PROJECT TITLE:

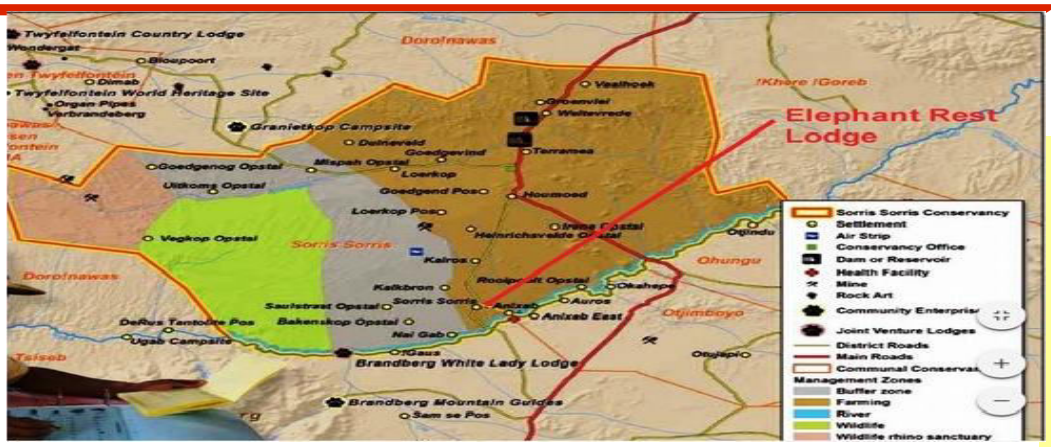
ENVIRONMENTAL IMPACT ASSESSMENT FOR THE CONSTRUCTION AND OPERATION OF A LODGE ESTABLISHMENT ON PORTION THE SORRIS-SORRIS CONSERVANCY AT THE T-JUNCTION OF ROAD D2319 AND THE ROAD TO ANI-#GAB, KUNENE REGION, NAMIBIA

COMPILED BY:
Crowned Eagle Investments Consultants
P O Box 95340
Windhoek
Office: Unit 6A
17 Hahnemann Street
Windhoek West
Email: crownedeagleinvestcc@gmail.com
Cell: +264810358451/0815605122

Environmental Assessment Practitioner Lead Consultant:
Joseph Ihula
Bachelor's Degree in Environmental Health Honours

PROPONENT:
Ms. Cathleen So-oabes
Elephant Rest Lodge Cc

PREPARED FOR: *Office of The Environmental Commissioner*, **Ministry of Environment and Tourism**



Elephant Rest Lodge location

Table of Contents

APPENDICES

3. Area Map
4. Newspaper Articles

CHAPTER ONE: INTRODUCTION AND BACKGROUND OF THE PROJECT

1.1 Background and rationale of the project

The proponent has identified an investment opportunity in Ani-#gab area. They intend to develop a Rest Camp Lodge with parking spaces, bar, restaurant and attendant facilities at 229000-ha conservation area of the Sorris-Sorris Conservancy, ideally located at the T-junction of road D2319 and the road to Ani-#gab. The project is expected to boost tourism in the area and create employment and income for the promoter and the local community.

The principle measure of sustainable development is that all activities, which are carried out to achieve development, must take into account the needs of environmental conservation. The sustainability of the ecosystem requires the balance between human settlement development and the natural ecosystem, which is a symbiotic relationship. This can be achieved through careful planning and the establishment of appropriate management systems. In modern times, the need to plan activities has become an essential component of the development process. Consequently, a number of planning mechanisms have been put in place to ensure that minimum damage is caused to the environment. Environmental planning is also integrated with other planning processes such as physical planning, economic planning, and development planning. Environmental Impact Assessment (E.I.A) is considered part of environmental planning. EIAs are undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority. In Namibia, the competent authority is the Ministry of Environment and Tourism.

As part of the EIA process, it is necessary to devise alternatives to avoid undesirable impacts. Besides the alternative, identification of impacts may also lead to the development of mitigation measures i.e. means of reducing the impacts. As a tool of environmental planning, E.I.A is therefore precautionary in nature. E.I.A is neither antidevelopment nor does it stop

actions, which impact the environment. It only requires that those impacts be considered. Most development activities impact the environment hence a “no impact” interpretation of environmental impact assessment could lead to no development. But a “considerable impact” interpretation of E.I.A will lead to better development. If environmental impacts are ignored, the project may not be sustainable in the long-run, in which case the money invested in it will have been wasted. In this case the proponent intends to construct a lodge at 229000-ha conservation area of the Sorris-Sorris Conservancy, ideally located at the T-junction of road D2319 and the road to Ani-#gab. It has been established that such projects have a potential of causing significant impacts on the environment. It is under this premise that the proponent deemed it necessary to carry out an Environmental Impact Assessment (E.I.A) for the proposed project. Environmental Impact Assessment studies were carried out as per the provisions of the Namibia’s Environmental Assessment Policy of 1995, the Environmental Management Act No. 7 of 2007, Government Notice No. 29 of 2012 (Listed Activities) and the Government Notice No. 30 of 2012 (EIA Regulations). This report is a product of the entire study and will be used in various decision-making platforms including consideration for issuance of an EIA license by the Office of the Environmental Commissioner.

1.2 Objective and Scope of Study

The objective of the E.I.A Study report is to carry out an Environmental Impact Assessment (E.I.A) for the proposed project, to meet the environmental compliances laid down by the Ministry of Environment and Tourism. The scope of report would be as per the E.I.A guidelines outlined by the Namibia’s Environmental Assessment Policy of 1995, the Environmental Management Act No. 7 of 2007, Government Notice No. 29 of 2012 (Listed Activities) and the Government Notice No. 30 of 2012 (EIA Regulations), for new construction projects. Generally, essentially the purpose of this E.I.A is to inform the decision makers, regulatory agencies, required to authorize actions, and the public regarding the anticipated environmental impact of the proposed development Lodge, and possible ways to mitigate them.

The report includes a description of the project setting, a comprehensive evaluation of the site, baseline studies, predicted environmental impacts and governing legislations.

An Environmental Management Plan (EMP) will be prepared, which includes mitigation strategies, as well as measures and recommendations for the effective management of the impact of the project on the natural, social and economic environment.

1.3 Need for the Project

Namibia is generally described as a country of contrasting landscapes varying from the greenery in the extreme Northern regions, the animal variety and savannah landscape in North Central and Central regions and the desert, which transforms into the beach and finally the Atlantic Ocean in the Coastal Region of Erongo. This fascinating landscape complemented by a stable environment ensuing in the country has been a key point to the growth of tourism in Namibia. According to the World Tourism Organization (UNWATO)'s World Tourism Barometer 2012, Namibia is ranked in the top ten with a 4.4% growth. This growth is in line with tourism industry growth in sub-Saharan region of Africa, which is experiencing a marked increase in tourist arrivals. By 2011 Namibia was commanding more than one million tourists, a figure which is very healthy. Like said before, Ani#gab and the surrounding areas don't have any meaningful tourist attractions due to lack of meaningful tourist centres. With the Sorris-Sorris Lodge, which is quite expensive, one wouldn't expect any meaningful tourist visits. This is an opportunity that Elephant Rest Lodge will uniquely close by having beatified scenery, natural experience of the beautiful mountains and wild animals as well as the normal accommodation and entertainment facilities.

The combination of diversity attraction scenery, wildlife and cultural experience push accommodation as the entire visitors will need somewhere to sleep. According to the same document (Namibia Tourist Exit Survey 2016), tourist preferred using B&Bs, and Rest Camps more than any other type of accommodation

According to the Namibia Tourist Exit Survey 2016, 27,9% of the tourists who visit Namibia visit the Northern parts of Namibia and surrounding areas. Of the 23% who visit this area, 8.5% visit for holiday purposes. This is the group from which visitors to the cultural Elephant Lodge will be drawn. Namibia had 1.4 million visitors in 2016, meaning that 378,000 of them visited Northern Namibia and the surrounding areas.

The hospitality industry, for the past couple of years, has been responding to the growth in the overall tourism industry. To date, the industry has a variety of establishments capitalising on the tourism boom and spread throughout the country based on the tourism activity in the different regions.

Performance of these facilities as measured by occupancy rates has been on the increase for the past few years as the government and the country in general has taken a drive to promote tourism in Namibia. The increases have also been a direct result of cessation of wars in the country and its neighbour, Angola. Thus, on average, the occupancy rates for all categories in the hospitality industry have been increasing. This shows that the market is in the growth phase and Elephant Rest Lodge can utilise on this expansion.

Elephant Rest Lodge is in the hospitality sector as well located in a community conservancy area, which makes it fall under the hospitality and tourism industry. The lack of any similar accommodation facility in the conservancy will distinctively make Elephant Rest Lodge a very different area to visit.

It is estimated that the Elephant Rest Lodge will achieve an average of 66% - 83% occupancy rate.

1.4 Terms of Reference

The terms of reference for the preparation of an E.I.A study report were:

- A critical look into project objectives
- The proposed location of the project site
- Description of project objectives.
- A concise description the national environmental legislative and regulatory framework, and any other relevant information related to the project
- Evaluation of the technology, procedures and processes to be used in the implementation of the project
- Evaluation of materials to be used in the construction and implementation of the project and their extended sources

- Description, evaluation and analysis of the foreseeable potential environmental effects of the project broadly classified into physical, ecological/biological and socioeconomic aspects which can be classified as direct, indirect, cumulative, irreversible, short term and long-term effects.
- Evaluation of the products, by-products and wastes to be generated by the project
- To propose/recommend a specific environmentally sound and affordable liquid and solid waste management system
- Evaluation and analysis of alternatives including the proposed project, project alternative, project site, design and technologies
- An Environmental Management Plan (EMP), proposing the measures for eliminating/minimizing or mitigating adverse impacts on the environment,
- Propose measures to prevent health and safety hazards and to ensure security in the working environment for the employees, residents and for the management in case of emergencies. This encompasses prevention and management of the foreseeable accidents and hazards during construction phase.

1.5 General Approach

A team of experienced environmental professionals was assembled to conduct the scope of report highlighted above, as required by MET. An iterative approach among the team members and other project professionals was adopted, facilitated by weekly team meetings as required. The E.I.A team worked very closely with proponents, project Architects and engineers. Baseline data for the study area were generated using a combination of:

- Field studies
- Analysis of maps, plans, aerial photos
- Review of reports and background documents
- Desk Top Studies
- Structured interviews
- Public Consultative meetings

This project report provides relevant information and environmental considerations on the project proponent's intention to seek approval from MET for the construction and completion of the development.

1.6 Scope of Report

The Environmental Impact Assessment for the Lodge will include but not limited to:

- Provision of a comprehensive description of all components of the project and the work to be undertaken during the project.
- Give an overall assessment of the existing physical and biological environment of the proposed development area.
- Present a socio-economic and cultural evaluation of the proposed development area and its surroundings.
- Identify and assess the potential impact of the project on the surrounding area, particularly as it relates to the cumulative impacts of this project on any existing developments.
- Assess the drainage structure, particularly with respect to existing natural drainage channels, proposed man-made drainage/water features or any proposed changes in topography. Potential impacts of increased surface runoff and sediment loading will also be addressed.
- Describe the construction methods to be employed during the proposed works.
- Describe the mitigation measures to be employed during the proposed works.
- Outline disposal of solid, liquid and any hazardous waste during the construction and operational phases.
- Determine the method, level and location of the sewage disposal facility and the potential impact of disposal on the environment.
- Give the timelines/scheduling for individual tasks to be undertaken.
- Detail an environmental Monitoring and Management Plan.

The Lodge will be developed on the said piece of land that the developer already owns. The Architectural plans have been submitted for approval by all the relevant authorities. For full implementation of the project, the following prerequisites will be met:

- Acquisition of funding to complement the developer's contribution.
- Appointment of established competent and capable contractors and consultants to undertake the development.
- Acquisition of approvals from the relevant authorities.
- Acquisition of EIA clearance certificate.

After the pre-requisites are met the proponent will then commission the development as is planned.

CHAPTER TWO: POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

The Table 1 below summarises the legislation and policy guidelines that are relevant to the proposed project and is not exhaustive.

Table 1: Relevant legislations and policy guidelines

Title of legislation, policy or guideline	Implications for proposed project (Please read all Acts with their Regulations)
The Namibian Constitution of 1990	The Constitution clearly indicated that the State shall actively promote and maintain the welfare of the people by adopting policies aimed at management of ecosystems, essential ecological processes and biological diversity of Namibia for the benefit of all Namibians, both present and future.
Environmental Assessment Policy of Namibia (1995)	The Policy seeks to ensure that the environmental consequences of development projects and policies are considered, understood and incorporated into the planning process, and that the term ENVIRONMENT is broadly interpreted to include biophysical, social, economic, cultural, historical and political components.
Environmental Management Act No. 7 of 2007	The Act provides a list of projects requiring an Environmental Assessment. It aims to promote the sustainable management of the environment and the use of natural resources and to provide for a process of assessment and control of activities, which may have significant effects on the environment.
MET Policy	This document contains the approved Ministry policy for providing support

Document Community-Based Tourism Development (June 1995	to, and encouraging the development of, community-run tourism activities and enterprises on communal land. This policy document provides a framework for ensuring that local communities have access to opportunities in tourism development and is able to share in the benefits of tourism activities that take place on their land. Support for the involvement of rural communities in tourism enterprises is important: To implement the government policy of giving communities access to development opportunities and because where tourism is linked to wildlife and wild landscapes, the benefits to local communities can provide important incentives for conservation of these resources.
Act No.5, 1996 Nature Conservation Amendment ACT, 1996	This amend to the Nature Conservation Ordinance of 1975, provide for an economically based system of sustainable management and utilization of game in communal areas. This amend allows for the formation of Conservancies in communal areas.
Water Resources Management Act No. 11 of 2013	This Act protects all water resources in Namibia. The Act also laid down conditions to ensure that proper wastewater treatment is provided, including requirement for wastewater discharge permit from the Directorate of Water Affairs.
Hazardous Substances Ordinance No. 14 of 1974	The Ordinance applies to the manufacture, sale, use, disposal and dumping of hazardous substances, as well as their import and export. Its primary purpose is to prevent hazardous substances from causing injury, ill-health or the death of human beings. Hydrocarbons handled during the construction phase may be hazardous thus careful handling and

	management is vital to prevent spills, explosions, ill-health or death.
Forest Act No. 12 of and its amendments	The purpose of this Act guides the use and management of forestry and related resources. The aims of the forest management as per the Act, is to achieve manage of forest "for which forest resources are managed and developed, including the planting of trees where necessary, to conserve soil and water resources, maintain biological diversity and to use forest produce in a way which is compatible with the forest's primary role as the protector and enhancer of the natural environment."
Pollution Control and Waste Management Bill of 1999	The Bill promote sustainable development and the establishment of the Pollution Control and Waste Management Unit; to prevent and regulate the discharge of pollutants to the air, water and land; to make provision for the establishment of an appropriate framework for integrated pollution prevention and control; to regulate noise, dust and odour pollution; to establish a system of waste planning and management; and to enable Namibia to comply with its obligations under international law in this regard.
National Waste Management Policy, 2010	This policy is focusing specifically on Waste Management and use of various technologies waste treatment and disposal to minimize health risks. It is also geared to have a unified waste management system countrywide. This policy provides the necessary guidance on the processes related to waste management in the MOHSS, wider Namibia health and social welfare sectors, and other relevant stakeholders. It is taking into consideration the process of integrated waste management from generation to final disposal. This practice also focuses on medical, household, mining, agricultural, and construction waste.
Draft Wetlands Policy of 2004	This policy strives to complement existing policy instruments regarding sustainable development and sound natural resource management in Namibia. Its implementation provides a platform for the conservation and

	wise use of wetlands, thus promoting inter- generational equity regarding wetland resource utilisation. Furthermore, it facilitate the Nation's efforts to meet its commitments as a signatory to the International Convention on Wetlands (Ramsar) and other Multinational Environmental Agreements (MEA's
National Heritage Act No. 27 of 2004	The Act 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.
Labour Act No. 11 of 2007)	Consolidate and amend the labour law; to establish a comprehensive labour law for all employers and employees; to entrench fundamental labour rights and protections; to regulate basic terms and conditions of employment; to ensure the health, safety and welfare of employees; to protect employees from unfair labour practices; to regulate the registration of trade unions and employers' organisations; to regulate collective labour relations; to provide for the systematic prevention and resolution of labour dispute; to establish the Labour Advisory Council, the Labour Court, the Wages Commission and the labour inspectorate; to provide for the appointment of the Labour Commissioner and the Deputy Labour Commissioner; and to provide for incidental matters.
Public Health Act, No. 36 of 1919 and Amendments and Regulations	This Act makes provision for the prevention and control of infectious diseases, venereal diseases and epidemics. It also regulates sanitation, food and public water supplies.
Namibia Tourism Board	To establish the Namibia Tourism Board and to provide for its functions; to provide for the registration and grading of accommodation establishments;

Act 21 of 2000	to provide for the declaration of any sector of the tourism industry as a regulated sector and for the registration of businesses falling within a regulated sector; and to provide for matters incidental thereto.
National Policy on Climate Change for Namibia, 2010	In harmony with the findings of the IPCC over time and the Earth Summits being held annually the policy seeks to outline a coherent, transparent and inclusive framework on climate risk management in accordance The proposed project will ensure that there will be limited release of greenhouse gasses such as methane, carbon dioxide, and nitrous oxides. Methods such as wet surface operations to reduce dust

CHAPTER THREE: PROJECT DESCRIPTION, DESIGN ENVIRONMENT AND CONSTRUCTION

3.1 Ownership

The Elephant Rest Lodge is a newly established and registered 'Close Cooperation', its sole member being Ms. Cathleen So-oabes.

3.2 Location

The proposed project will be located within the 229000-ha conservation area of the Sorris-Sorris Conservancy, ideally located at the T-junction of road D2319 and the road to Ani-#gab.

This is approximately halfway between the old mining town of Uis and the World Heritage Site Twyfelfontein. "Sorris-Sorris" is the Khoe-khoegowab expression for an "abundance of sunshine".

The Sorris-Sorris district has an approximate population of 1300 people. The geographical features are composed of an arid area receiving 25 mm average annual rainfall, thus has sparse grass cover and trees, mostly along dry river course, landscape of hills and plains descending to the scenic Ugab River.

Livelihoods in the area generally focus on farming, which is inhibited by low rainfall. Most farmers focus on a mix of cattle, goats and sheep, and small gardens are maintained by many households. Income from employment, pensions and remittances supplements the farming income for many residents. The existing conservancy is providing new livelihood choices by encouraging tourism, as well as enabling other natural resource use options. While the conservancy is currently not in a position to distribute cash payments to residents, it is generating a variety of benefits. The conservancy has created a number of jobs and is facilitating employment in the tourism and trophy hunting industries.

The proposed Guest Lodge is going to promote tourism in the area as well as provide for an opportunity for job creation to the local residents in Sorris-Sorris/Ani#gab. The service station

is also motivated by the recent establishment of a camp area which will soon be upgraded to a fully fletched lodge facility. This all in all will boost tourism and increase economic activities in the area

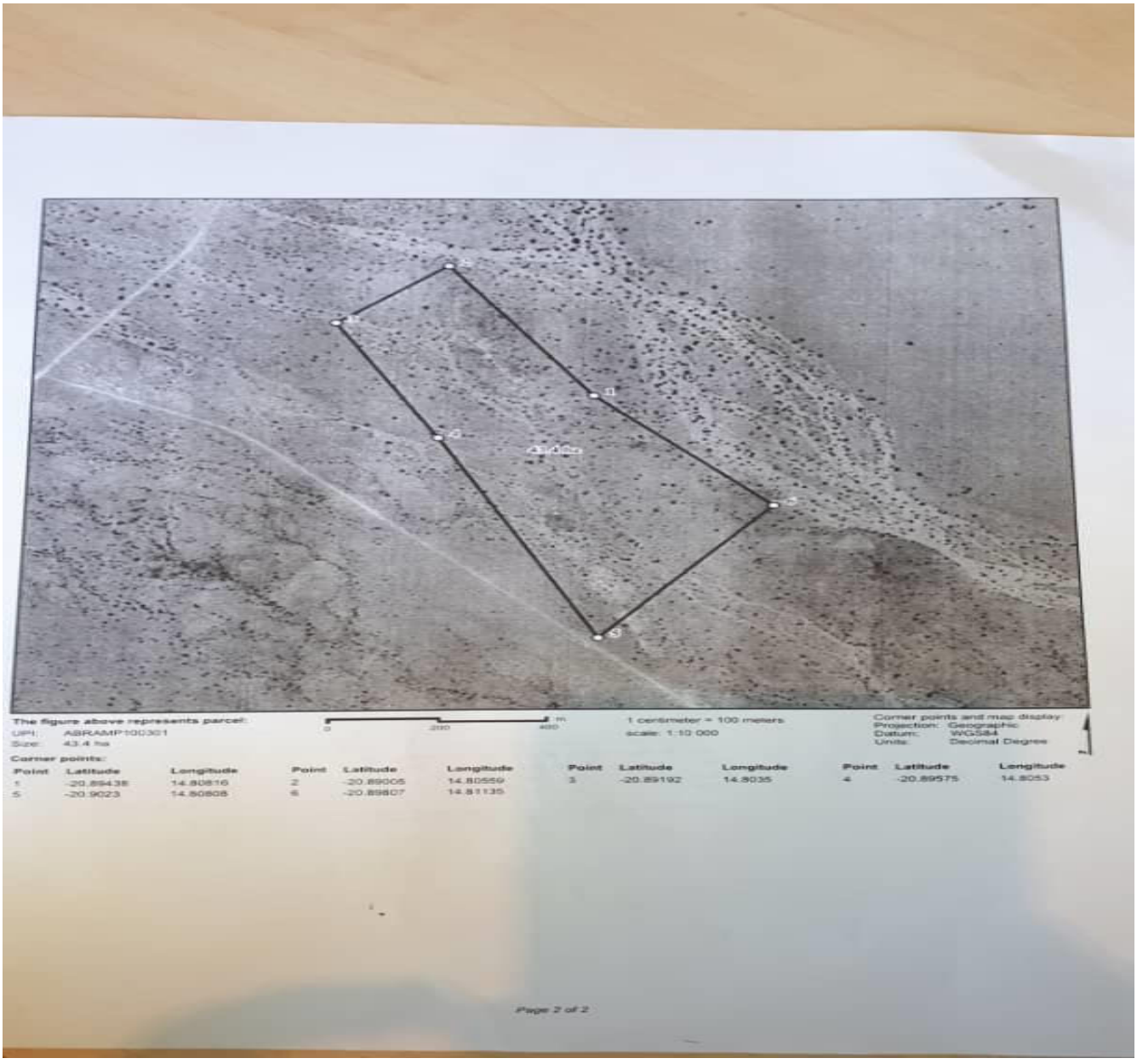


Figure 1: The location of the proposed project

3.2.1 Climate

Average Rainfall: Sorris-Sorris has an arid to semi-arid type of climate receiving an average rainfall of 25 mm and lowest being 0 mm per annum. Rainfall events are sporadic and unpredictable, high intensity, highly localised storm events between October and April. Precipitation is the lowest in July, with an average of figure of 0 mm.

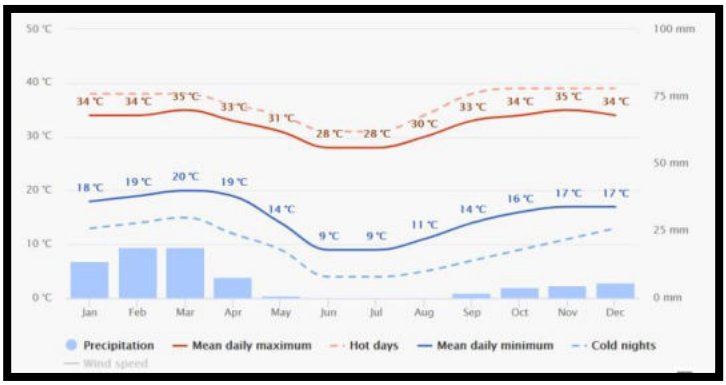


Figure 2: Typical yearly average rainfall graph for Sorris Sorris Average Evaporation: Evaporation in the area is noted to be varied depending on the rainfall and temperature, normally there is a fluctuation in evaporation. Evaporation in the area is averaged 3000 to 3200 mm.

Wind Directions: Wind blow from Northwest to Southeast and Northeast to Southwest on an average record of 19 mph, experiencing strong wind during dry season between July – September. ***Humidity:*** Relative humid conditions occur during rainy season, from January to March with 48% and from October to December. Rainfall and temperature determine the variation in humidity. ***Temperature:*** Summer is from October to April and temperatures can reach 40º C, which plummets at night to cool levels. Average daily temperatures range from 20 to 34º C. Winter is from May to September with wonderful warm days which are contrasted by very cold nights, when temperatures often drop to below freezing.

3.2.2 Vertebrate Fauna and Flora

3.2.2.1 Flora

Potential vertebrate flora associated with the general area commonly in the project area– albeit broadly – referred to as the Mopane Savannah (Giess 1971) while Mendelsohn *et al*. (2002) refers to it as the Western Highlands. The vegetation structure encompasses grasslands and scattered trees (Mendelsohn *et al*. 2002).

The savannah biome of Sorris-Sorris area is located forms part of protected areas network in Namibia covering 37% of the land area, but only 7.5% of the biome (Barnard 1998). The Huab and Ugab Rivers which are less than 20km from the project site are viewed as sites of special ecological importance due to their biotic richness; large desert dwelling mammals and high value for human subsistence and tourism while the entire Kaokoveld is viewed as a major tourism area with distinctive values including its high endemicity; habitat and cultural integrity threatened by tourism pressure. This biotic richness is mostly associated with the intersections of the rocky terrain and major ephemeral river courses in the area.

The proposed project is within the shrub Mopane Savannah biome, as the name implies, is characterised by Colophospermum mopane in trees and shrubs form while the grasses are varied and dependant on soil types (Giess 1971). Larger trees are mainly associated with the various drainage lines whilst shrubs dominate the plains. Grasses are dominated by Entoplocamia aristulata, Stipagrostis hirtigluma and Schmidtia kalahariensis (Giess 1971) as inferred by (Cunningham, 2017).

The proposed project development will have minimal impacts on flora because the project area is already disturbed. There are no sensitive environs threatened by the project, this is because the site is just within the surroundings of the conservancy Office and several homesteads.

Figure 3: Site view of the proposed location

3.2.2.1 Fauna

The booming tourist business in the Kunene region and the subsequent establishment of Sorris-Sorris Conservancy has seen wildlife numbers in the area including surrounding communal areas rebounding from historic lows prior to independence.

Sorris-Sorris conservancy area is home to a diversity of mammals, rodents, birds, reptiles and amphibians. Existing in the environs are also large game such as Rhinos, different species of elephants, giraffe, Hartmann's mountain zebra, kudu, gemsbok, springbok, duiker, steenbok, klipspringer and ostrich. Large carnivores including lions, leopards, cheetahs and caracals, spotted and brown hyenas and jackals are spotted occasionally in the wild desert. A high degree of endemism has developed along the Namibian escarpment and of late was the recent spotting of the white Giraffes. The exact project area environs according to the Sorris-Sorris Conservancy Land use map, it is not under classification of a sanctuary for habitat of certain animal's species.

The project will be expected to be of negligible impact on the existing animal diversity. Below is an illustration of the current tree species on site. The project area is not sited with a significant surface water zone. The study area lies within the most arid part of the country were the mean annual rainfall is less than 50mm per annum. The area has a deep-water table because of the geological rock formations in the area and the dry nature of the environs. The

proponent will sink a borehole, which will ensure water supply to the guest lodge and campsite, the and other surrounding households and for animal consumption.

3.2.3 Surface and Groundwater

There are no perennial or ephemeral riverbeds within the project site, The Huab and Ugab Rivers, which are more less 20km from the project site, will not be affected by the construction and operation of the guest house. The proposed project will have little or no significant impact to general area hydrological drainage, and thus the project will have a relatively low impact on surface and ground water. Measures to address groundwater pollution during construction phase will be put in place in the EMP developed for this project and forming part of this ESR.

3.2.4 Pedology & Geology

Areas within Sorris-Sorris conservancy are underlain with lithic leptosols soils, which are characterized as very thin and shallow sandy soils (Mendelsohn *et al* 2002). Leptosols are formed in actively eroding landscapes, especially in the hilly or undulating areas that cover much of southern and northwestern Namibia.

These coarse–textured soils are characterized by their limited depth caused by the presence of a continuous hard rock, highly calcareous or cemented layer within 80cm of the surface. The Leptosols are therefore, the shallowest soils to be found in Namibia and they often contain much gravel and sand. As a result, their water-holding capacity is low and vegetation in areas in which they occur is often subject to drought.

Rates of water run-off and water erosion can be high when heavy rains fall. Moreover, these soils can support low densities of livestock and wildlife. The soils are even much thinner in the claim vicinity due to exposed hard rock material. The baseline study on site identified sandy soils covering the greater area of the project site and its surroundings.

The general geology is distinguished by the Epupa lithological unit the project site is surrounded by the younger Otavi, with the Swakop and Karoo lithological units to the south. The Epupa, Huab, Abbabis Metamorphic Complexes (Cx), which are predominately

consisting of para-/orthogneiss, metasedimentary rocks, amphibolite dykes with local, foliated intrusive granites. These metamorphic complexes are believed to be of Palaeoproterozoic age, (Miller 2008). These metamorphic complexes being the oldest rocks in Namibia, forming part of the basement and only outcropping in these regions of Namibia.

These rock units in some cases can produce economically valuable deposits of base and precious metal such as gold, copper, lead and zinc, which explains why in Sorris-Sorris conservancy there are several mining areas that are decommissioned or are still in operation. Granite rock outcrops can be seen near the project site, and to the west a kopje of granite regolith can be observed. These rock types also explain the predominance of sandy soils in the area.

3.2.5 Topography

Generally, the Sorris-Sorris conservancy area has an undulating landscape, with rises occasionally, and the mining area rises on a mountain ridge. Further North and Western side of the site are high hilly and mountainous landscapes that stretch to as far as Opuwo and part of the Grootberg stretch. The proposed project site has a generally flat terrain, which also gives less potential for pollution attenuation in case of groundwater pollution.

3.3 Construction design

The lodge will consist of 10 shaded camp units and 5 open campsites units, a main house, a kitchen house and maintenance as well as a staff accommodation building. Special features will be a rock lapa / bar with the add-on that no vehicles will be able to get into the close vicinity of the lodge buildings. Guest vehicles will be parked in an area that does not obstruct the view as well as the general 'touch and feel' of the lodge operations. The construction of the different buildings will be a mix of units made of stones found on site as well as clay or sandbag units.

3.4 Services

In line with the major change that is happening in tourism in Namibia since the ATTA Conference in 2013, as well with changing guest expectations towards adventure tourism the

USP's of the Elephant Rest Lodge with the 'Small 5', the 'micro biodiversity', hiking and cultural adventure of the surrounding desert farming environment.

The vision of the Elephant Rest Lodge will be guided by offering a programme that makes the transition from a consuming visitor experience to a participating guest adventure!

This activity transition will include:

- The food offered to be locally sourced and of organic cultures
- A participatory approach in the cultural activities offered
- A high priority focus on 'local is lekker'

To underline the 'eco' nature of the lodge, the following environmentally sustainable practices will be implemented

- Solar power & solar water heating & solar cooking
- Recycling of waste water including re-use of recycled water for toilets
- Separation of waste and recycling as well as composting
- Organic gardening
- Use of non-toxic biologic cleaning detergents

3.5. Water

During the construction stage, water will be sourced from the Ani-#gab village using trucks container trucks and stored in tankers. However, the first stage of the construction involves drilling of a borehole on the site.

3.6. Power

Currently there is no power connection at the site or a nearby power line. Therefore the initial days a generator will be used for power while the project team will be installing a solar power system at the site.

3.7. Sewage System

The proposed site lacks an existing sewer line. During construction, a temporary toilet is proposed to dispose waste from the workers. The site will have an elaborate sewer system. Construction activities will include the following;

- Excavation works and Foundation laying
- Construction works for the Lodge.
- Setting up the sewerage treatment works
- Fitting the utilities for the building
- Procurement of construction materials from approved dealers
- Storage of the construction materials
- Transportation, storage of construction materials and disposal of the resulting construction wastes/debris using light machinery.
- All required kinds of works will be done by registered expertise.

The project will begin after the Ministry of Environment and Tourism issues an approval to the proposed project and the financiers release funds. It is estimated to take approximately 12 months to complete.

3.8 By Products and Disposal Methods

In all construction projects, some waste or by products are usually produced on the project site. These wastes include; broken glasses, pieces of broken tiles, nails, pieces of broken wood and pieces of roofing materials. The contractor will emphasize on efficiency to minimize construction wastes. The removal and disposal of such refuse and other related wastes come in handy. The contractor will work hand in hand with the local community to facilitate waste handling and disposal from the site. The wastes will be disposed off into the approved dumpsites.

CHAPTER FOUR: DESCRIPTION OF THE EXISTING AND ANTICIPATED IMPACTS

4.1 Existing Impacts

There are hardly any negative environmental impacts on the site at the moment, except some little noise from vehicles plying Khorixas – Ani-#gab Road.

4.2 Anticipated Impacts

Impacts can be positive or negative, direct or indirect. The magnitude of each impact is described in terms of being significant, minor or negligible, temporary or permanent, long-term or short term, specific/localized or widespread and reversible or irreversible.

4.2.1 Positive Impacts of the Proposed Project

The proposed development will have positive impacts to the society and the general environment. Some of benefits include the following:

- Creation of market and wealth to the local people through selling of cultural and traditional products and services to the tourists.
- Provision of employment during construction and occupation stage
- Maximum utilization of the plot
- Provision of affordable high-quality rest camp lodge.
- Creation of employment for office management, security services and other business to support the offices
- Economic-investment hence wealth creation for the proponent.

4.2.2 Negative Impacts of the Proposed Project

Against the background of the above positive impacts, there are a few negative drawbacks that are anticipated mostly during the construction and occupation of the project. They include the following:

- Impact to soil (soil erosion and degradation) especially when laying the foundation
- Change in land use
- Destruction of the sensitive habitat
- Noise pollution
- Increased use of energy
- Increased vehicular transport
- Increased waste generation (both solid and liquid).
- Loss of vegetation on the site
- Air pollution as a result of dust particles emanating from construction activities.

Exhausts from the involved machinery will lead to increased levels of noxious gases such as Sulphur, carbon and nitrogen oxides

- The health and safety of workers and immediate residents/neighbours may be compromised due to accidents, pollution and disturbance
- Need for parking spaces
- Human-Wildlife conflict

4.2.3 Anticipated Environmental Impacts

On the basis of information gathered during the field study, potential impacts of the project are tabulated below. The effects of any form of impacts can be minimized by having an idea of the magnitude of each before the project is implemented. The magnitude of each impact is described in terms of being significant, minor or permanent, short-term or long term, specific (localized) or widespread, reversible or irreversible. Most of the impacts have been addressed in the proactive design of the project and other mitigations can only be guaranteed through

active and responsible management committed to the propositions of the environmental management plan.

Table 2: Assessment criteria of significant impacts

Key	Type of impact	Key	Type of impact.
++	Major positive impact.	+	Minor positive impact.
- -	Major negative impact	-	Minor negative impact.
0	Negligible/zero impact	NC	No change
Sp	Specific/localized	W	Widespread.
R	Reversible	Ir	Irreversible.
Sh	Short term.	L	Long term.
T	Temporary	P	Permanent

The table below gives the potential environmental issues and impacts of the project. The impacts are relative to the information gathered during site visits, observation of the general area and consideration of the general construction activities/works.

Table 3: Assessment criteria of significant impacts

Impacts on Or due to:-	Construction	Occupation	Remarks
Increased Employment Opportunities	**++**	**++**	The development will create additional job opportunities for the local community members of the Conservancy and especially for the Ani-#gab village residents. At preparatory, construction and operational stages, local village and Conservancy members will be employed and consequently

			livelihood support for family members will be improved (short-term and long-term) – in particular as on average support from one job benefits five family members
Increase in Local Population	-	-	The development will not have a significant impact on the population size of the area. The proposed development will source a very small number of highly skilled personnel from outside the Conservancy and local community during the construction phases. All semi-skilled and unskilled staff will be employed from the village/Conservancy and appropriate training provided. Hence, having staff members at Elephant Lodge that are skilled. Human presence in the remote project site will though increase. It is not expected that this increase of human presence will significantly negatively impact the wildlife or diminish the eco-tourism experience in the area. It is however expected that this increased human presence will help to manage the currently largely unmanaged campers
Increase in Local Economic Activities	+	+	Trading opportunities among the local people are expected to increase. Food and other household necessities will be sold to the camp and its staff, providing both a short-term and long-term positive economic activity. Increased employment numbers within the village/Conservancy will also support local trade through increased income in the area, including sale of handcrafts.
Water Supply	-	-	The development is unlikely to put pressure on

Availability			water demand in the area and will not overwhelm the groundwater resources, as campers are known using water sparingly and they spend most of their time in the field.
Loss on Cultural Site	**-**	**-/0**	No significant impact determined. It has become clear that well managed eco-tourism activities in Conservancies, has no significant impact and can enhance cultural activities and promote their preservation by linking the camp with the cultural tours into the community.
Increased Demand for Health Services	**+**	**-**	During construction and operations, all occupational health related injuries will be referred to the local health facilities for immediate attention, at Ani-#gab village clinic. This will not have a significant impact on the capacity of the staff and facilities to meet the demand for health care, since most of the employed people will be from the area and already reside there. HIV and AID programs for the Contractors, Camp Staff and for the local communities will need to be developed and provide so to ensure that all participating people are not exposed to increased risk of HIV spread
Worker Safety			During the construction and operation phases, light machinery will be employed for the digging and putting up associated infrastructure. Absence of clear safety guidelines may lead to accidents affecting worker's safety and productivity, however, this will not be the case during the construction of this development and clear safety

			guidelines will be available and all workers will be briefed and trained accordingly, taking into consideration that the activity is inside the Park and the risk of wild animal.
Displacement of people	**0**	**0**	No impact, as it is in the Conservancy.
Machinery noise and vibration	**+**	**0**	During the construction and operational phases, noise and vibrations from the vehicles and machineries will result into noise and vibration. This impact will be insignificant to Wild animals. The construction workers are the most vulnerable and therefore they should wear protective gear
Changes in Land use Extent.	_	-/0	The proposed project will have an impact on the current land use. The proposed location of project is within farming or animal grazing areas. However, due to consistent droughts farming activities had decreased around the area. Therefore, the proponent will work together with the farmers around to ensure that the lodge does not great impact to the farming activities as well ensuring mutual benefits.
Loss of Wildlife Habitat, Indigenous Flora and Fauna	-	-	The project site will not interfere directly with any existing wildlife routes, browsing and grazing area. However, limited loss of some terrestrial wildlife habitat and flora is expected. However, given the size of the proposed development in relation to the larger landscape, this can be considered insignificant

Pollution: Air/dust Noise Oil waste.	-t r - t r - Sh 0	0 - 0 0	During construction, dust and exhaust emission will be generated from the construction activities, concrete mixers and workers will generate noise and vibration that may have negative effect to the neighbourhood. Petroleum oils and grease used in vehicles and construction machinery may spill or leak on/into the ground but these will be very negligible. Sound and up to date pollution control Measures will be put in place.

Site drainage	0	0	Storm water will result from the roof catchments of the proposed Hotel Block, paved areas such as parking lots and drive ways. Due consideration has been paid to the surface drainage systems of the site and roof catchments. Landscaping is encouraged.
Soil erosion	0	0	Soil erosion is not a problem at the site
Construction Materials	_	0	Building stones will be required for the construction of the rooms. Other materials will include piping, tiles, wood etc. All these will be sourced from suppliers who deal in them. Undesirable, hazardous or Unauthorized materials should not be used

4.2.4 Social Impact Assessment

People within the project site and its area of influence were informed of the proposed development. There was no objection to the proposed project by the residents and other stakeholders in the project area. Most residents welcomed the idea and also commented on some issues of concern. A summary of the resident's comments is as follows:

- The proposed project will generally improve the value of the project site.
- There will be enough offices for the high demand.
- Provision of business space for commercial services that are needed
- The construction of the offices will create employment opportunities for residents of the area.
- Construction noise, change in land use and high-water intake during construction was raised as issues of environmental concern in general.

The residents who commented on this proposed for sound mitigation measures.

CHAPTER FIVE: PUBLIC CONSULTATION

Public Consultation forms an important component of the Environmental Assessment process. It is agitated for in the EIA Regulations (2012), 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 newspaper adverts, site notice and registering I & APs. 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.

5.1 PUBLIC CONSULTATION ACTIVITIES

The following tasks have been undertaken during public consultation process, which started October 2020.

5.1.1 Identification of Interested and Affected Parties (I&AP's)

After the scoping process, the EIA team identified I&AP's and key stakeholders of the proposed project. The public participation activities to be undertaken for this EIA process were incorporated into the overall approach of the EIA background information. Among key stakeholders identified were Ani-#gab community leaders, Ministry of Agriculture Ani-#gab, Sorris-Sorris Conservancy Management Committee, the local school, farmers, local clinic and local neighbours. Other I&AP's could register to the EIA team and a special database created capturing all their names and correspondence details.

5.1.2 Distribution of BID

A Background Information Document (BID) was distributed on request by I & A Parties and it was distributed to key stakeholders identified during the scoping process. The Background Information Document (BID) provided a description summary of the proposed project, and the project proponent and the whole procedure of the EIA to be followed.

5.1.3 Public Announcement

An extensive public announcement was done to make sure the public is aware of proposed development. The EIA study was announced publicly through the following means:

Table 3: Details on public notifications of the EIA study

Method	Area of Distribution	Language	Date Placed
The Namibian	Country Wide	English	18 November and 26 November 2020
Site notices	Ani-#gab Community Hall	English/Afrikaans	18 November 2020

5.1.4 Public Participation meeting

A public consultation meeting was conducted on 28 November 2020 at Ani-#gab Community Hall. The meeting date was proposed by the identified I & A Parties after the distribution of the BID document. The meeting was attended by … and all identified I & A Parties attended (see attached attendance register).

Figure 4: Public consultation meeting at Ani-#gab village community hall

During the public consultation meeting no objections were raised against the project. The community and the I&APs welcomed the project and was seen as a boast to the economic and social growth in the area. The outcome of the meeting has shown that the project will create employment to the residents, generate income for the residents through the tourists who will be finding accommodation at the guest lodge. The community further requested the proponent to plough back to the community through Social Corporate Responsibilities by providing drilling a borehole for their animals and the wild animals in order to reduce the human-animal conflict that is affecting the community which is caused by wild animals especially elephants that invade the community looking for water. In addition, the Ministry of Agriculture emphasised that the proposed area is within farming area, therefore, the proponent should consider environmental factors that has impact on animal health such as waste management, especially plastics. This concern was addressed in the Environmental Management Plan in chapter 8.

CHAPTER SIX: ISSUES OF CONCERN AND MITIGATION MEASURES

6.1 Occupational Health and Safety (OHS)

During construction, there will be increased dust, noise and air pollution. The immediate neighbours and workforce involved would be more subjected to these environmental hazards. Food for the construction workforce is usually provided by mobile individuals who usually operate without licenses. This can compromise health of the workers especially if foodstuffs are prepared in unhygienic conditions.

Mitigation Measures

- The contractor should have workmen's compensation cover. It should comply with Labour Act, as well as ordinances, Regulations and Union Agreements.
- A first aid kit should be provided within the site. This should be fully equipped at all times and should be managed by qualified person.
- Adequate sanitary facilities will be provided and standard cleanliness maintained.
- Workers will be encouraged to prepare their own food at the site, maintaining hygiene.
- Workers to be trained on personal safety to avoid accidents.
- All workers should be provided with full protective gear. These include working boots, overalls, helmets, goggles, earmuffs, masks and gloves.

6.2 Increased Water Demand

Water is a major concern especially in construction sites. The proposed development may cause some strain to the existing water source since construction activities are known to be heavy water consumers. Occupation of the developments will bring about an increase in water consumption. The proponent will ask for permission from the Ani-#gab village

community leaders to fetch water from the community water sources in the initial days. Water will be stored at the site in storage tanks.

Mitigation

- There will be water tanks at the site to take care of water shortages.
- A borehole will be drilled at the site to supply water to the lodge.
- Roof catchments should be provided with rainwater harvesting systems to enhance collection and storage of rainwater. Such water can be used to water flower gardens and all kind of cleaning required on site.
- Encourage water reuse/recycling during both construction and operational phases.
- Avoid wasting the water supplied to the site.
- The contractors should use water bowsers to bring in water for construction activities especially during periods of high-water demand subject to authorization.
- Provision of notices and information signs within the project to notify on means and needs to conserve water resource.

6.3 Construction Materials

All construction materials including pipes, pipefittings, roofing materials, cement, building stones and sand should be sourced from accredited suppliers. Undesirable, hazardous, corrosives or unauthorized materials should not be used. This is because such materials may contaminate the water thus hampering its quality.

Mitigation

- Quality should be thoroughly controlled through regular tests.
- Materials should be sourced from licensed dealers and suppliers.

6.4 Construction Waste

In construction projects, there are usually some wastes on the site. Removal and disposal of such refuse and other related wastes come in handy. The waste should be disposed into the approved dumpsites.

Mitigation

- The contractor or proponent should work hand in to facilitate waste handling and disposal from the site.
- The waste materials should be properly segregated and separated to encourage recycling of some of them with the approval of the site engineer.

6.5 Power Demand

There will be high power demand during construction and occupation stages. As indicated earlier generators will be used during the initial stages before installation of solar power system. This will require fuel that may cause air pollution hence there is need to use power effectively. Energy conservation involves proper use of electrical appliances, lighting systems and other electrical gadgets used for different purposes.

Mitigation

- All electrical appliances should be switched off when not in use.
- Put off all lights when not in use.
- Use a design that is environmentally sound to avoid use of electricity for air conditioning
- Use energy conserving electric lamps for general lighting.
- Utilize natural light inside buildings to avoid using electricity for lighting during the day.

6.6 Pollution

The construction activities on the site will result to increased dust and gas emissions. Such dust and gases have direct negative impact to the quality of air and hence animal/human health. Hooting of the involved vehicles and workers will generate noise and vibrations, which may have effect to the neighbourhoods. Petroleum oils and grease as used in vehicles and construction machinery may spill or leak on/into the ground.

- Sound pollution control measures should be applied/ adapted
- Regular and prompt maintenance of construction machinery and equipment. This will minimize generation of hazardous gases and other suspended particulate matter.
- Areas generating dust particles should be regularly sprinkled with water to reduce dust blowing out over the area and should be enclosed where possible to mitigate the effects of wind on them.
- Maintenance should be carried out in a well-designed and protected area and where oil/grease is completely restrained from reaching the ground.
- All oils/grease and materials should be stored in a site's store, which is usually located in the contractor's yard.

6.7 Soil Degradation

This can occur during excavations for foundation laying. The excavated materials can be carried by water or water causing erosion.

Mitigation Measures

- Excavated materials should be removed promptly from the site o avoid erosion
- Avoid unnecessary movement of soil materials from the site
- Control construction activities especially during rainy any windy conditions

- Sprinkling of water to reduce dust
- Landscaping after completion of the project and introduce appropriate vegetation.

6.8 Flora

The vegetation on the site at the moment will be cleared to pave way for the project construction. There are no endangered species on the project site.

- New vegetation will be introduced and managed on completion of the development to restore or improve the appearance of the site and also reduce soil erosion.
- Landscaping should be done within the site to improve site appearance after project completion.

6.9 Fauna

No major faunal species were observed as human activity has impacted negatively to the environmental fauna. There will be negligible disturbance to small animals/bird life especially during excavations. In general, construction activities might disturb fauna. Such small animal/bird life will have to find new nesting homes.

Mitigation Measures

- Ensure minimal disturbance of the environment
- Any destroyed vegetation will be restored after the completion of the project
- Landscaping and gardening will be done to restore aesthetic value as well as greening of the site.

6.10 Disturbance of the Public (Noise)

Noise is unwanted/undesirable sound that can affect job performance, safety, and health. Psychological effects of noise include annoyance and disruption of concentration. Physical effects include loss of hearing, pain, nausea, and interference with communications when the exposure is severe.

Construction activities will be generating noise and hence affecting other operations in the neighbourhood. Such noise will mainly emanate from the construction machinery and equipment which include trucks and other vehicles accessing the site not forgetting noise that would emanate from the workers on site and from the demolition activities.

Mitigation Measures

- Machineries should be maintained regularly to reduce noise resulting from friction.
- There should not be unnecessary horning of the involved machinery
- Construction works should be carried out only during the specified time
- Provision of bill boards at the construction site notifying of the construction activity and timings

6.11 Sewage and Effluents

Effluent/ sewage resulting from sanitary facilities and wastewater from the proposed developments is of significant concern with respect to the environment. It should always drain effectively into the proposed septic tanks systems via well designed and laid pipe networks.

Mitigation

- Ensure no undue interference with the laid drainage system.
- All drain pipes passing under the building; driveway or parking should be of heavy-duty PVC pipe tubes encase in 150mm concrete surround. All manholes on drive ways and parking areas should have heavy-duty covers set and sealed airtight as approved by specialists.

- All waste pipes should have cleaning rodding eyes accessible from outside and free to every part of the system for inspection, cleaning and repair.
- Sanitary facilities should be kept clean always through regular cleaning.
- Ensuring the sewerage treatment plant is not overloaded to increase efficiency and minimize or eliminate incidences of untreated sewer spills to the environment l servicing the treatment plant to maintain its efficiency.

6.12 Air Quality

The construction activities on the site will result to increased dust and gaseous emissions. Some construction machinery and trucks, including small vehicles generate hazardous exhaust fumes such as Carbon Oxides (Cox), Sulphur Oxides (SOx) and Nitrogen Oxides (NOx). Dust particles as caused by wind and vehicles suspends in the air mostly during dry spells. Such dust and gases have direct negative impact to the quality of air hence animal/ human health.

Mitigation

- Provide personal protective equipment, materials and clothing such as nose masks and goggles to workers during demolition and construction phases.
- Regular and prompt maintenance of construction machinery and equipment. This will minimize generation of hazardous gases and other suspended particulate matter.
- Control over areas generating dust particles. Such areas should be regularly cleaned or sprinkled with water to reduce dust.
- Use environmentally friendly fuels such as unleaded gasoline.

6.13 Traffic Density

The proposed project will come along with increased vehicle traffic along the connecting routes especially during the construction and occupation phases..

Mitigation Measures

- It is important that warning/ informative signs should be erected at the site. The signs should be positioned in a way to be easily viewed by the public and mostly motorists.
- Drivers will be expected to observe strict traffic rules to reduce the risk of accidents or incidents.
- Provide enough parking spaces for the lodge occupants and for visitors.

6.14 Solid waste.

The proposed activities will generate related solid wastes which include stones, wood, broken glasses, containers, rods of metal, pieces of iron sheets, sharp objects (nails) etc. If solid waste is not removed promptly away from the generation points it accumulates in to large heaps harboring rats, flies etc. which transmits disease not to mention bad odors on decomposition.

Mitigation

- The contractor or the proponent should work hand in hand with Ani-#gab Community to facilitate waste handling, and disposal from the site. The resulting debris will be collected, transported and disposed off at suitably approved dumpsites.
- Provision of dustbin cubicles at the gate as the central collection point.
- Waste receptacles will be placed at strategic points to discourage littering.
- The materials should be properly segregated and separated to encourage recycling of some of them.

6.15 Accident/Disaster Prevention

The following rules will be observed to avoid accidents both during construction and occupation of the building.

Mitigation

- Ensure that the operational manuals are available and accessible for every equipment /machinery
- Properly maintain all machinery and equipment to prevent premature failure or possible accidents
- Provide accessible and clear escape routes that are marked
- Install enough firefighting equipment within reach
- Train workers and office caretakers on fire fighting and first Aid and personal safety
- Carry out fire and emergency drills to assess disaster preparedness
- Provide personal protection equipment during construction
- All electrical equipment and machinery shall be properly grounded
- Only properly trained employees to operate equipment or machinery and proper instructions in their safe operation shall be provided.

6.17 Security

Security of the site and those working and living within is of utmost significance. The house-dwellers within the facility must be assured of their security at all times. The nearest Police Station is in Khorixas, which is not accessible during times of emergency.

Mitigation

- Strategic installation of lighting as well as security alarms and backup systems
- There already exist security guards within the property who provide security in a 24hour basis.
- The site shall be fenced.

6.18 Project Completion

Completion phase will involve; notification of intent to all relevant agencies and liaising with the project Consultants that is engineers, architects and environmentalists in a bid to ascertain guidelines on possible impacts and mitigation measures. On completing the construction works on the site, everything will be left in good order. To achieve this, the following should be accomplished: -

- Landscaping of open areas should be done. Such areas should be sealed from trenches and other depressions and vegetation introduced.
- All waste materials such as wood, glass, stones, sand and scrap metals should be removed from the site and be disposed appropriately.
- General rehabilitation of any excavated areas should be done and quality vegetation introduced to add aesthetic value to the site.
- All construction equipment should be removed after completion of the work.

Billboards erected on site will be removed to signify project completion

CHAPTER SEVEN: ALTERNATIVES AND PROPOSED ACTION

7.1 Alternatives

The consideration of alternatives to a proposal is a requirement of many E.I.A systems. It lies at the heart of the E.I.A process and methodology. During the scoping process, alternatives to a proposal can be generated or refined, either directly or by reference to the key issues identified. A comparison of alternatives will help to determine the best method of achieving project objectives while minimizing environmental impacts or, more creatively, indicate the most environmentally friendly or best practicable environmental option.

7.2 The Proposed Development Alternative

In this development proposal, the proponent will develop the Elephant Lodge as planned after receiving the E.I.A Clearance Certificate from the Authority. The project will be implemented thereby, realizing the proponent's goal of provision of tourists' accommodation. However, the development has to ensure that all environmental measures are complied with during the implementation and operation period. The proposed development alternative is composed of the proponent's final proposal, with the inclusion of the EMA guidelines and regulations and procedures as stipulated in the EMA Regulations of GN 30 of 6 February 2012.

7.3 Alternative Site

There is no alternative site for the proposed project. The proponent did identify the plot earlier on and has invested many resources in terms of consultancy fees for the architect and other construction consultants. Also, the project proponent would spend long periods of time, which would call for cost; already incurred in the proposed development i.e. whatever has been done and paid to date would be counted as a loss to the proponent.

7.4 The No Action Alternative

If the proposal fails to receive the anticipated approval from EMA, the project will not be implemented and thus the developments will not commence. Provision of jobs for skilled and non-skilled workers will not be realized and there will be no generation of income from the plot and hence the high demand for Guest Lodge will not be met and this will impact negatively on the proponent's investment plan.

7.5 The Comparison of Alternatives

Under the proposed Development Alternative, the project will provide short-term jobs for the workers during construction and ensure maximum utilization of the plot. There would be more benefits from the site and the anticipated negative environmental impacts will be minimal. Provided the Environmental Impact mitigation measures are implemented as well as adaptation of sound construction management practices, negative effects on the environment would not be expected.

CHAPTER EIGHT: ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

The environmental management plan involves risk management strategies that should be undertaken by the project proponent and the project manager to mitigate environmental degeneration. They are approaches to monitor, control, reclaim and restore the environment back to its appropriate state. EMPs for projects thus provide logical frameworks within which the identified issues of environmental concern can be mitigated, monitored and evaluated. Environmental monitoring involves measurement of relevant parameters, at a level of details accurate enough, to distinguish the anticipated changes. Monitoring aims at determining the effectiveness of actions to improve environmental quality.

The environmental management and monitoring plans have been developed and outlined to bring home the key findings of the Environmental Impact Assessment of the project in mention, recommending necessary mitigation actions, defining roles, monitor able indicators and the estimated cost.

The EMPs outlined in tables hereafter address the potential negative impacts and mitigation measures as well as roles, costs and monitor able indicators that can help to determine the effectiveness of actions to upgrade the quality of environment; as regards the proposed project. The EMPs have considered both construction and occupation phases.

8.1 Environmental, Health and Safety Management and Monitoring Plan

Environmental monitoring and evaluation are essential in the project lifespan as they are conducted to establish if the project implementation has complied with the set environmental management standards as articulated in the Environmental Management Act (EMA) No. 7 of 2007, and its attendant EMA Regulations of GN 30 of 6 February 2012.

In the context of the proposed project, design has made provisions for an elaborate operational monitoring framework for the following among others:

- Disruption of natural environment and modification of microclimate
- Air and noise pollution
- Proliferation of kiosks
- Workers accidents and health infections during construction process
- Proliferation of uncollected wastes

Table 8.1: Environmental, Health and Safety Management and Monitoring Plan

CONSTRUCTION PHASE			
ENVIRONMENTAL IMPACT	**MITIGATION MEASURES**	**RESPONSIBILITY**	**MONITORING MEASURES**
Commissioning of the Construction Works	- Site hand-over and Ground breaking	Project team (Lead Consultant/Architect, contractor Proponent)	Presence of the project Team
Securing the Construction Site	- Construction of Perimeter Wall and Hoarding	Contractor	Presence of Perimeter Fence
Housing for Construction/ Site staff	- Construction of Labour Camp	Contractor	Presence of Labour Camp
Security for Construction Material	- Construction of Site Stores - Construction materials to be delivered in small quantities to minimize storage problems	Contractor	Presence of Site store

Extraction and Use of Building Materials	- Availability and sustainability of the extraction sites as they are non-renewable in the short term - Landscape changes e.g. displacement of animals and vegetation, poor visual quality and opening of depressions on the surface	Contractor/Proponent /project team	Material site rehabilitation
Collapse of Building during Construction	- Ensuring Building Strength and stability - Use of appropriate construction materials and reinforcements as per specifications - Ensuring building components are as per designs - Proper supervision - Ensure proper timelines are followed e.g. curing time	Contractor/project team	Presence of the project Team
ENVIRONMENTAL IMPACT	**MITIGATION MEASURES**	**RESPONSIBILITY**	**MONITORING MEASURES**

- **Disturbance of Traffic flow during construction** - **Emissions of CO_2, NO_x and fine particulate matter**	- Proper signage - Awareness creation - Education to truck drivers	Contractor/Project team and general public	- Presence of site Notice Board /Hoarding - Presence of Security guards to control traffic -Presence of warning signs and education materials
Soil Excavation leading to site disturbance	- Excavate only areas to be affected by buildings - Dumping of excess excavated materials to sites designated by Conservancy Management - Restoration of sites Excavated	Contractor	Landscaping after completion of construction
Soil Erosion	- Create and Maintain soil traps and embankments. - Landscaping after completion of construction	Contractor/Proponent Architect/Site engineer Landscape Architect	Lack/Absence of Soil Erosion
Noise Pollution and Vibration	- Ensure use of serviced and greased equipment - Switch off engines not in use - Construction work to be confined to between 8am	Proponent and Contractor	Lack of complaints

	to 5pm - Ensure use of earmuffs by machine operators		
Air Quality	- Water sprinkling of driveways or the use of biodegradable hydrant e.g. Terrasorb polymer will reduce dust emission during construction - Ensure servicing of vehicles regularly	Proponent and Contractor	- Lack of complaints - Workers wearing protective clothing and earmuffs

Risks of Accidents and Injuries to Workers	- Education and awareness to all construction workers - Ensure use of appropriate personal protective clothing - Provide First Aid Kits on site - Ensuring Building Strength and stability - Proper supervision	Proponent Contractor	- Presence of well-equipped First Aid kit - Presence of Security Guards on site - Presence of a register on the site

Health and Safety	- Provide First Aid Kits on site - Proper signage and warning to public of heavy vehicle turning - Ensuring Building Strength and stability - Provide clean water and food to the workers. The contractor to abide by all construction conditions as stipulated in the Labour Act's health safety and workforce welfare	Proponent Contractor	- Presence of well-equipped First Aid kit - Presence of Security Guards on site - Presence of a register on the site
Solid Waste Generation	- Ensure waste materials are disposed of on approved sites - Ensure re-use of materials that can be re-used - Use of the 3Rs – Reduce, Re-use, Re-cycle	Proponent Contractor	- Absence of Solid waste on the site
Energy Consumption	- Use electricity sparingly since high consumption of electricity negatively impacts on these natural resources and their sustainability - Use of Standby Generators.	Proponent Contractor	-Presence of Generators

Excessive Water Use	- Excessive water use may negatively impact on the water source and its sustainability	Proponent Contractor	- Use of water tanks and water recycling
ENVIRONMENTAL IMPACT	**MITIGATION MEASURES**	**RESPONSIBILITY**	**MONITORING MEASURES**
Solid Waste Generation and Management	- Regular inspection and maintenance of the waste disposal systems during operation phase - Establish a collective waste disposal and management system - Provide waste disposal bins to each house well protected from adverse weather and animals - Ensure waste materials are disposed of on approved sites - Use of the 3Rs – Reduce, Re-use, Re-cycle	Proponent Contractor	-Presence of waste management policy -Presence of waste handling bins -Absence of wastes
Liquid Waste Generation and Management	- Regular inspection and maintenance of the waste disposal systems during the operation phase - Connection to Sewer system	Proponent Contractor	- Conventional sewer system - Presence of waste handling bins - Absence of wastes

-Increased loading on Infrastructure services **-Increased vehicular and/or pedestrian traffic** **-Increased demand on water, sanitation services**	- Have paved local access road and walkway system - Encourage rainwater harvesting - Provision of increased water storage capacity - Provide adequate storm water drainage system	Contractor Proponent	- Absence of run-off - Presence of good roads - Pavements and drainage channels
Traffic	- Provide adequate parking facilities within the project site	Contractor/Proponent Residents	- Presence of amble parking in the premises
Increased social conflict	- Increased economic activities - Employment generation, income earnings	Contractor Proponent Neighbourhood associations	- Employment of local people - Income generation for local people through cultural and socio-economic activities

Storm Water impacts	-Provide roof gutters to collect and direct roof water to drains -Construct drains to standard specifications - Develop a storm water drainage system and linkage to natural drains	Proponent contractor	- Absence of Flooding and dampness in the building
- Disruption of existing natural environment and modification of micro-climate - **Increased development density - Increased glare/solar reflection. Reduced natural ground cover/surface run-off and obstruction of ventilating winds**	- Careful layout and orientation of buildings to respect wind and sun direction. - Adequate provision of green and open space planted with grass, shrub and tree cover. - Minimum use of reflective building material and finishes for roof, wall and pavement.	Project team (Contractor Proponent, Architect or Lead Consultant, etc.)	- Proper orientation Planted trees/Landscaping
Insecurity	- Ensure secure perimeter wall where applicable - Have a single-entry point that is manned 24 hours	Contractor, Proponent	- Presence of perimeter wall - Presence of day and night security guards

Building Safety	- Assess the condition of buildings to ascertain usefulness	Engineer/Proponent	- Engineer and Tests on the building
Land and Building use	- Ascertain the Planning development policy	Local Authority Physical Planner	- Consultants present
Absence of Decommissioning Plan	- Prepare decommissioning plan	Proponent/Architect	- Demolition plan prepared - Approval of the same by Local Authority Planners
Accidents/Injuries	- Securing the Site by fencing off	Contractor/Proponent	- Perimeter fence
Un-disconnected Services- Power, Water, telephone, sewer etc.	- Ensure disconnection of all services. - Remove all surface and underground cables & wiring	Contractor	- Absence of cabling
Solid Waste Generation (Demolition waste)	- Ensure waste materials are disposed of on Council and EMA approved sites - Ensure re-use of materials that can be re-used -Use of the 3rs - Reduce, Re-use, Re-cycle	Proponent/Contractor	- Absence of Debris
Noise and Vibration	- Ensure use of serviced equipment - Switch off engines not in use - Demolition work to be confined to between 8 to 5pm - Ensure use of earmuffs by workers	Proponent/Contractor	- Reduction of noise and vibration impacts

CHAPTER NINE: DECOMMISSIONING

Decommissioning is an important phase in the project cycle and comes last to wind up the operational activities of a particular project. It refers to the final disposal of the project and associated materials at the expiry of the project lifespan. If such a stage is reached, the proponent needs to remove all materials resulting from the demolition/ decommissioning from the site. The following should be undertaken to restore the environment.

- Remove all underground facilities from the site
- The site should be well landscaped by flattening the mounds of soil and Planting indigenous trees and flowers
- All the equipment should be removed from the site
- Fence and signpost unsafe areas until natural stabilization occurs
- Backfill surface openings if practical

The table below shows the proposed decommissioning plan:

Table 9.1. EMP for Decommissioning

Expected Negative Impacts	**Recommended Measures**	**Responsible Party**	**Time Frame**
1. Construction Machinery/Structure & Wastes			

Scraps material and other debris	Use of an integrated solid waste management system i.e. through a hierarchy of options. Wastes generated as a result of facility decommissioning activities will be characterized in compliance with standard waste management procedures. The contractor will select disposal locations and the local council based on the properties of the particular waste generated.	Project Manage & Contractor	During decommissioning
	All buildings, machinery, equipment, structures and partitions that will not be used for other purposes should be removed and reused or rather sold/given to scrap material dealers.	Project Manager & Contractor	During decommissioning
	Where recycling/reuse of the machinery, equipment, structures and other waste materials is not possible the materials should be taken to approved dumpsites.	Project Manager & Contractor	During decommissioning
Rehabilitation of project site			

-Vegetation disturbance -Land deformation: soil erosion, drainage problems	-Implement an appropriate re-vegetation programme to restore the site to its original status. -During the vegetation period, appropriate surface water runoff controls will be taken to prevent surface erosion; -Monitoring and inspection of the area for indications of erosion will be conducted and appropriate measures taken to correct any occurrences; -Fencing and signs restricting access will be posted to minimize disturbance to newly-vegetated areas;	Project Manager & Contractor	During decommissioning
Social- Economic impacts			
-Loss of income -Loss of Office facilities	The safety of the workers should surpass all other objectives in the decommissioning project. -Adapt a project – completion policy; identifying key issues to be considered. -Compensate and suitably recommend the workers to help in seeking opportunities elsewhere -Offer alternative office facilities	Project Manager & Contractor	During decommissioning

CHAPTER TEN: CONCLUSION AND RECOMMENDATIONS

From the foregoing analysis, the social and economic rating for this project is highly positive. Evaluation of alternatives has already shown that options are limited and costly. Already the proponent has sunk a substantial amount of money in the project up to the design stage.

Further delay of the project is denying all stakeholders the anticipated benefits of the investment; while, redesigning or relocation will lead to loss of time and money that is already tied in the preliminary costs of the project

The project does not pose any serious and negative environmental impacts. Adequate mitigation measures have been proposed to address any of the negative impacts arising from the project.

The project will create employment and improve income earnings. The project will boost the diminishing office supply in the country and more so in urban areas.

The proposed project design has integrated mitigation measures with a view to ensuring compliance with all the applicable laws and procedures. The proposed project will be implemented after approvals by among others, the Ministry of Environment and Tourism, Ministry of Agriculture and Sorris-Sorris Conservancy. During project implementation and occupation, Sustainable Environmental Management (SEM) will be ensured through avoiding inadequate/inappropriate use of natural resources, conserving nature sensitively and guaranteeing a respectful and fair treatment of all people working on the project, general public at the vicinity and inhabitants of the project.

In relation to the proposed mitigation measures that will be incorporated during construction phase, the development's input to the society; and cognation that the project is economically and environmentally sound, establishments are considered beneficial and important. It is our considerable

opinion that the proposed development is a timely venture that will subscribe to proponent's timely investment.

It is thus our recommendation that the project be allowed to go ahead with the implementation provided the outlined mitigation measures are adhered to. Major concerns should nevertheless be focused towards minimizing the occurrence of impacts that would degrade the general environment. This will however be overcome through close follow-up and implementation of the recommended Environmental Management and Monitoring Plans (EMMPs).

Recommendations for the prevention and mitigation of adverse impacts are as follows:

- The proponent should therefore follow the guidelines as set by the relevant departments to safeguard and envisage environmental management principles during construction and operation/occupation phases of the proposed project.
- It is important that warning/ informative sign (bill boards) be erected at the site. These should indicate the operation hours and when works are likely to be started and completed. The signs should be positioned in a way to be easily viewed by the public and mostly motorists.
- All solid waste materials and debris resulting from construction activities should be disposed off at approved dumpsites.
- All construction materials e.g. pipes, pipe fittings, sand just to mention a few should be sourced/procured from bonafide / legalized dealers.
- During construction all loose soils should be compacted to prevent any erosion. Other appropriate soil erosion control measures can be adapted. Any stockpiles of earth should be enclosed, covered or sprinkled with water during dry or windy conditions to minimize generation of dust particles into the air.
- Once earthworks have been done, restoration of the worked areas should be carried out immediately by backfilling, landscaping/ levelling and planting of suitable tree species.

- Proper and regular maintenance of construction machinery and equipment will reduce emission of hazardous fumes and noise resulting from friction of metal bodies.
- A fully equipped first aid kit should be provided within the site.
- Workers should get food that is hygienically prepared. The source of such food should be legalized or closely controlled.
- The contractor should have workmen's compensation cover and is required to comply with Labour Act as well as other relevant ordinances, regulations and Union Agreements.
- The contractor should provide adequate security during the construction period.

REFERENCES

Burke, A. 2009. Wild flowers of the Northern Namib. Solitaire Press (Pty) Ltd. Windhoek, Namibia.

Burke, A. 2009. Wild flowers of the Central Namib. Solitaire Press (Pty) Ltd. Windhoek, Namibia

Christelis G. & Struck Meier W. 2001. Groundwater in Namibia: an explanation to the hydrogeology map. John Meinert Printing (Pty) Ltd. Windhoek, Namibia.

Legal Assistance Center Website. http://www.lac.org.na/. Accessed May 2019 to August 2019

Mendelsohn, J. 2003. Atlas of Namibia: A portrait of land and its people. David Philip Publishers. Cape Town, South Africa.

Muller M.A.N. 2007. Grasses of Namibia. John Meinert Printing (Pty) Ltd. Windhoek, Namibia.

NACSO Website. http://www.nacso.org.na/index.php. Accessed May 2019 to August 2019.