁸ <https://www.nacso.org.na/conservancies/uibasen-twyfelfontein>

⁹ (Lohe et al., 2021).

the Ugab River northwards, the Namib is described as a rocky desert. The average rainfall ranges from less than 50 mm/a in the west to slightly more than 300 mm/a in the east.

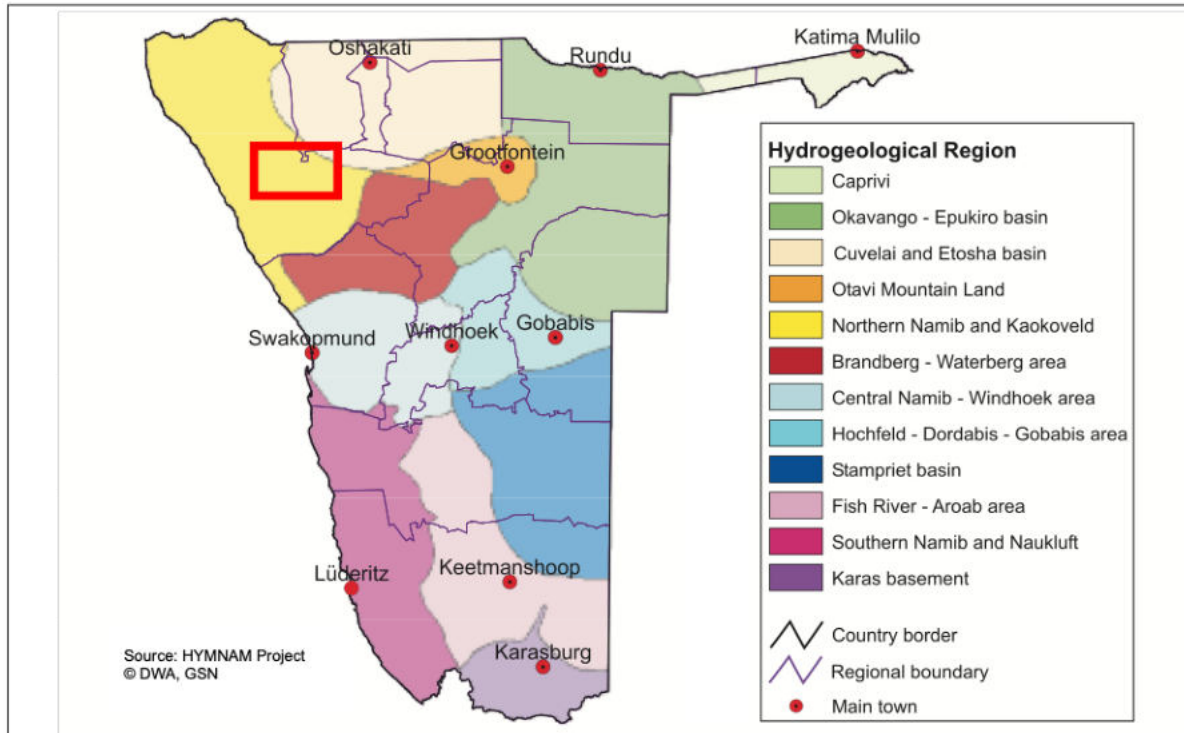


Figure 8. Ground water basins and Hydrogeological Map of Namibia (*Project Site: Red Square*)

Except for the Kunene River, all rivers are ephemeral: these are the tributaries of the Kunene flowing north, e.g., Otjinjange, Omuhongo and Ondoto, and the westward- flowing ephemeral rivers (from north to south), Nadas, Sechomib, Khumib, Hoarisib, Hoanib, Uniab, Koigab, Huab and Ugab.

Generally, the region has low groundwater potential and knowledge and understanding of aquifer characteristics in the Region is sparse due to few numbers of drilled boreholes and fewer groundwater studies done in the area¹⁰. The degree of metamorphism affects the groundwater potential in the region characterized by granitic and metamorphosed rocks which exhibit low tendency to store groundwater.

¹⁰ (Lohe et al., 2021)

Groundwater in the region is found in fractured¹¹ and faults underlain by granite and meta-sediments with low yield of water. The risk of over-abstraction in these fractured ‘aquifers is high and common. The low storage capacity of the rocks combined with erratic recharge could lead to over- abstraction of the aquifer.

5.4 Climate

Kunene Region is one of the most affected region by drought in the country. The region’s rainfall is highly sporadic ranging from 50mm – 400mm per year which increases from the western part of the region to the eastern part.

The general climatic condition of the area is arid and dry characterized by high rainfall variability frequent and prolonged periods of drought. In most cases, temperature exceeds 30°C throughout the year with an average maximum temperature between 32°C and 34°C. Low average temperatures ranging from 8°C to 10°C are only experience in May, June and July.

5.5 Biodiversity

5.5.1 Flora

Generally, Twyfelfontein area is home ana trees, camel thorn trees, mopane tress and mustard trees. The famous *Welwitschia mirabilis* is also found at several patches in the area. Mainly, the area is characterised by mopane (*Colophospermum mopane*) annual grass species (Fig 9).

¹¹ a subplanar discontinuity in a rock or soil formed by mechanical stresses. A fracture is visible to the naked eye and is open (i.e., not filled with minerals),



Figure 9. Mopane (*Colophospermum mopane*) and annual grass on site

5.5.2 Fauna

5.5.2.1 Domestic

People in the conservancy farms with goats, sheep and cattle. The arid environment and shallow soils present challenge to agriculture.

5.5.2.2 Wildlife

Due to its location between Sorris Sorris and Tora Conservancies, Twyfelfontein is rich in wild animals but recent droughts have significantly reduced their numbers. The Conservancy is home to desert adapted wildlife such as elephants, gazelle, ostrich, cheetahs and occasional rhinos. The Aba //Huab River that traverse through the conservancy serves as a migratory route for desert elephants and supports a variety of wildlife throughout the year. Other wildlife life includes, giraffe, mountain zebra, kudu, klipspringer, duiker, steenbok and the diminutive dik-dik. On occasion nomadic lions and Black Rhinos are known to roam around the area.

6 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. Lastly, the aridity of the area coupled with effect of climate change requires investments in water resource development to ensure sustainable water supply for the livelihood of the local people.

7 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

Table 3. Regulatory framework applicable to the project

Legislation	Relevant authority	Applicability
The Constitution of Namibia	Government of Namibia	The Namibian constitution is the supreme law of the country and makes provision for environmental protection and sustainable development. Article 95(1) of the Constitution of Namibia states that:- “The State shall 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”.
Environmental Management Act No. 7 of 2007	MEFT	The environmental management act No.7 of 2007 aims to promote the sustainable use of natural resources and provides the framework for the environmental and social impact assessment, 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)	MEFT	<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. 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>
Water Supply And Sanitation Policy 2008	MAWLR	<p>2.3.1 Water supply</p> <p>To improve the provision of water supply in order to:</p> <ul style="list-style-type: none"> • Contribute to improved public health; • Reduce the burden of collecting water; • Promote community based social development taking the role of women into special account; • Support basic water needs; • Stimulate economic development; and • Promote water conservation.

Legislation	Relevant authority	Applicability
Revised Policy on Human Wildlife Conflict Management 2018-2027	MEFT	The policy was developed to manage human wildlife conflict in a way that recognizes the rights and development needs of local communities while at the same time recognizing the need to promote biodiversity conservation.
Revised National Strategy on Wildlife Protection and Law Enforcement	MEFT	The strategy provides policy directives, a framework and common approaches to the protection and conservation of wildlife and ensures the effective enforcement of laws governing wildlife resources in the country.
National Policy on Community Based Natural Resource Management	MEFT	This policy provide a framework that promotes the wise and sustainable use of natural resources on State land outside protected areas as well as the promotion of integrated natural resource planning and management.
Pollution Control and Waste Management Bill (in preparation)	MEFT, MOHSS	The Pollution Control and Waste Management Bill, intents to regulate and prevent the discharge of pollutants into the air and water as well as providing for general waste management. Upon gazettelement, the Bill will repeal the Atmospheric Pollution Prevention Ordinance (11 of 1976).
Public Health Act (Act No. 36 of 1919)	MOHSS	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.

Legislation	Relevant authority	Applicability
		<p>The proponent should ensure that the workers are provided with protective gear to safeguard their wellbeing. The activities should also be conducted in a manner that does not pose any danger to the general public.</p>
<p>Water Resources Management Act (Act No. 11 of 2013)</p>	<p>MAWLR</p>	<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. Furthermore, any watercourse on/or in close proximity to the site and associated ecosystems should be protected in alignment with the listed principles.</p> <p>Water is one of the most important resources, and determinant factor for any development. Therefore, water abstraction should satisfy the provisions of the water act (water abstraction / borehole permit should be applied from the respective ministry).</p>
<p>Water Act No, 54 of 1956</p>	<p>MAWLR</p>	<p>This act states that, all water resources belongs to the State. It prevents pollution and promotes the sustainable utilization of the resource. To protect this resources, this act requires that permits are obtained when activities involve the following:</p> <ul style="list-style-type: none"> (a) Discharge of contaminated into water sources such as pipe, sewer, canal, sea outfall and (b) Disposal of water in a manner that may cause detrimental impact on the water resources

Legislation	Relevant authority	Applicability
The Occupational Safety and Health Act No. 11 of 2007	MOL	A safety risk is a statistical concept representing the potential of an accident occurring, owing to unsafe operation and/or environment. In the working context “SAFETY” is regarded as “free from danger” to the health injury and to properties.
Soil Conservation Act No. 76 of 1969	MAWLR	This act promotes the conservation of soil, prevention of soil erosion. Prevent soil salinification.
National Heritage Act No. 27 of 2004	MEAC	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)	MURD	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. The Regional Council is considered to be an interested and affected party (I&AP) and reserve the right to comment on the project and EMP.
Polluters Pays Principle	MEFT and International Conventions	This principle ensures that proponent takes responsibility of their actions. Hence in cases of pollution, the proponent bears the full responsibility and cost to clean up the environment

8 PUBLIC PARTICIPATION PROCESS

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.

8.1 Meeting with Conservancy Management Committee

On 14th August 2023, RDC held a meeting at the conservancy office with the conservancy management committee to discuss the proposed support by CCFN and the development of the EMP (fig 10). The committee expressed profound gratitude of the proposed support, indicating that lack of rainfall and prolonged drought affect the conservancy.

After the meeting, the committee and RDC undertook a site assessment at the proposed borehole location. While on site, the committee indicated that, the proposed borehole will only be able to top supply water to the World Heritage Site and nearby tourism establishment but, it will not be possible to supply water to the community. This is because, the site location is zoned for wildlife and tourism activities, while the conservancy communities reside north-east of the conservancy. Consequently, the committee is looking forward to engage CCFN to consider supporting the conservancy community with a borehole. The committee strongly believe that, providing the community with a borehole will prevent community and their livestock to utilize wildlife dedicated borehole thereby reducing the challenge of HWC.

Competent and or regulatory authority such as Ministry of Environment Forestry and Tourism (MEFT), Ministry of Agriculture Water and Land Reform (MAWLR), where consulted during the project development phase.



Figure 10. Meeting with Conservancy Management Committee of Uibasen Twyfelfontein Conservancy office

9 IMPACT ASSESSMENT

The environmental impact assessment was done in accordance with the criteria for impact evaluation outlined in Table 4 below. This approach conforms with the Environmental Impact Assessment Regulations (Government Gazette No. 4878) of EMA. The approach adopts two phases: (i) identification and (ii) Assessment of impacts.

- **Impact identification:** Potential project impacts during construction and operation were be identified.
- **Impact Assessment:** The criterial outline in table 3 was be used to determine impact significance, which was determined under two mitigation scenarios; **without mitigation** and **with mitigation**. The confidence of impact mitigation depends on the level of certainty based on available information to assess the impact.

Table 4. Criteria for Impact Evaluation

Risk Event	Rating	Description of the risk that may lead to an Impact
Impact type	0	No Impact
	+VE	Positive
	-VE	Negative
Probability	The probability that an impact may occur under the following analysis	

	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)
Confidence level	The confidence level of occurrence in the prediction, based on available knowledge	
	L	Low
	M	Medium
	H	High
Significance (Without Mitigation)	0	None (Based on the available information, the potential impact is found to not have a significant impact)
	L	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)
	M	Medium (This is when the impact is expected to be of short term moderate and normally regionally. In most cases, such impacts require that the projects are altered to mitigate the impact or alternative method of mitigation is implemented)
	H	High (The impact is definite, can be regional or national and in long term. The impact could have a no-go implication unless the project is re-designed or proper mitigation can practically be applied)
Mitigation	The applied measure / alternative to reduce / avoid an impact	
Significance (With Mitigation)	0	None (Based on the available information, the potential impact is found to not have a significant impact)
	L	Low (The presence of the impact's magnitude is expected to be temporal or localised, that may not require alteration to the operation of the project)
	M	Medium (This is when the impact is expected to be of short term moderate and normally regionally. In most cases, such impacts require that the projects are altered to mitigate the impact or alternative method of mitigation is implemented)
	H	High (The impact is definite, can be regional or national and in long term. The impact could have a no-go implication unless the project is re-designed or proper mitigation can practically be applied)
Duration	Time duration of the impacts	
	1	Immediate

	2	Short-term (0-5 years)
	3	Medium-term (5-15 years)
	4	Long-term (more than 15 years)
	5	Permanent
Scale	The geographical scale of the impact	
	1	Site specific
	2	Local
	3	Regional
	4	National
	5	International

9.1 Identification Of Impacts And Assessment

9.1.1 Aquifer Conservation

Potential of over abstraction of groundwater. This impact should be avoided by intermittent monitoring of the borehole performance and water quality.

9.1.2 Range Management

Uncontrolled abstraction could lower the water table which may result in dying vegetation. This impact may not be applicable to fractured aquifer, however in cases where it is noticed, necessary monitoring programme would require to be implemented.

9.1.3 Socio-Economic

Increase tourism activities at the World Heritage Site will increase result in the increase of benefits for the conservancy which will create an incentives for conservation by the conservancy communities.

9.1.4 Potential Salinification

Over abstraction can could lead to deteriorating of groundwater. This is also another monitoring indicator for the status of the aquifer.

9.1.5 Groundwater pollution

The aspects is highly unlikely to occur as there are no (industrial) activities in the surround that could pollute under groundwater. The EMP has proposed adequate mitigation measures for the handling of oil and lubricants during drilling phase.

9.1.6 Heritage and Archaeology

A chance find is developed for the operation in case workers stumble on heritage and archaeological materials during drilling.

10 THE ENVIRONMENTAL MANAGEMENT PLAN (EMP)

10.1 Purpose of the EMP

This Environmental Management Plan (EMP) is a risk strategy that contains logical framework, monitoring programme, mitigation measures, and management control strategies to minimize environmental impacts. It further stipulates the roles and responsibility of persons involved in the project. These strategies are developed to reduce the levels of impacts for the projects. Lastly, the EMP further aims to develop mitigation measure of social and environmental risk that the project may cause as identified in the Environmental Social Management Framework (ESMF) of the project.

10.2 Compliance to the EMP

This EMP is a legally binding document as given under the provisions of the Environmental Management Act, 2007 (Act No. 7 of 2007). Uibasen Twyfelfontein Conservancy and the National Heritage Council with support with from CCFN and contractors should adhere to the framework of this document.

10.3 Roles and Responsibility

10.3.1 Proponent

The proponent, Uibasen Twyfelfontein Conservancy and the National Heritage Council with support with from CCFN shall take overall responsibility for proper implementation of the EMP. It remains the responsibility of the proponent to appoint key personnel for the implementation of

the EMP such as Site Manager and ensure that all employees and contractors are conversant with the EMP.

10.3.2 Site Manager

The Site Manager (SM) represents the proponent on site. He/she shall be responsible for daily activities in ensuring environmental protection. All communication with regard to the implementation of EMP must be channelled through the SM

10.3.3 Employees

It shall be responsibility of employees to always adhere to the provision of EMP.

10.3.4 Environmental Compliance Officer

Compliance to EMP is enforced by the environmental inspector as provided for under Environmental Management Act (No. 7 of 2007) (EMA)

10.3.5 Ministry of Agriculture Water and Land Reform

This ministry as mandated through the Water Resources Management Act 11 of 2013 to ensure adequate management, protection, development, use and conservation of water resources; to provide for the regulation and monitoring of water services and to provide for incidental matters. MAWLR will be responsible to ensure to that the allocated abstraction by the water permit is not exceeded to ensure a health aquifer.

10.4 Disciplinary Action

This EMP is a legally binding document, non-compliance to the EMP is punishable in accordance to the provision of EMA.

11 THE EMP TABLE

This EMPs is structured to address potential impacts during the drilling / construction and operational phase of the borehole in addressing issues of Socio-Economic, Bio-Physical Environment, Pollution and Waste Generation and Heritage Resources . This is a living document that is subject to amendment when the needs arise to ensure environmental protection. Thus, aspects that may not necessarily be covered during its development could be added on.

11.1 Construction Phase

Activities to be undertaken during construction includes; drilling of the borehole and digging of trenches to lay the water pipelines that will transport water to the World Heritage Site. Establishment of water storage tanks will be supported by concrete base at the World Heritage Site. Supporting infrastructures such as elevated solar panels platforms, and elephant proof fence will be constructed.

11.1.1 Socio-Economic Consideration

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
Staff induction	To ensure that all staff / employees are familiar with the requirements of the EMP	<ol style="list-style-type: none"> 1. All employees must go through an induction course for the provision of the EMP. 2. Ensure that a copy of the EMP is kept on site 	<ul style="list-style-type: none"> • Induction Minutes and Attendance Register, Physical verification of the EMP on site. 	Contractor
Employment Socio-Economic	To ensure that general work created during the project is reserved for local people	<ol style="list-style-type: none"> 1. Ensure that all general work is reserved for local people 	<ul style="list-style-type: none"> • Employee register • Wages for employee 	Contractor

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
advancement for local		2. Fair compensation and labour practise as per Namibian Labour Laws must be followed	• Complains about payment	
Skill and Knowledge transfer	To build local capacity	1. Identify and train competent people (Preferable youth) to do basic maintenance of water pump and its supporting infrastructure	• Training report	Contractor
General waste	To manage solid waste To prevent littering, pollution, contamination of water and general environmental health hazards	1. Provide the necessary waste drums 2. No onsite burying / dumping or burning of waste material is permitted. 3. Ensure appropriate waste collection and removal from the site and effective disposal	Physical verification of waste drums Report of waste disposal	Contractor

11.1.2 Health and Safety of employees

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
HIV and AIDS, Alcohol and Drug abuse	Prevent alcohol and drug use at work place. Provide awareness of dangers on HIV/AIDS	<ol style="list-style-type: none"> 1. Ban the employees against the use of alcohol during working hours 2. Provide awareness on the dangers and health impacts of alcohol and drug use 3. All employees must be screen with the breathalyser to avoid intoxicated personnel on site 4. Adopt a disciplinary system to discipline staff for non-compliance 5. Provide Condoms to employees 	<ul style="list-style-type: none"> • Monitor presence of alcohol at harvesting site • Awareness meeting attendance registers • Breathalyser report • Disciplinary reports • Physical assessment and logs of condom procurement 	Contractor
Health	To ensure employees and community health	<ol style="list-style-type: none"> 1. Abide to the Occupational Health and Safety and Labour Act of Namibia and other statutory requirements such as International Labour Practise (Organization?) (ILO) 2. Ensure adequate first aid kit 3. Supply clean drinking water to the site 	<ul style="list-style-type: none"> • Complaints of health issues by employees • First aid kit available 	Contractor
Safety	To ensure employees and community safety	<ol style="list-style-type: none"> 1. Develop a safety plan 2. Ensure that every employee goes through an induction course about safety 3. Provide appropriate Personal Protective Equipment (PPE) which includes helmets, 	<ul style="list-style-type: none"> • Safety plan / pamphlets • Training minutes and attendance register • Physical verification of PPE 	Contractor

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
		overalls, safety shoes, safety glasses, gloves, etc.		
Noise Pollution	To prevent noise nuisance	<ol style="list-style-type: none"> 1. Maintain low speed 2. All vehicles must be well serviced to prevent excessive noise 3. Do not hoot unnecessary 4. Do not rev the vehicle engines 5. Do not play loud music / radio 	Noise complaints / reports by tourist / community Vehicle service books	Contractor

11.1.3 Safety of borehole / water infrastructure

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
Destruction of water infrastructure by elephant	To prevent destruction of boreholes and associated infrastructure by elephants.	1. Construct an elephant proof fence around the borehole and its supporting infrastructures	<ul style="list-style-type: none"> • Physical verification of elephant proof fence 	Contractor

11.1.4 Bio-physical consideration

Environmental / Social Impact	Objective	Proposed Mitigation Measure	Monitoring Indicator	Responsibility
Biodiversity	To protect plant and animals	<ol style="list-style-type: none"> 1. Do not cut down trees unnecessary. 2. Do not kill animals (crawling) unless it possess danger to human safety. 3. Poaching is strictly forbidden. 	<ul style="list-style-type: none"> • Physical verification • Report of poaching 	Contractor
Land degradation	To prevent soil disturbance / erosion	<ol style="list-style-type: none"> 1. Movement of vehicles must be well coordinated to ensure minimal soil disturbance. 	<ul style="list-style-type: none"> • Physical observation of tracks outside designated areas 	Contractor
Water pollution	To prevent surface and groundwater pollution	<ol style="list-style-type: none"> 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 oil and lubricants. 3. All vehicle and machinery must be well service to avoid leakages. 4. Soils contaminated with grease, oils and hydrocarbons must be collected and disposed of appropriately. 	<ul style="list-style-type: none"> • Physical observation of drip trays, oil marks etc • Vehicles service report / service books • Training report on emergency response • Reports of disposal of contaminated soils 	Contractor
General waste	To manage solid waste To prevent littering, pollution, contamination of water and general environmental health hazards	<ol style="list-style-type: none"> 1. Provide well labelled waste drums. 2. No onsite burying / dumping or burning of waste material is permitted. 3. Ensure appropriate waste collection and removal from the site and dispose at appropriate waste disposal site. 	<ul style="list-style-type: none"> • Physical verification of waste drums • Report of waste disposal at approved sites 	Contractor

11.1.5 Heritage Resources

Heritage Resource	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Responsibility
Heritage and Archaeology	<p>The proposed area does not have known Heritage site or archaeological material. Regardless and as standard practise, a chance find is developed to ensure protection of artefacts, heritage and archaeological materials.</p>	<ol style="list-style-type: none"> 1. Employee must be trained on the possible find of heritage and archaeological material in the area; 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 by; <ol style="list-style-type: none"> i. Stopping the activity immediately ii. Informing the operational manager or supervisor iii. Cordoned of the area with a danger tape and manager to take appropriated pictures. 1. Manager/supervisor must report the finding to the following competent authorities, National Heritage Council of Namibia (061 244 375) National Museum (+264 61 276800) or the National Forensic Laboratory (+264 61 240461). 	<p>Training records and attendance registers</p>	<p>Contractor</p>

11.2 Part II: Operation Phase

11.2.1 Aquifer Conservation

This aspect is critical part of this EMP owing to the low yield fractured aquifers and known over-abstraction which leads to degraded water quality especially increase in salinity. Therefore, this EMP put strong emphasis on monitoring of water quality to ensure a healthy aquifer.

Environmental / Social Aspect	Objective	Action Required	Monitoring Indicator	Party responsible
Water abstraction	To conserve the aquifer	<ol style="list-style-type: none"> 1. Do not abstract more than what is allocated by the permit. 2. Develop and implement a ground water monitoring plan. 3. Install automatic measuring gauge to monitor abstraction. 4. Carry out periodic pumping yield to assess aquifer sustainability. 5. Monitor local vegetation and report their unusual health status. 6. Undertake systematic water quality assessment. 	Abstraction reports Ground water monitoring plan Report of test pumping Physical verification of vegetation Water quality	Proponent

11.2.2 Bio-physical and socio-environmental concerns

Environmental / Social Aspect	Objective	Action Required	Monitoring Indicator	Party responsible
Human Health (Quality of Water fit for human consumption)	To ensure the water is fit for human consumption	1. Undertake intermittent water quality assessment to ensure that it is fit human consumption	Water quality monitoring reports	Proponent
Ecology	Rangeland Management	2. Monitor the vegetation health condition during abstraction and vice versa	Vegetation monitoring	Proponent
Skill and knowledge transfer	To build local capacity	1. Identify and train competent people (Preferable youth) to do basic maintenance of the borehole and its supporting infrastructure	<ul style="list-style-type: none"> • Training report 	Proponent
Risk of water infrastructure destruction by elephant	To prevent infrastructure destruction by elephant	1. Build high and thick enough that will prevent elephants access to the water tank and solar infrastructures (elephant proof fence	<ul style="list-style-type: none"> • Elephant proof fence 	Proponent
Corrosion of borehole metal casing	To ensure the casing are not corroded that could affect pump yields and water quality	1. Use non-corrosive casing.	<ul style="list-style-type: none"> • Corrosion monitoring reports 	Proponent

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 in figure 11 below, in an efficient, effective and consistent manner.

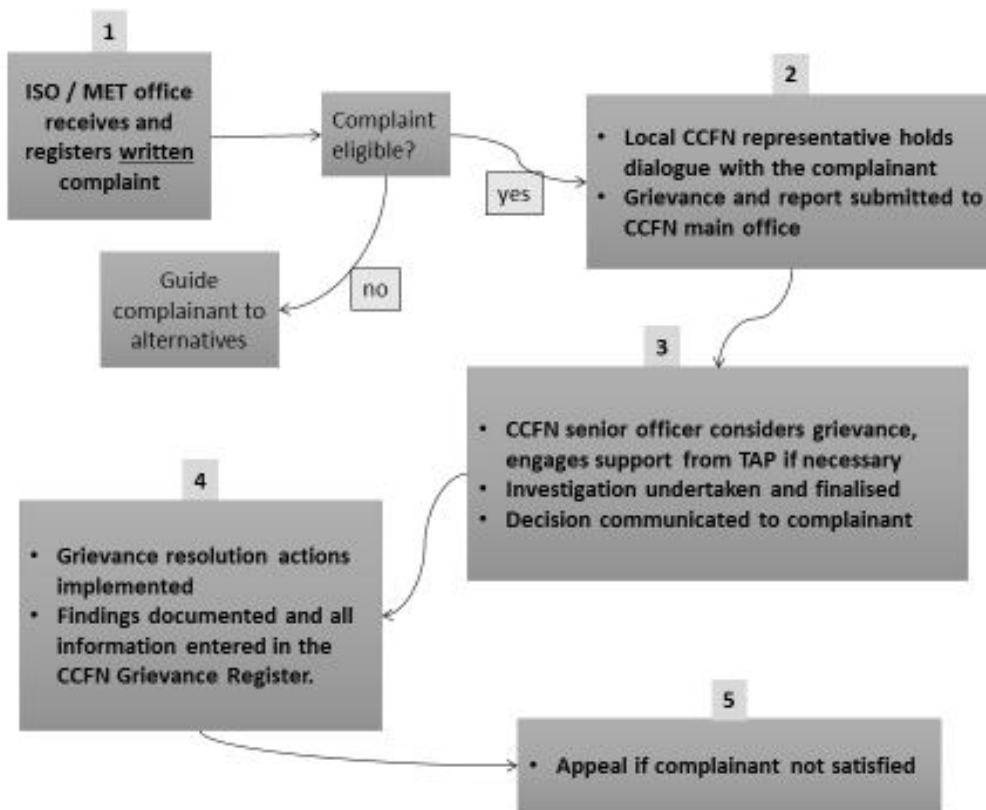


Figure 11. GRM flow chart (Source: ESMF_Poverty Oriented Support to Community Conservation in Namibia)

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 World Heritage Site 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 Conclusions

With the available information, the following conclusions were made:

1. The area is known to have low yield aquifer, mainly fractured aquifer in granitic rock.
2. Over-abstraction of water has been reported in the region, which led to degraded water quality.
3. The area receive low to no rainfall in some years which limits potential of recharge.
4. There are no alternative means to supply water (i.e. through a pipeline scheme). The borehole remains the only option.
5. Supplying of water with a truck is not sustainable and efficient to realize the full potential of the World Heritage Site.

14.2 Recommendations

- It is recommendations to the approving authority for the issuance of the ECC
- Develop and implement a groundwater monitoring plan(s)
- Ensure intermittent testing of water quality and obtain necessary fitness approval

15 ANNEX 1. GROUND WATER 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. A plan must be given of groundwater quality monitoring procedures to be followed. This includes the frequency of sampling and chemical constituents to be analysed for. A baseline of water quality is therefore required to monitor the water quality overtime.

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.

15.3 Aquifer Properties

Aquifer properties such as aquifer pumping tests may vary overtime, especially in areas with poor recharge.

15.4 Monitoring Wells

This aspect of monitoring will not be applicable to fractured aquifer which are found in the area.

16 ANNEX 2. ATTENDANCE REGISTER



PUBLIC MEETING ATTENDANCE REGISTER: ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED DRILLING OF A BOREHOLE FOR WATER SUPPLY AT TWYFELFONTEIN WORLD HERITAGE SITE, KUNENE REGION

DATE: 14.08.2023

TIME: 11:56

VENUE: CONSERVANCY OFFICE

No	Name	Organisation	Contact detail (tel or email)	Signature
1	IRENE M	RDC	0811477889	
2	Laurensia Mastes	Uibosen T. Conservancy	0814139174	
3	Raymond A. GEISEB	Uibosen T.C	0812857933	
4	GINA THOMAS	UTC	081323444	
5	Grace Shihelo	RDC	0812567709	
6	Anna Frichas	Hookman T/A	0812038136	
7	ELIPHAS ARESEB	UTC	0814856959	
8	Johannes Naaseb	UTC	0813082183	
9	SIMON WISEB	UTC	0817467261	
10	SETH I. HENDRICKS	ZITC	0814657751	

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