ENVIRONMENTAL IMPACT ASSESSMENT

FOR THE PROPOSED INSTALLATION AND OPERATION OF AN 80M GUYED MAST TELECOMMUNICATION TOWER IN OKARUNDU OPSTAL NO.2, KARIBIB DISTRICT, ERONGO REGION: NAMIBIA

ENVIRONMENTAL SCOPING REPORT

FINAL

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Acronyms

TERMS	DEFINITION
BID	Background Information Document
CA	Competent Authorities
MTC	Mobile Telecommunication Limited (Pty) Ltd
EAP	Environmental Assessment Practitioners
ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
EMP	Environmental Management Plan
GDP	Gross Domestic Product
GHG	Greenhouse Gasses
ISO	International Organization for Standardization
I&Aps	Interested and Affected Parties
JBIC	Junior Baiano Industrial Consultants
MEFT: DEA	Ministry of Environment, Forestry and Tourism's Directorate of Environmental Affairs
PPE	Personal Protective Equipment

EXECUTIVE SUMMARY

Junior Baiano Industrial Consultants (JBIC) cc has been engaged by the **Mobile Telecommunication Limited (Pty) Ltd (MTC)** to conduct an Environmental Impact Assessment (EIA), develop an Environmental Management Plan (EMP) and apply for an Environmental Clearance Certificate for the proposed Installation and Operation of a 80m guyed mast Telecommunication tower, earmarked for the C32 network road coverage from Karibib to Witwatersbors. The site is located in Okarundu Opstal no: 2, Karibib district, Erongo Region.

In terms of the Environmental Impact Assessment Regulations 2012, the proposed project triggered the application for an environmental clearance certificate because of the following activities:

Environmental Impacts

- Generation of waste during construction and operation.
- Impacts on vegetation and biodiversity through clearing of land during construction.
- Health and safety impacts during construction and operation.
- Surface and groundwater impacts during construction.

Social and Economic Impacts

- The project is generally expected to contribute to improving the livelihoods of the local community of Karibib through employment opportunities and increased provision of telecommunication services and amenities which are not readily available in the area.
- An EMP has been developed to mitigate any anticipated possible impacts of the project to the environment.

Public Participation Process

Interested and Affected Parties were notified of the project through site notices and newspaper adverts. All relevant information regarding consultation is covered in Chapter 4 of this document and attached in Appendix A.

Recommendation

Based on the Environmental Assessment it is concluded that most of the impacts identified can be addressed through the recommended mitigation and management actions for both the construction and operation phases of the tower. Should the recommendations included in this report and the EMP be implemented the significance of the impacts can be reduced to reasonably acceptable standards and duration. All developments could proceed provided that general mitigation measures as set out are implemented at a minimum.

In this respect it is recommended that the proposed project receives an Environmental Clearance Certificate, provided that the recommendations described in this report and the EMP are implemented.

1 CHAPTER ONE: BACKGROUND

1.1 INTRODUCTION

Mobile Telecommunication Limited (Pty) Ltd (MTC) intends to achieve the objective of improved telecommunication connectivity, and continue to expand network coverage in the remote areas of Namibia with the aim of bringing development close to the people in line with the decentralization approach. MTC proposes to install and operate a 80m guyed mast Telecommunication tower, earmarked for the C32 network road coverage from Karibib to Witwatersbors. The site is located in Okarundu Opstal no: 2, Karibib district, Erongo Region.

Environmental Management Act, 2007 (Act No.7 of 2007) and the regulations for Environmental Impact Assessment as set out in the Schedule of Government Notice No. 30 (2012) echoes the need of an Environmental Impact Assessment (EIA) for new projects (such as the proposed development) that are specified by the Act.

Non-compliance to legal obligations presents liabilities and it is in the wake of the need to attain sustainability that MTC has opted to undertake an EIA for its proposed guyed mast telecommunication tower. EIA is required to obtain an Environmental Clearance Certificate (ECC) from the Ministry of Environment and Tourism (MET) before the project can proceed. In this context the company has set out to conduct the Environmental Impact Assessment (EIA) for its upgrade activities. The EIA is the official appraisal process to identify, predict, evaluate and justify the ecological, social and related biophysical impacts of the project on both the environment and, affected and interested stakeholders. It provides insight on alternatives and measures to be adopted to prevent or mitigate any impacts/risks that may ensue from the project and its associated activities.

As per the requirements of the Environmental Management Act No. 7 of 2007, MTC has appointed JBIC to conduct the EIA and develop an Environmental Management Plan (EMP) for the proposed project. In this respect, this document forms part of the application to be made to the DEA's office for an ECC for the proposed project, in accordance with the guidelines an statutes of the Environmental Management Act No.7 of 2007 and the environmental impacts regulations (GN 30 in GG 4878 of 6 February 2012).

1.2 PROJECT LOCATION

Mobile Telecommunication Limited (MTC) intends to Install and operate an 80m guyed mast Telecommunication tower, earmarked for the C32 network road coverage from Karibib to Witwatersbors. The site where the mast is to be established is located in Okarundu Opstal no: 2, Karibib district, Erongo Region. The figure below the locality map of the project area.

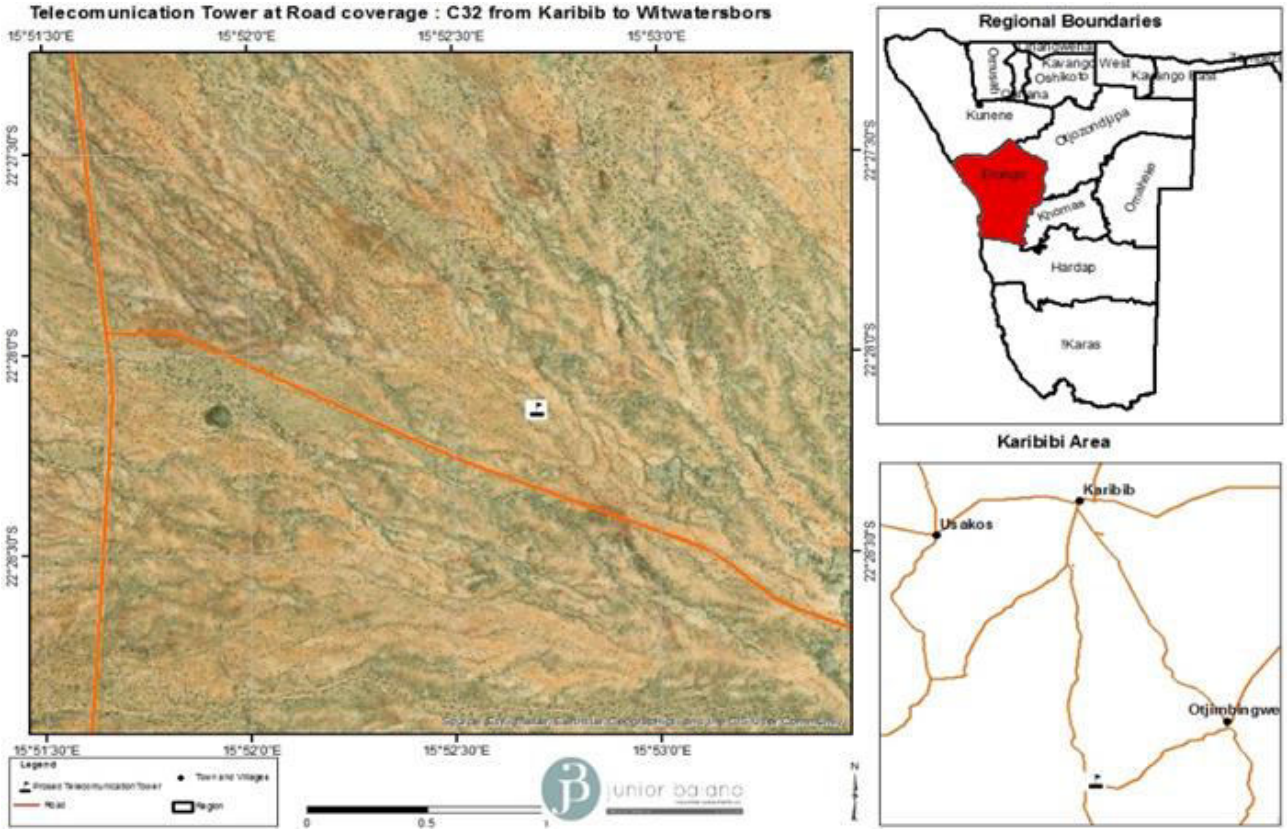


Table 1-1: Site Locality

1.3 PROJECT OVERVIEW

In addition to expanding and improving mobile network coverage into the various areas where there is either poor or no network access at all, MTC seeks to provide various telecommunication service providers in Namibia with infrastructure that is ready to use. The project works involve the construction and operation of a typical guyed mast telecommunication tower which includes:

- Planning and Design of Project Work – this compasses land acquisition and registration; preliminary site investigations e.g. geotechnical assessments and topographical surveys; permit applications; preparation of site plans/drawings and application of the appropriate approvals from the relevant regulatory authorities;

assessment of baseline conditions to determine supply and demand for required project services; carry out EIA and obtain the appropriate approvals; etc.

- Site Preparation – this entails grading, landscaping, building roads and siding of project areas in order to make the sites free of obstruction prior to construction. It may also involve utilization of heavy machinery/equipment to fully prepare the landscape. This includes physically removing vegetation, any pre-existing concrete foundations, etc. By doing this, the sites are prepared for new concrete foundations and other needed site work.
- Building Foundation - once the site landscaping is fully prepared, getting the project areas mapped out for the foundation is the next critical phase before items can be delivered. The breakdown of the foundation process encompasses location of conduits into concrete shelters, placing rock in foundation bed to provide a firm surface for concrete, placing of rebar in framed areas to add extra strength for poured concrete; etc.
- Transportation, Logistics and Construction - site preparation complete and foundation in place, the next important step is preparing for transportation, logistics and construction of the tower. This takes into account evaluating all site conditions to make sure they are conducive for the weight of cranes and trucks; planning for transporting very heavy pieces of equipment such as telecom concrete shelters, generators, cabinets or fiber optic cable; execution and control of the procurement; movement and stationing of personnel, material and other resources; etc.
- Electrical and Grounding - it is necessary to determine and install all necessary electrical and grounding materials needed to power the project areas.
- Operation of the tower

1.4 ACCESSIBILITY

The sites are easily accessible from an existing access roads connecting to residential areas and other parts of the Karibib district.

1.5 INFRASTRUCTURE AND SERVICES

- Water – Borehole water and NAMWATER supply maybe used for project operations.
- Ablution – establishment of septic tanks or latrines.

1.6 NEED AND DESIRABILITY

According to Statista, the telecom sector is responsible for an estimated global spend of US$520 billion annually. Globally, telecommunications impact how societies are able to connect with each other, communicate, and conduct business. In today's world, there is almost nothing as important as reliable communication. Reliable communication depends on reliable telecommunications infrastructure, empowering people and businesses alike to communicate by phone, internet, wired and wireless connections, and more. It is only through this infrastructure that there is the ability to communicate locally, nationally, and around the globe.

Telecommunications have an undisputed role in the country's economic performance. All sectors of any economy rely heavily on good telecommunications infrastructure. In some instances communications costs can account for up to some 20 to 30 per cent of total operating expenditure for many a business.

The Harambee Prosperity Plan and National Development Plans set the goals, targets, and strategy for Namibia to move on a path to economic prosperity through a concerted strategy for the development of Namibia's economic growth. These Plans also include specific growth targets milestones and strategies for the sustainable deployment of Namibia's resources to achieve the stated economic and social development goals. Communication is one of the major targets aimed in the NDP5 and to stimulate development of any aspect, internet and voice connectivity is a pre-requisite. This project, is a major step in addressing the objectives of the developmental plans and targets of the Namibian government.

1.7 PROJECT ALTERNATIVES

The project will not be implemented if the No-Go option is selected. The no-project alternative would mean that the various potential impacts/risks emanating from the proposed project would not be experienced. Thus the current uses and value and other potential land uses of the site are likely to be retained.

In addition there would no increased pressure on resources such as electricity and water which are already under strain. There also would be no increased chances of pollution and other potential negative impacts that would emanate from project activities.

If the project is implemented it is anticipated that the project will have the following benefits

- Creation of much needed employment opportunities
- Facilitation of local and national economic growth
- Quick and accessible communication and exchange of information
- Worldwide access

These benefits will not be realised if the project does not take place.With the current needs in voice and internet connectivity within the city, region and nation, it is imperative that the tower should be constructed. The non-development of the proposed tower will furthermore impede economic development and socio-economic progress.

Due to the project's numerous environmental and socio-economic benefits, and that the identified environmental impacts can be suitably mitigated it has been determined that the No Go option can be eliminated. Should the Competent Authorities (CA) refuse the authorisation of the proposed project, the 'No Go' option will be "implemented" and the status quo of the site will remain intact - leaving the site in its present state.

Table 1-2: Other Alternative Considerations

Item	Description	Alternatives	Comments
1.	Siting	• Current site • Other sites within the district	The selected sites for establishment of masts have been determined to be suitable due to the following: • Elevation - The locations are strategic because they can allow the coverage of a wider radius. • Land suitability – Elevated platform that has the potential to reduce soil disruption and habitat destruction. It also allows for foundation designs that minimize ground disturbance and excavation. • Accessibility – there is easy access to essential infrastructure such roads • There are no ecologically sensitive areas, wildlife corridors and habitats to minimize disruption and habitat destruction.
2.	Mast design and infrastructure	• Low impact foundation design	• Choose foundation designs that minimize ground disturbance and excavation.

Item	Description	Alternatives	Comments
			• Consider helical pile foundations or elevated platforms can reduce soil disruption and habitat destruction. • Use sustainable and recycled materials for construction, reducing the environmental impact of resource extraction and manufacturing. • Install bird diverters or reflectors to reduce bird collisions with masts and guy wires. • Plan for easy dismantling and recycling of components at the end of the mast's life cycle. • Avoid using adhesives or materials that are difficult to separate during decommissioning. • Create buffer zones around masts to prevent interference with bird flight paths. • Use native vegetation around the mast site to enhance biodiversity and provide habitat for local wildlife. • Incorporate landscaping practices that require minimal water and maintenance.
3.	Transportation	• Road • Rail • Water (Atlantic ocean)	Given the location of the project water, road and rail are the most cost effective means of transport.
4.	Solid Waste Disposal	• Construction of a solid waste disposal site at the project site • Disposal of solid waste off site	Establishment of an acceptable waste disposal site on site maybe considered. Where waste materials cannot be disposed on site these may be disposed off at Walvis Bay or Windhoek.
5.	Water and Sanitation	• Municipal water supply and sewer system. • Drilling a Borehole on site • Septic tank	Considering that the site very far away from domestic water and sewer reticulation systems drilling of a borehole and establishment of a septic tank or latrines at the project site. Although this has its challenges in terms of supply, water from the NAMWATER reticulation maybe used as well.
6.	Energy	• Electricity • Solar	• Equip masts with solar panels to generate renewable energy for powering equipment.

Item	Description	Alternatives	Comments
			• Excess energy generated can be fed back into the grid or stored in batteries. • Use energy-efficient equipment to reduce power consumption and the need for continuous energy supply. • LED lighting and efficient cooling systems can contribute to energy savings.

1.7.1 Conclusion

It is recommended that the project goes ahead, with the telecommunication mast as a viable option as it is a cost effective and sustainable land use option.

2 CHAPTER TWO: POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

2.1 INTRODUCTION

This EIA Report for the mast has been prepared in reference to identified Namibian laws and regulations that impinge on the project throughout all its phases. Legislation is one of the most important instruments of government that ensures the following:

- Acceptable pollution control and waste management
- Conservation and utilisation of resources
- Sustainable land-use planning and regulation
- Safe and healthy workplace environments
- Determination amongst others things of the rights and responsibilities of individuals and authorities to whom the legislation applies.

The international and national laws, agreements and treaties that govern the social and environmental issues of the project are outlined in the following sub-section. The sub-section take into account brief summarises of selected legislation; it do not seek to provide comprehensive details of all legal obligations that apply to the project but rather an overview.

2.2 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

The pursuit of sustainability is guided by a sound legislative framework. In this section, relevant legal instruments as well as their relevant provisions have been surveyed. An explanation is provided regarding how these provisions apply to this project.

Table 2-1: Legal Compliance

Aspect	Legislation	Relevant Provisions	Relevance to the Project
The Constitution	Namibian Constitution First Amendment Act 34 of 1998	• Article 16(1) guarantees all persons the right to property. It therefore provides everyone a right to acquire, own and dispose of property, alone or in association with others and to bequeath such property. • Article 95(I) "The State shall actively promote and maintain the welfare of the people by adopting policies that are aimed at maintaining ecosystems, essential ecological processes and the biological diversity of Namibia. It further promotes the sustainable utilisation of living natural resources basis for the benefit of all Namibians, both present and future."	• The project will enable the full execution of right to practice any profession, or carry on any occupation, trade or business by availing necessary provisions such as practising any profession, or carry on any occupation, trade or business in the country. • Through implementation of the environmental management plan, the proponent will ensure conformity to the constitution in terms of environmental management and sustainability.
Biodiversity Conservation	Convention on Biological Diversity (CBD)	Namibia is a signatory of the Convention on Biological Diversity and thus is obliged to conserve its biodiversity.	The project will preserve tree species on as part of their plans for greed and sustainable development.

Aspect	Legislation	Relevant Provisions	Relevance to the Project
Environmental protection	United Nations Convection to combat Desertification	Namibia is bound to prevent excessive land degradation that may threaten livelihoods.	It will be the responsibility of the proponent to conserve vegetation on and around the area, to avoid encroachment of the desert environs in the area.
National Development Plans	NDPs	Namibia's overall Development ambitions are articulated in the National Vision 2030. At the operational level, five-yearly national development plans (NDP's) are prepared in extensive consultations led by the National Planning Commission in the Office of the President. The Government has so far launched a 4th NDP focusing on high and sustained economic growth, increased income equality Employment creation.	The proposed project will propel NDP4 targets in telecommunications, logistics, tourism and commodities market. Adding on, this will create employment which will work towards the NDP and Vision 2030.
Archaeology	National Heritage Act 27 of 2004	Section 48(1) states that "A person may apply to the Namibian Heritage Council (NHC) for a permit to carry out works or activities in relation to a protected place or protected object"	Any heritage resources discovered would require a permit from the NHC for relocation.
	National Monuments Act of Namibia (No. 28 of 1969) as amended until 1979	• "No person shall destroy, damage, excavate, alter, remove from its original site or export from Namibia: • Meteorites, fossils, petroglyphs, ornamental infrastructure graves, caves, rock shelters, middens, shells that came into existence before the year 1900 AD; or any other archaeological or palaeontological finds	The proposed site of development is not within any known monument sites, both movable and immovable as specified in the Act, however in finding any materials specified in the Act, contractors on site will take the required route and notify the relevant commission.

Aspect	Legislation	Relevant Provisions	Relevance to the Project
Environmental	Environmental Management Act 7 of 2007	• Requires that projects with significant environmental impacts are subject to an environmental assessment process (Section 27). • Requires for adequate public participation during the environmental assessment process for interested and affected parties to voice their opinions about a project (Section 2(b-c)). • According to Section 5(4) a person may not discard waste as defined in Section 5(1)(b) in any way other than at a disposal site declared by the Minister of Environment and Tourism or in a manner prescribed by the Minister. • Details principles which are to guide all EIAs	This Act and its regulations should inform and guide this EIA process.
	EIA Regulations GN 57/2007 (GG 3812)	• Details requirements for public consultation within a given environmental assessment process (GN No 30 S21). • Details the requirements for what should be included in a Scoping Report (GN No 30 S8) and EIA report (GN No 30 S15).	This Act and its regulations should inform and guide this EIA process.
	Pollution and Waste Management Bill (draft)	• This bill defines pollution and the different types of pollution. It also points out how the Government intends to regulate the different types of pollution to maintain a clean and safe environment.	The project should be executed in harmony with the requirements of the act to reduce negative impacts on the surrounding

Aspect	Legislation	Relevant Provisions	Relevance to the Project
		• The bill also describes how waste should be managed to reduce environmental pollution. Failure to comply with the requirements considered an offence and is punishable.	environs from waste during construction or operation.
	Soil Conservation Act 76 of 1969	This act makes provision for combating and for the prevention of soil erosion, it promotes the conservation, protection and improvement of the soil, vegetation, sources and resources of the Republic of Namibia.	The Project impact on soil will rather be localised, however the Act should provide for guidelines of operation during construction to prevent soil erosion and contamination during operation.
	National Biodiversity Strategy and Action Plan (NBSAP2)	The action plan was operationalised in a bid to make aware the critical importance of biodiversity conservation in Namibia, putting together management of matters to do with ecosystems protection, biosafety, and biosystematics protection on both terrestrial and aquatic systems.	Forming part of the EIA of and EMP for this Project, the proponent will consider all associated impacts, both acute and long term, and will propose methods and ways to sustain the local biodiversity.
	Hazardous Substances Ordinance 14 of 1974 Regulations Made In Terms Of Hazardous Substances Ordinance 14 of 1974 sections 3 and 27	To provide for the control of substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure thereby in certain circumstances; to provide for the division of such substances into groups in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such	The proponent will have to conform to this Act and its regulations through application for relevant licences with the relevant bodies highlighted thereto

Aspect	Legislation	Relevant Provisions	Relevance to the Project
		substances; and to provide for matters connected therewith.	
Forestry	Forest Act 12 of 2001	• Tree species and any vegetation within 100m from a watercourse may not be removed without a permit (S22(1) • Provision for the protection of various plant species.	• Land clearing of an extensive piece of land will be done upon approval from the Directorate of Forestry. • A plan will be put in place preserve trees and other species where possible. Indiscriminate cutting down of trees is to be avoided.
Water	Water Act 54 of 1956	• The Water Resources Management Act 24 of 2004 is presently without regulations; therefore, the Water Act No 54 of 1956 is still in force: • A permit application in terms of Sections 21(1) and 21(2) of the Water Act is required for the disposal of industrial or domestic wastewater and effluent. • Prohibits the pollution of underground and surface water bodies (S23(1). • Liability of clean-up costs after closure/ abandonment of an activity (S23(2)). • Protection from surface and underground water pollution	The protection of ground and surface water resources should guide development's layout plans.
Health and Safety	Labour Act (No 11 of 2007) in conjunction with Regulation 156,	• 135 (f): "the steps to be taken by the owners of premises used or intended for use as factories or places where machinery is used, or by occupiers of	The proponent will employ several people and shall ensure securing a safe environment and preserving the health and

Aspect	Legislation	Relevant Provisions	Relevance to the Project
	'Regulations Relating to the Health and Safety of Employees at work'.	such premises or by users of machinery about the structure of such buildings of otherwise to prevent or extinguish fires, and to ensure the safety in the event of fire, of persons in such building;" (Ministry of Labour and Social Welfare). • This act emphasizes and regulates basic terms and conditions of employment, it guarantees prospective health, safety and welfare of employees and protects employees from unfair labour practices.	welfare of employees at work. This will include applying appropriate hazard management plans and enforcing Occupational Health and Safety (OHS) enforcement by contractors.
	Public Health and Environmental Act, 2015	• Under this act, in section 119: "No person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health."	The operation will ensure compliance to the terms of the Act.
	The Atomic Energy and Radiation Protection Act, Act 5 of 2005	Provides for the adequate protection of the environment and of people against the harmful effects of radiation by controlling and regulating the production, processing, handling, use, holding, storage, transport and disposal of radiation sources and radioactive materials, and controlling and regulating prescribed non-ionising radiation sources according to the standards set out by the ICNIRP.	Justifies the need for assessing the impact of electromagnetic radiation from the mast on the nearby residents.
	"Guidelines for Limiting Exposure to Time-	Provides international standards and guidelines for limiting the adverse effects of non-ionising radiation on	-Justifies the need for assessing the impact of ionising and non-ionising radiation from

Aspect	Legislation	Relevant Provisions	Relevance to the Project
	Varying Electric, Magnetic, and Electromagnetic Fields (up to 300GHz)" (April 1998 developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP))	human health and well-being, and, where appropriate, provides scientifically based advice on non-ionising radiation protection including the provision of guidelines on limiting exposure.	the operation of the network technologies to be installed on site.
Services and Infrastructure	Communications Act, 2009 (Act No. 8 of 2009)	(10) The Authority may impose specific obligations and requirements on a licensee regarding to masts, towers or other facilities including requirements relating to the environmental or aesthetic impact of such facilities;	As a pre requisite, telecommunication masts would require environmental clearance certificates and, in this respect, the proponent is authorised this through this EIA to obtain such.
	Communication Bill 2009	Provide for the regulation of telecommunication activities. The bill provides licencing and enforcement of conditions, and the approval or equipment and technical standards to ensure public health and safety.	As per relevant spectrum, network equipment should be as per licenses.
	Road Ordinance 1972 (Ordinance 17 0f 1972)	• Width of proclaimed roads and road reserve boundaries (S3.1) • Control of traffic during construction activities on trunk and main roads (S27.1)	Although the project is a major boost for the town, the commodities market and the national highways the proponent needs to ensure that the development do not affect

Aspect	Legislation	Relevant Provisions	Relevance to the Project
		• Infringements and obstructions on and interference with proclaimed roads. (S37.1) • Distance from proclaimed roads at which fences are erected (S38)	the major roads within their vicinity during construction and operation phases.
	Electricity Act 4 of 2007	• Requires that any generation and or distribution complies with laws relating to health, safety and environmental standards (s 18(4)(b) • In the event that exemption from acquiring a license is granted, the Minister may impose conditions relating to public health safety or the protection of the environment.	Obliges the proponent to comply with all relevant provisions of the EMA and its regulations when installing electrical connections to the tower.

3 CHAPTER THREE: RECEIVING ENVIRONMENT

3.1 SOCIO-ECONOMIC

The project is located in the Karibib district in the Erongo region (see Figure below). According to Namibia Statistics Agency (2011), the population of the Erongo Region is 150 809 people with the population of Karibib district being 13,320 people.

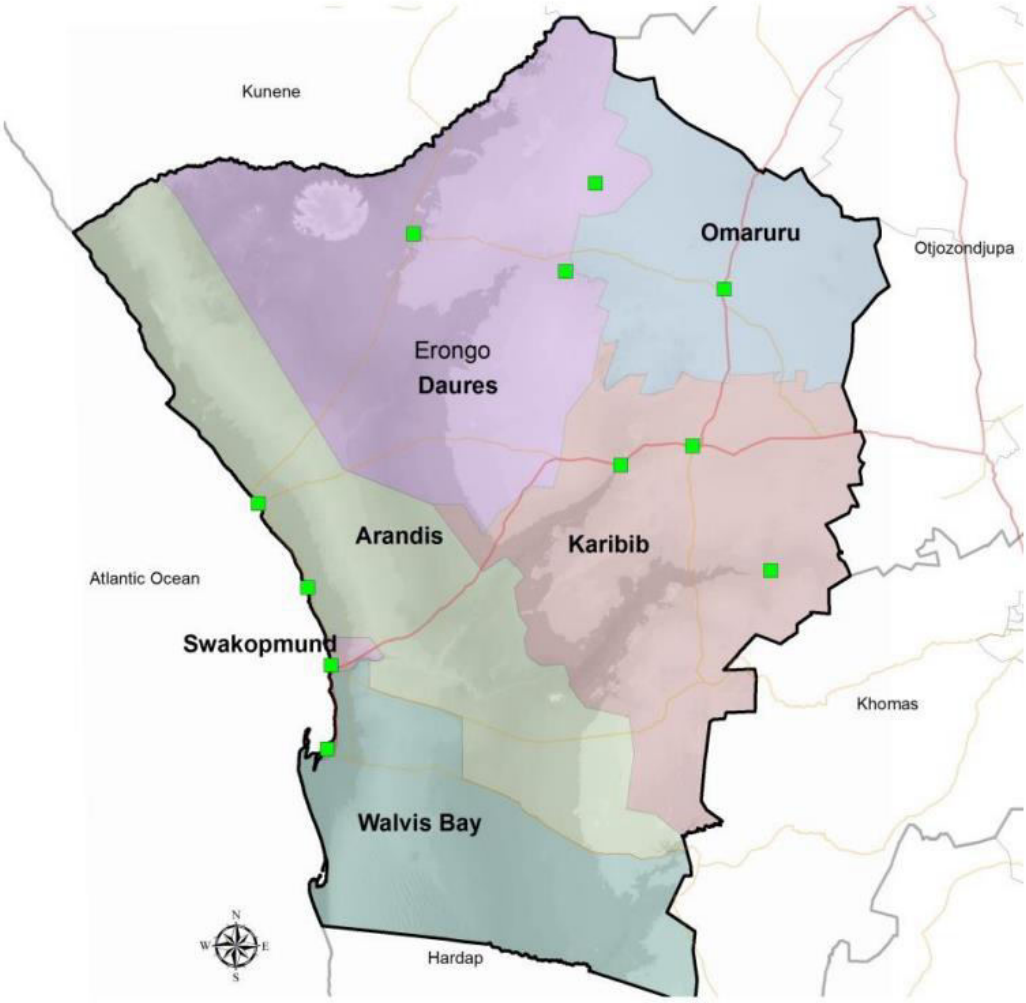


Figure 3-1: Erongo Region

Source: Karibib Urban Structure Plan, 2016

3.1.1 Socio-economic environment

The socio-economic environment of the Karibib District in Namibia is influenced by a combination of factors including its geographical location, economic activities, infrastructure, and social dynamics. Here are some key aspects of the socio-economic environment in the Karibib District:

Economic Activities: The district's economy is primarily driven by mining, agriculture, and tourism. Mining activities, such as limestone and marble extraction, contribute to local

employment and economic growth. Agriculture, although challenging due to the arid climate, includes subsistence farming, livestock rearing, and some small-scale irrigation projects.

Mining Sector: The Karibib District is known for its marble and limestone resources. These minerals are used in construction, manufacturing, and as decorative stones. Mining operations provide employment opportunities for local communities, although the scale and sustainability of these activities can vary.

Tourism Potential: The district's unique landscapes, including desert environments and geological formations, have tourism potential. Ethical and responsible tourism can contribute to local economies through accommodation, guided tours, and cultural experiences.

Infrastructure: Access to basic infrastructure, including roads, electricity, and water supply, varies across the district. Urban areas may have better access to services compared to more remote or rural parts.

Employment Opportunities: Employment opportunities in the district are often linked to the mining sector, agriculture, small businesses, and tourism-related activities. Seasonal fluctuations in economic activities can impact employment stability.

Extrapolating from the national unemployment statistics, the constituency has an unemployment rate of 33.40% and youth unemployment rate of 46.10% (Namibia Central Bureau of Statistics, 2019). This shown in the figure below.

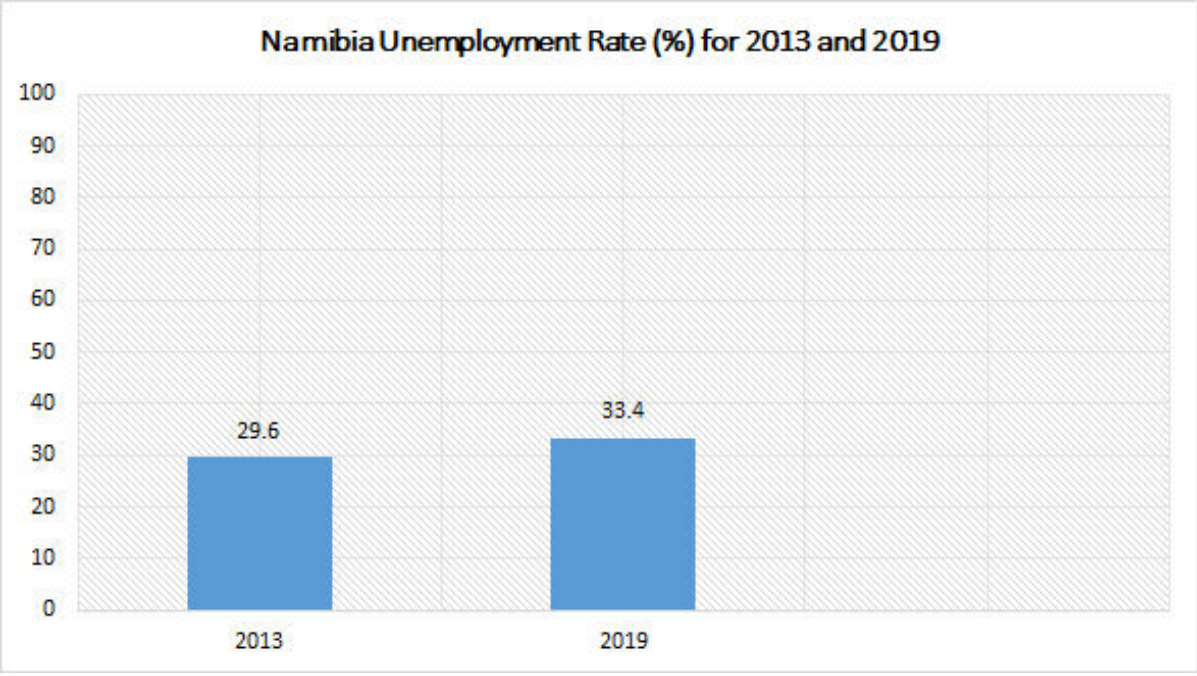


Figure 3-2: Namibia Unemployment Rate and Youth Unemployment Rate

The project will support the district's need for employment as well as the expansion of the local economy. Numerous employment opportunities are to be created for work personnel throughout the project phases. In addition other forms of employment are likely to result from spillover effects, through indirect services such as supply of raw materials, equipment, machinery, etc.

Education and Healthcare: Access to education and healthcare services can be challenging in some areas due to geographical distances and infrastructure limitations. Schools and healthcare facilities may be concentrated in urban centers.

Water Availability: Water scarcity is a significant socio-economic challenge in the district, affecting both households and agricultural activities. Water sources may be limited, and communities often rely on careful water management practices.

Community Livelihoods: Many communities in the Karibib District rely on subsistence farming, livestock herding, and informal trade for their livelihoods. Traditional knowledge and skills play a role in sustainable resource use and cultural preservation.

Challenges and Opportunities: The arid climate poses challenges for agriculture, and economic diversification efforts may be important for long-term sustainability. Infrastructure development, including road connectivity and access to basic services, can improve the quality of life for local residents.

Conservation and Cultural Heritage: Conservation efforts, such as sustainable land use and wildlife management, may contribute to both ecological health and tourism. Preserving cultural heritage, including indigenous practices and traditional knowledge, can contribute to community resilience and identity.

The socio-economic environment of the Karibib District reflects a mix of traditional practices, economic activities, and efforts to balance development with conservation. Collaborative approaches involving local communities, government agencies, and non-governmental organizations are crucial for addressing challenges and unlocking opportunities for sustainable socio-economic growth.

3.2 CLIMATE

The climate of the Karibib District in Namibia is characterized by arid to semi-arid conditions, with distinct seasonal variations in temperature and precipitation. The region experiences

relatively low annual rainfall and is known for its hot temperatures. Here are the key features of the climate in the Karibib District:

Arid Climate Type: The Karibib District falls within the arid climate category. Arid climates are defined by low annual precipitation levels, resulting in water scarcity and limited vegetation cover. The area can also be described as having a desert climate, characterized by very low annual rainfall and high evaporation rates.

Seasonal Rainfall: Rainfall in the Karibib District is highly seasonal, with the majority of the precipitation occurring during the summer months.

The rainy season typically extends from November to March. During this period, the district may receive the bulk of its annual rainfall.

Annual Rainfall Amount: Annual rainfall in the Karibib District can vary, but it is generally low, ranging from about 100 to 300 millimeters (4 to 12 inches) per year on average.

Rainfall amounts may exhibit significant internal variability, leading to occasional drought conditions.

Temperature: The district experiences high temperatures throughout the year. Summers (from November to March) are particularly hot, with daytime temperatures often exceeding 30°C (86°F) and occasionally reaching above 40°C (104°F).

Winters (from June to August) are milder, with daytime temperatures ranging from 20°C to 30°C (68°F to 86°F).

Temperature Extremes: Temperature variations between day and night are common, leading to relatively cool nights even during the hottest months.

Frost can occur in winter, particularly in the early morning hours when temperatures are at their lowest.

Evaporation and Aridity: High temperatures and low humidity levels contribute to high rates of evaporation in the district.

The combination of low rainfall and high evaporation results in arid conditions, where water availability is limited.

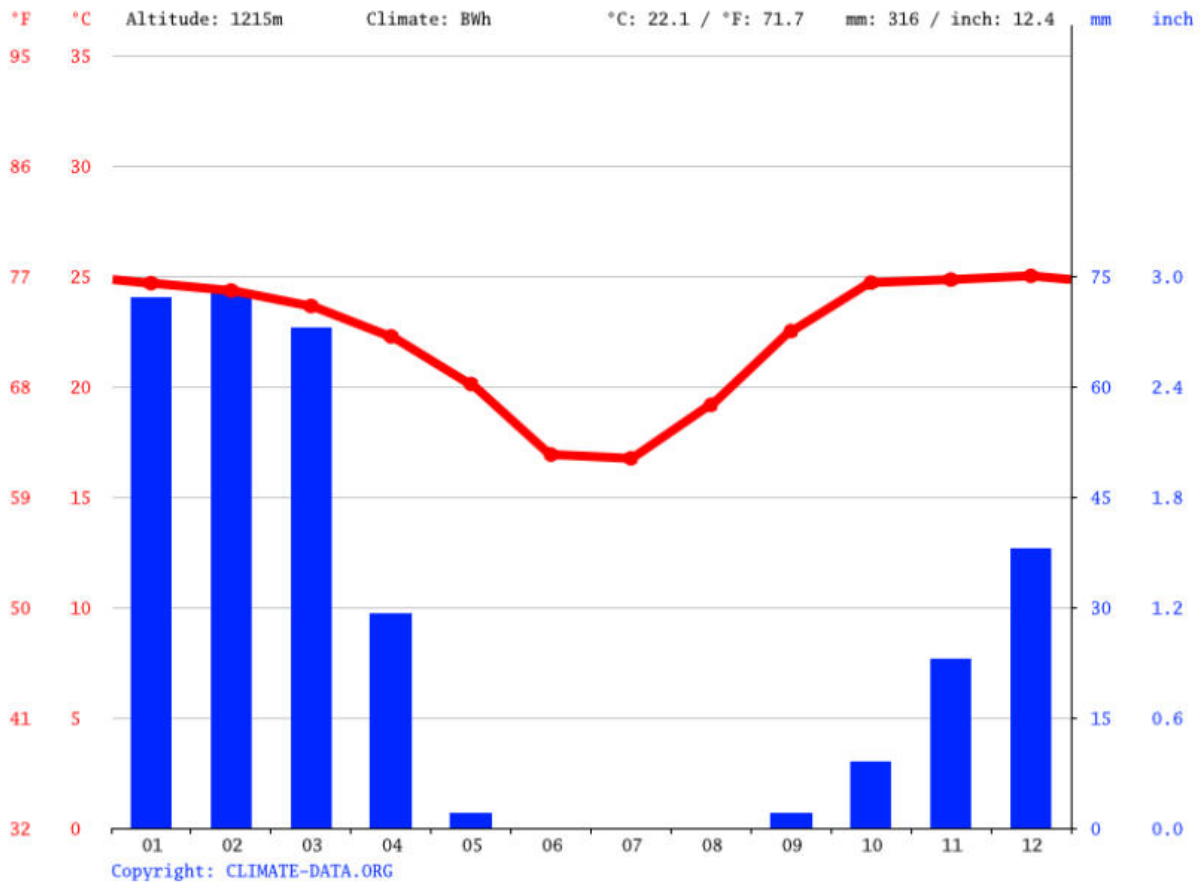


Figure 3-3: Karibib Climatic Graph

Source: Climate-data.org, 2022

Wind: Wind is a common feature of the Karibib District's climate. Dry, dusty winds can contribute to soil erosion and further desiccation of the landscape.

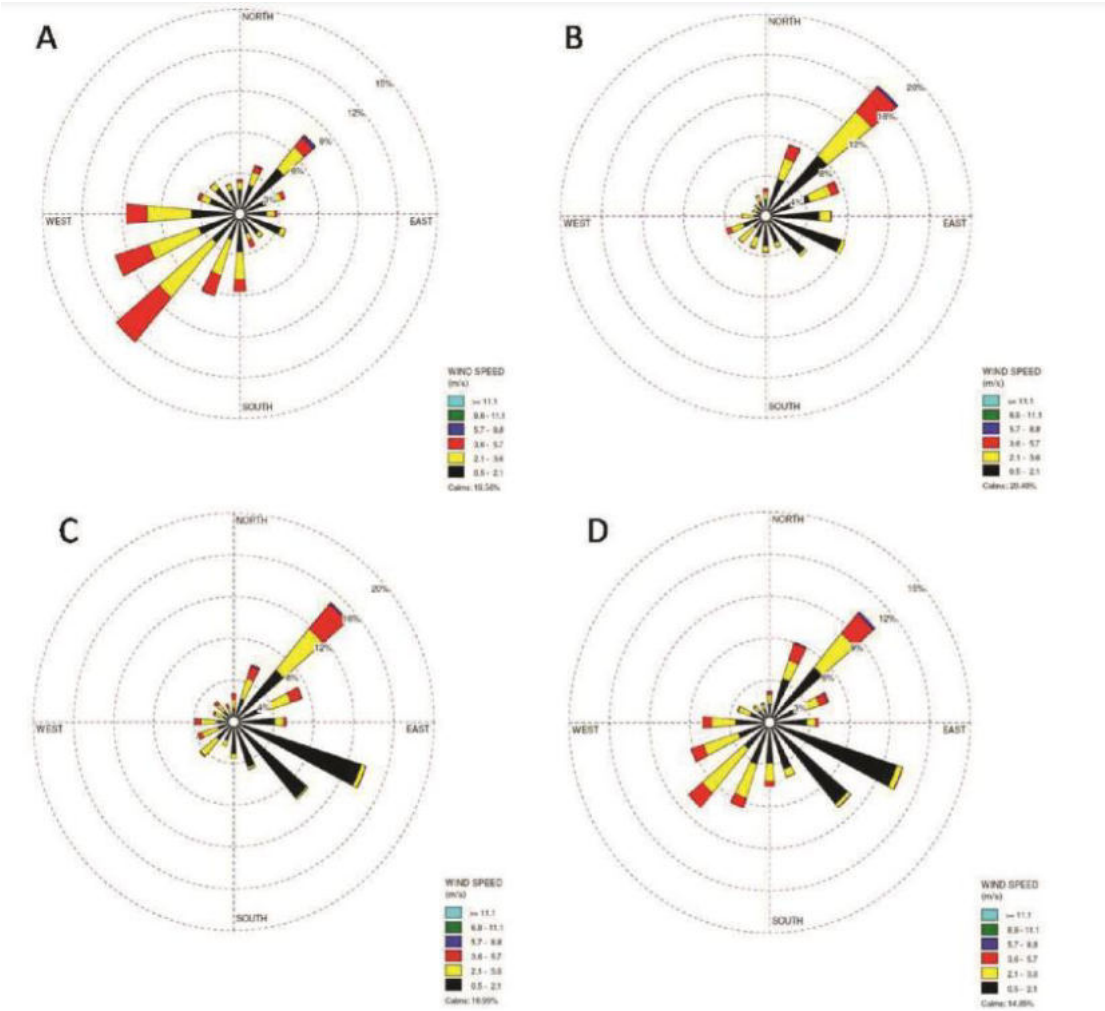


Figure 3-4: Prevailing Wind

Microclimates: Microclimates within the district can vary due to factors like elevation, proximity to water sources, and local topography. Some areas may receive slightly higher rainfall or experience slightly milder temperatures.

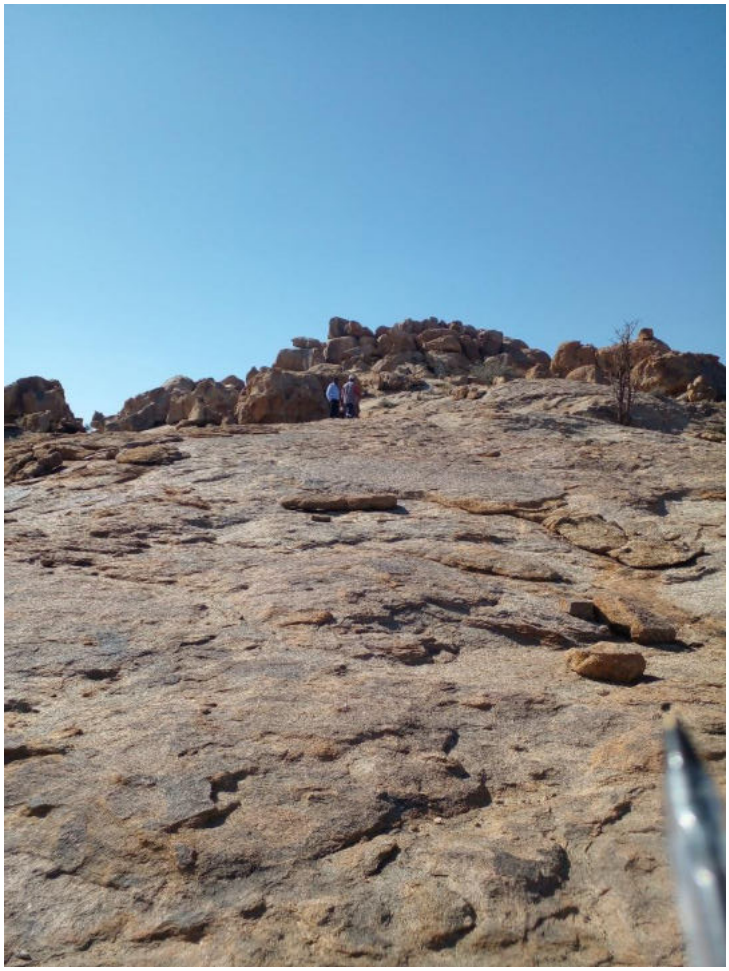
The arid climate of the Karibib District presents challenges for water availability, agriculture, and ecosystem dynamics. Local communities and wildlife have adapted to these conditions over time, relying on strategies such as water conservation, drought-resistant crops, and utilization of available water sources. Additionally, the district's unique climate shapes the types of vegetation and wildlife that can thrive in the region.

3.3 BIODIVERSITY

The biodiversity of the Karibib District is influenced by its unique geographical and ecological features. The district, located in central Namibia, showcases a range of flora and fauna adapted to the arid and semi-arid environment. Here are some key points regarding biodiversity in the Karibib District:

Flora Diversity: The flora in the Karibib District is adapted to the challenging desert conditions, characterized by low rainfall and high temperatures. The availability and distribution of plant species can be influenced by various factors, including soil types, moisture levels, and local microclimates. Additionally, some species might be more prevalent in specific seasons or years depending on rainfall patterns. Vegetation in the area includes various succulents, shrubs, and drought-resistant plants that have evolved to store water and minimize water loss through adaptations like small leaves or spines. The image shows an over of the sparse vegetation cover in the project area.

The rock outcrops in the project area generally have few plant plants growing as shown in the image below.



Examples of typical plant species found in and around the project area include *Acacia species, Ziziphus mucronata, Sesamothamnus lugardii, Othonna euphorbioides, Grewia flava, Cissus quadrangularis, Euphorbia virosa, Aloe dichotoma* and *Hoodia gordonii*. Endemic plant species may be present, adapted to the specific microclimates and soil conditions of the district.

Ephemeral drainage lines are an important habitat to larger trees especially Acacia eriolobia, Euclea pseudebrnus, Faidherbia albida and Ziziphus mucronate.

Fauna Diversity: The district hosts a diverse range of wildlife species, including mammals, birds, reptiles, and insects. Desert-adapted mammals such as oryx, springbok, and small carnivores have developed strategies to survive in the arid environment. Bird species are adapted to the desert conditions and may include raptors, ground-dwelling species, and opportunistic feeders.Reptile diversity is notable, with species like geckos, lizards, and snakes well adapted to the desert's temperature extremes.

Endemism and Rarity: The Karibib District might harbor species that are endemic to the region or have limited distributions due to its unique ecological conditions.

Some species may have adapted to the specific microhabitats within the district, contributing to localized biodiversity.

Conservation Importance: The district's biodiversity holds ecological value by contributing to ecosystem services, including pollination, soil health, and nutrient cycling. Some species may play roles in seed dispersal and predator-prey interactions that maintain ecosystem balance.

Threats and Challenges: Human activities, such as habitat degradation, urbanization, and overgrazing, can threaten the biodiversity of the Karibib District. Climate change impacts, including altered precipitation patterns and increased temperatures, might also affect species' distributions and survival.

Conservation Efforts: Local conservation organizations, government agencies, and community initiatives may be working to protect and conserve the district's biodiversity. Efforts might include habitat restoration, wildlife monitoring, and community engagement to promote sustainable practices.

The biodiversity of the Karibib District reflects the adaptation of species to the arid environment and contributes to the ecological health and resilience of the region. Recognizing the value of biodiversity and implementing conservation measures are essential to ensure the long-term survival of species and the maintenance of ecosystem services.

It is important to note that given the limited scale of land disturbance and that the project is within relatively disturbed land it is not expected that the project will have a significant impact on the biodiversity of the project area.

3.4 GEOLOGY AND HYDROLOGY

3.4.1 Geology of Karibib District

The Karibib District, located in central Namibia, is situated within a region of diverse geological formations and historical tectonic events. The geology of the district reflects the complex geological history of the southern African region.

Damara Sequence: The rocks in the Karibib District belong to the Damara Sequence, a complex assemblage of sedimentary, volcanic, and metamorphic rocks formed during the Neoproterozoic to Cambrian periods. These rocks were deposited in an oceanic environment and subsequently deformed and metamorphosed.

Damara Orogeny: The Damara Sequence was affected by the Damara Orogeny, a major tectonic event that occurred during the Pan-African Orogeny. This event resulted in the folding, faulting, and metamorphism of rocks in the region.

Metamorphic Rocks: The district contains metamorphic rocks such as schists, gneisses, and marbles, which were formed through the recrystallization of original rock materials under high pressure and temperature conditions.

Volcanic Rocks: Volcanic rocks, including lava flows and volcaniclastic deposits, are present in the area. These rocks formed during volcanic activity associated with the rifting and opening of the ancient ocean.

Sedimentary Rocks: Sedimentary rocks like sandstones, shales, and conglomerates are also part of the geological record in the Karibib District, representing periods of sediment accumulation and erosion.

3.4.2 Geohydrology of Karibib District:

The geohydrology of the Karibib District is influenced by its geological formations, climate, and water resources. The district faces challenges related to water availability and sustainable water management.

Aquifers: The district contains several aquifers that store groundwater. These aquifers are often associated with fractured rocks and sedimentary formations. The Damara Sequence includes potential groundwater-bearing units.

Unconsolidated Aquifers: In some areas, unconsolidated sedimentary deposits can act as shallow aquifers, providing local water sources for domestic and agricultural use.

Water Scarcity: The Karibib District, like many other parts of Namibia, experiences water scarcity due to its arid to semi-arid climate. Surface water sources are limited, and groundwater is a critical resource for communities and ecosystems.

Groundwater Quality: Monitoring groundwater quality is important, as some areas might have elevated levels of certain minerals or pollutants. Ensuring safe and potable groundwater is essential for public health.

Sustainable Water Management: Sustainable management of groundwater resources is crucial to meet the needs of the local population, agriculture, and industries. Balancing water extraction with recharge rates is vital for preventing overexploitation.

Climate Change Impact: Climate change could potentially impact water availability in the district through altered precipitation patterns, increased evaporation rates, and changing hydrological dynamics.

The geology and geohydrology of the Karibib District are shaped by its complex geological history and the challenges posed by its arid climate. Effective management and conservation of water resources are essential for sustaining both human populations and the natural environment in this region.

4 CHAPER FOUR: PUBLIC CONSULTATION

4.1 OVERVIEW

The public consultation process forms an important component of the Environmental Assessment process. It is defined in the EIA Regulations (2012), as a "*process in which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to, specific matters*" (S1). Section 21 of the Regulations details steps to be taken during a given public consultation process and these have been used in guiding our process.

Formal public involvement has taken place via public consultations and focal meetings, newspaper announcements to inform the public that such a large-scale project is under consideration. The public consultation process has been guided by the requirements of Environmental Management Act (EMA) No. 7 of 2007 and the process has been conducted in terms of regulation 7(1) as well as in terms of the EMA Regulations of GN 30 of 6 February 2012 and the World Bank EIA standards and project ToR.

Its overriding goals have been to ensure transparency in decision making and to.

- ✓ Ensure stakeholder concerns are incorporated in project design and planning;
- ✓ Increase public awareness and understanding of the project and
- ✓ Enhance positive development initiatives through the direct involvement of affected people.

The objectives of the public participation is to build credibility through instilling integrity and of conducting the EIA, Educate the stakeholders on the process to be undertaken and opportunities for their involvement and build stakeholders by establishing an agreed framework accordingly. This requires accessible, fair, transparent and constructive participation at every stage of process. Inform stakeholders on the proposed project and associate issues, impacts and mitigation and using the most effective manner to disseminate information.

In this section of the report, the results of consultations with various classes of stakeholders are summarized. The results of consultations with other stakeholders and community members who took part in this EIA are attached as Appendices.

The consultation was facilitated through the following means:

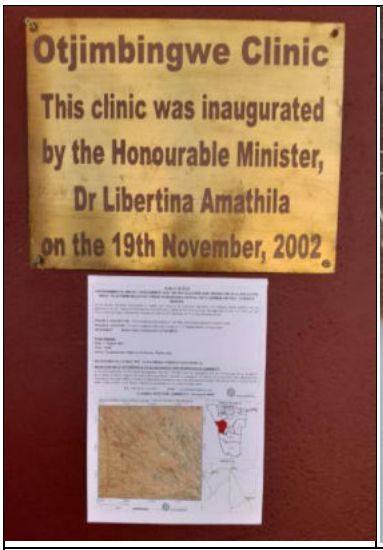
- A Background Information Document (BID) containing the project description, the EIA process and an invitation to participate was shared with stakeholders and community members.
- Invitation to participate notices were published in the local newspapers (Windhoek Observer and Confidante) as shown in the table below and Appendix A of this document.
- Announcement of EIA process verbally in the common public meeting points.
- Placement of a public notice at the project site and various parts of the area (see photos below).

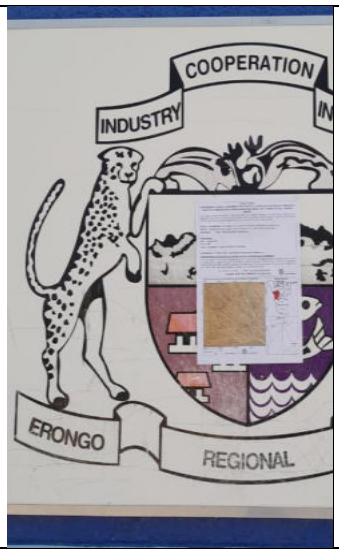
Table 4-1: Details of public notification of the EIA study

Method	Area of Distribution	Language	Date Placed
The Confidante	Country Wide	English	21 & 28 July 2023
Windhoek Observer	Country Wide	English	21 & 28 July 2023
Site notices	Project site	English	14 July 2023
Public Meeting	Tsoaxudaman Traditional Authority in Otjimbingwe	English,	11 August 2023 11h00 am



Site Visit and Assessment





Site Notices

Public Meeting

Figure 4-1: EIA Public Meeting Public Notices and Meetings during EIA process

- ✓ *Key Stakeholder Engagement Meeting*

A public meeting was organised on 11 August 2023 at Tsoaxudaman Traditional Authority in Otjimbingwe. Proof of public consultation is given in Appendix A of this document as well the attendance register explaining the project and the EIA study. Given below are the details of the meeting which was held:

- ✓ *Identification of Interested and Affected Parties (I&APs)*

The EIA team identified and consulted the following I&APs & key stakeholders for the proposed project:

- ❖ Local community leadership and regulatory authorities
- ❖ Community Members.

Other I&APs were allowed to register to the EIA team and compiled a database containing their names and correspondence details. The registration was accomplished over a period of 14 days.

- ✓ *Consultation with Stakeholders*

Experts in relevant fields, leaders of thought in environmental matters, local communities have been consulted for their opinions on issues relating to the potential ecological and socio-economic impacts of the proposed project. This provided an opportunity for stakeholders and the public at large to engage in the process and to make comments or express their concerns regarding the proposed development.

Table 4-2: Key findings of the public consultation process

SUMMARY OF ISSUES	
THEME	**ISSUE**
Economic	▪ Employment of general labour must consider employing local people. ▪ The company must take the social responsibility ▪ Improve the life being of the local residents.
Health and Safety	▪ Waste management concerns including both solid waste and wastewater. ▪ Potential air, noise and water pollution due to development. ▪ The company must provide enough health care to employees
Ecological	▪ Concerns regarding machinery oil spillages and leaks resulting land contamination, surface and ground water pollution. ▪ Hazardous waste (oil contaminated waste materials) should be contained and managed appropriately. ▪ Resources such as air and water should not be polluted during operations because communities, wild animals and livestock rely on these resources.
Communication	▪ Clear communication needs to be promoted between relevant authorities and the local community. ▪ Clarify nature of new property (how it works, what processes involved).

5 CHAPTER FIVE: ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS

5.1 OVERVIEW

The proponent recognizes the importance of undertaking the project operation in line with sustainable development objectives and applicable legal requirements. To this end an Environmental Management Plan (EMP) for the project is being developed in order to address negative environmental impacts and enhance positive impacts. The EMP takes into account identification of potential impacts, assessment of the significance of the risks associated with these impacts and the establishment of preventive actions as well as mitigation measures. The EMP will be monitored, reviewed, and updated as necessary with the aim of continuous improvement, taking into account various changes in project operations, the biophysical environment and socio-economic circumstances.

5.2 ASSESSMENT OF IMPACTS

This section outlines how the overall methodology to assessing the project's possible environmental and social impacts. Each potential impact must be assessed in order to properly evaluate its significance. The definitions and explanations for each criterion are set out below in Table 5-1.

Table 5-1: Assessment Criteria

Duration – What is the length of the negative impact?	
None	No Effect
Short	Less than one year
Moderate	One to ten years
Permanent	Irreversible
Magnitude – What is the effect on the resource within the study area?	
None	No Effect
Small	Affecting less than 1% of the resource
Moderate	Affecting 1-10% of the resource
Great	Affecting greater than 10% of the resource
Spatial Extent – what is the scale of the impact in terms of area, considering cumulative impacts and international importance?	
Local	In the immediate area of the impact
Regional / National	Having large scale impacts
International	Having international importance
Type – What is the impact	

Direct	Caused by the project and occur simultaneously with project activities
Indirect	Associated with the project and may occur at a later time or wider area
Cumulative	Combined effects of the project with other existing / planned activities
Probability	
Low	<25%
Medium	25-75%
High	>75%

(***Adopted from ECC-Namibia, 2017)***

Table 5-2: Impact Significance

Class	Significance	Descriptions
1	Major Impact	Impacts are expected to be permanent and non-reversible on a national scale and/or have international significance or result in a legislative non- compliance.
2	Moderate Impact	Impacts are long term, but reversible and/or have regional significance.
3	Minor	Impacts are considered short term, reversible and/or localized in extent.
4	Insignificant	No impact is expected.
5	Unknown	There are insufficient data on which to assess significance.
6	Positive	Impacts are beneficial

(Adopted from ECC-Namibia, 2017)

Table 5-3: Environmental Impacts and Aspects Assessment

Environmental Impact	Valued Ecosystem Component	Impact	Project Phase	Duration	Magnitude	Extent	Type	Probability	Significance	Infrastructure / Activity
TOPOGRAPHY	Landscape Scenery	Visual aesthetic impact	Construction and Operation	Moderate	Moderate	Local	Direct	Medium 25 - 75%	Minor	Tower construction
SOIL	Soil	Contamination to soil from paints and other potentially hazardous substances	Construction and Operations	Moderate	Small	Local	Direct	Low <25%	Minor	Tower
	Soil	Spillages of fuel, oil and lubricants.	Construction	Short	Small	Local	Direct	Low <25%	Minor	Tower and Access Roads construction
	Soil	Erosion	Construction	Moderate	Small	Local	Direct	Low <25%	Minor	Tower and Access Roads construction
LAND CAPABILITY	Terrestrial ecology	Change in land use	Construction and Operations	Permanent	Great	Local	Direct	Low <25%	Moderate	Tower
	Carrying capacity	Increase in human activities in the environment	Construction and Operations	Moderate	Moderate	Regional	Direct	Low <25%	Minor	Tower
WATER	Surface water quality	Water pollution from oils, lubricants and chemicals spillages.	Construction and Operations	Moderate	Small	Local	Direct	Medium 25 - 75%	Moderate	Construction hydrocarbons
	Surface water quality	Turbidity and high sediment load	Construction	Moderate	Small	Local	Direct	Low <25%	Moderate	Construction hydrocarbons

Environmental Impact	Valued Ecosystem Component	Impact	Project Phase	Duration	Magnitude	Extent	Type	Probability	Significance	Infrastructure / Activity
AIR QUALITY	Air Quality	Construction phase dust	Construction	Short	Small	Local	Direct	Low <25%	Minor	Tower and Access Roads construction
WASTE	Groundwater quality	Hazardous waste such as waste lubricants and stored chemicals may be release into the environment.	Construction and Operations	Short	Small	Local	Direct	Low <25%	Minor	Tower and Access Road construction
	Surface water quality	Threatened from chemicals being washed into nearby rivers	Construction and operations	Moderate	Moderate	Regional	Direct	Medium 25 - 75%	Moderate	Tower and Access Roads construction
	Surface water quality	Construction and Operational solid waste	Construction and operations	Moderate	Moderate	Regional	Direct	Medium 25 - 75%	Moderate	Tower and Access Roads construction and maintenance
FAUNA	Terrestrial ecology and biodiversity	Loss of habitat and driving away of local animals	Construction and Operations	Short	Small	Local	Direct	Low <25%	Minor	Tower and Access Roads construction
	Terrestrial ecology and biodiversity	Destruction of vertebrate fauna (e.g. road kills; fence and powerline mortalities)	Construction and Operations	Short	Small	Local	Direct	Low <25%	Minor	Tower and Access Roads
SOCIAL	Noise Pollution	Increased noise levels	Construction	Moderate	Small	Local	Direct	Low <25%	Minor	Tower and Access Roads
	Socio Economic Activities	Temporary and permanent employment prospects.	Construction and operations	Long	Moderate	Regional	Direct	Medium 25 – 75%	Tower and Access Roads	Tower and Access Roads

Environmental Impact	Valued Ecosystem Component	Impact	Project Phase	Duration	Magnitude	Extent	Type	Probability	Significance	Infrastructure / Activity
	Socio Economic Activities	Climate change impacts	Operations	Long	Moderate	Regional/ National	Direct	High >75%	Positive	Tower and Access Roads
	Contribution to National Economy	Employment, local procurement, duties and taxes.	Construction and Operations	Short	None	Regional/ National	Direct	Low <25%	Positive	Tower and Access Roads
HERITAGE	Artefacts, archaeological high value components	Destruction or affecting paleontological and archaeological artefacts	Construction and Operation	Moderate	Small	Local	Direct	Low <25%	Minor	Tower and Access Roads
HEALTH AND SAFETY	Health Sanitation	Poor ablution and waste management facilities may be detrimental to human health.	Construction	Moderate	Moderate	Local	Direct	Medium 25 – 75%	Moderate	Tower and Access Roads
	Property and human life	Electrocution, fires resulting in fatalities, damage to properties, fires and power surges.	Construction and Operation	Moderate	Great	Local	Direct	Medium 25 – 75%	Major	Tower and Access Roads
	Natural Environment	Spillage/ release of chemicals into the environment	Operation	Moderate	Great	Local	Direct	Medium 25 – 75%	Major	Tower and Access Roads

Environmental Impact	Valued Ecosystem Component	Impact	Project Phase	Duration	Magnitude	Extent	Type	Probability	Significance	Infrastructure / Activity
	Humans, Vegetation, Animals	Potential impacts from non-ionizing radiation propagated by masts.	Operation	Moderate	Small	Local	Direct	Low <25%	Minor	Tower
AVIAN IMPACTS	Air traffic	Air Traffic disturbances	Operation	Moderate	Great	Local	Direct	Medium 25 – 75%	Major	Tower
	Avifauna	Bird fatalities	Operation	Moderate	Moderate	Local	Direct	Medium 25 – 75%	Moderate	Tower
TRAFFIC	Access road	Vehicular accidents	Construction and Operation	Moderate	Great	Local	Direct	Medium 25 – 75%	Major	Tower