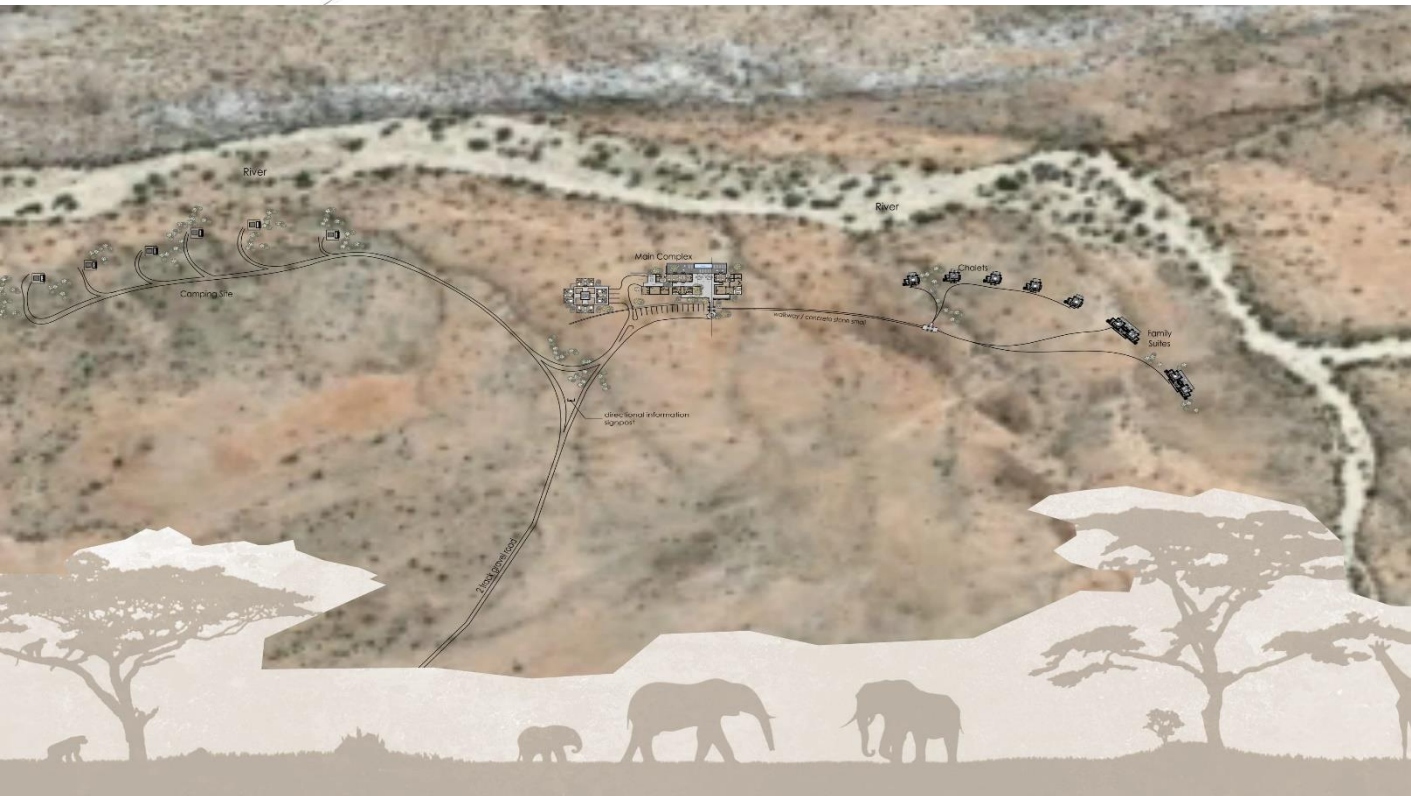


# THE ESTABLISHMENT OF DINALEDI LODGE AND CAMPSITES ON FARM LIBERTAS IN KARIBIB, ERONGO REGION - NAMIBIA



## ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Consultant:



Proponent:

Dinaledi Lodges and Campsite cc

APP-002155

December 2020

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## Definitions

<b>TERMS</b>	<b>DEFINITION</b>
BID	Background Information Document
EAP	Environmental Assessment Practitioners
ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EIA (R)	Environmental Impact Assessment (Report)
ESIA	Environmental and Social Impact Assessment
EMP	Environmental Management Plan
EMPr	Environmental Management Plan Report
GHG	Greenhouse Gasses
ISO	International Organization for Standardization
I&Aps	Interested and Affected Parties
MEFT: DEA	Ministry of Environment, Forestry and Tourism's Directorate of Environmental Affairs
NHC	National Heritage Council
NEMA	Namibia Environmental Management Act
ToR	Terms of Reference
UNFCCC	United Nations Framework Convention on Climate Change

## **i. Purpose of This Environmental Management Plan**

This Environmental Management Plan follows on environmental impacts associated with the proposed lodge and campsite establishment project, which were identified in the Environmental Scoping Report. A conscious decision was made based on the recommendations and guidelines by the Directorate of Environmental Affairs EIA guidelines in order to assess both significant and less significant environmental impacts ushered in with the proposed lodge development project. The developed Environmental Management Plan (EMP) for this proposed activity will have to be effectively implemented by the client, to ensure that adverse environmental impacts are not considered.

The framework within which this EMP is developed includes identifying various activities, their occurrence in the construction and operation processes and the likely impacts that are associated with those activities.

It is therefore necessary to subcategorize the EMP into Construction and Operational activities. The first category of the EMP which deals with project activities identified and highlight the activities impacts and the phases they are likely to occur. In this respect, this EMP alludes on anticipated construction activities and the mitigation measures that will need to be applied to reduce the severity of the impacts the proposed lodge may have on the surrounding environment. This will also include rehabilitation measures that will need to be implemented once the construction is completed and how to continuously monitor the plant in accordance to monitoring parameters highlighted herein.

## **ii. EMP PRINCIPLES**

The following principles have informed the compilation of this environmental management Plan:

- *The environment is considered to be composed of both biophysical and social components.*
- *Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.*
- *Development must be socially, environmentally and economically sustainable.*
- *Construction, in general, is a disruptive activity and all due consideration must be given to the environment, particularly the social environment, during the execution of the project to minimize the impact on the affected parties.*
- *Minimization of areas disturbed by construction activities will reduce the severity of the construction related environmental impacts and reduce rehabilitation requirements and costs.*
- *As minimum requirements, relevant standards relating to international, national, regional and local legislation, where applicable, shall be adhered to. This includes requirements relating to waste emissions (e.g. hazardous, airborne, liquid and solid), waste disposal practices, noise regulations, road traffic ordinance etc.*
- *Reasonable measures to avoid pollution and environmental degradation are to be provided for.*
- *The costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling, or minimizing further pollution, environmental damage or adverse health effects must be paid for by the person responsible for harming the environment.*
- *The responsibility for the environmental, health and safety consequences of the proposed development exists throughout its life cycle.*

## **1. CHAPTER ONE: BACKGROUND**

### **1.1. Introduction**

The proponent **DINALEDI LODGE AND CAMPSITE CC** intends to establish a lodge and camping facility Libertas, Daures Constituency-Erongo Region. This development has been necessitated by the recently booming tourism sector in Namibia and the project has been in planning before COPVID-19 affected business and tourism in the country and the world as whole. However, the proponent is hopeful that once tourism resume, the country will be more than ready to embark on tourism business and the proponent also want to play their role.

In this respect the proponent has appointed EnviroPlan Consulting cc to undertake an Environmental Scoping Assessment (ESA), formulate an Environmental Management Plan (EMP) and apply for an Environmental Clearance Certificate (ECC) to the Ministry of Environment, Forestry and Tourism (MEFT): Directorate of Environmental Affairs (DEA) for the proposed lodge establishment.

This document forms part of the application to be made to the DEA's office for an Environmental Clearance certificate for the proposed establishment of a lodge and campsite establishment according to the guidelines and 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**

The proposed development is on Farm Libertas, Daures Constituency in Erongo Region - Namibia. The proposed site is about 70km North of Karibib town which services the area. The project locality Map is on Figure 1.

### **1.3. Project site overview**

The proposed portion Farm Libertas in Daures Constituency within Karibib area of Erongo Region is 20 Ha and can accommodate the proposed project in terms of spatial requirements of the activity because the project will use about 5ha for the lodge and campsites development and the rest will be used for future development and activities. It is imperative to understand the proposed project area is within a communal area and is within the Spitzkoppe tourism area. The surrounding land used are mixed tourism, conservation and subsistence agriculture, however because water is not easy to come by agriculture is not particularly successful in this area.



There is clear evidence of existence of game within the project area and its surroundings, however due to influence of human encroachment into the area game survival have been impacted and will still be affected in the future.

The area affected by development still has vegetation cover and the EIA team observed that the proposed site can be classified as partially disturbed, due to existing infrastructure within the project area vicinity.

There no power supply to the site but boreholes for water supply have been drilled. There are existing conservancy tanks used for sewer reticulation system where the lodge development is. Within the project site there are existing residential structures were previous owners have vacated the area because on the non-productivity of this area, hence the new initiative by the developer to use the site for another economically viable land use to sustain the plot as well as the local economy.



**Figure 1: (left) Existing site infrastructure. (Right) Water Supply o the Farm.**

**Figure 2: Bottom-Solar power for lighting**



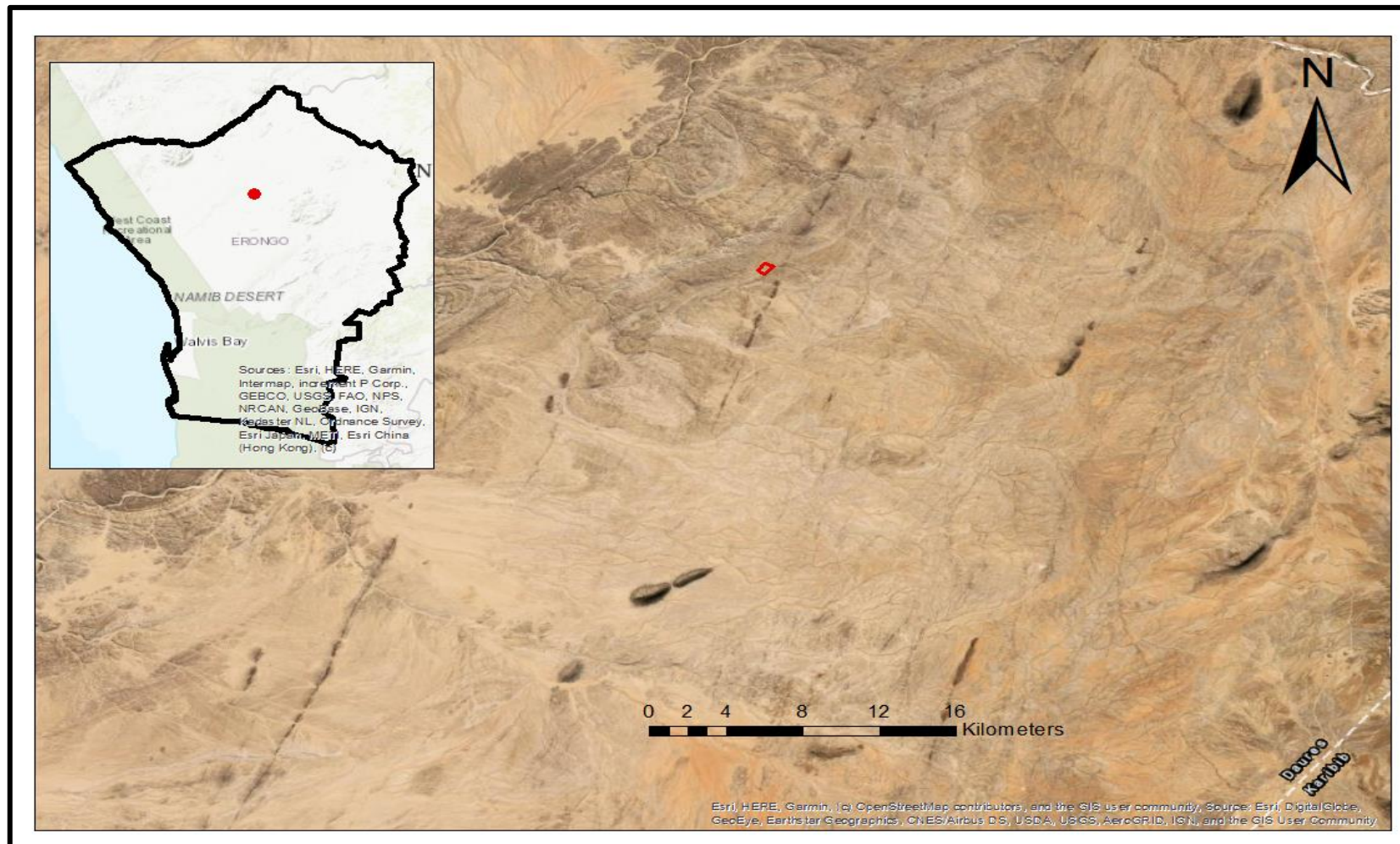


Figure 3: Proposed Project Site.



## 1.4. Project Overview

The proponent, Dinaledi Lodge and Resort cc intends to establish a world class lodge and campsite facility on Farm Libertas in Erongo Region-Namibia. The project is aimed at improving offerings in the tourism sector in Erongo and Namibia as a whole. The construction and operation of the lodge degree of safety for employees and equipment. The proposed infrastructure will have minimal impacts on the natural resources, i.e. water, fauna and flora.

## 1.5. Proposed project infrastructure

Proposed on site for construction, is as follows:

- 6 by 2 bedroomed lodging facility
- 11camping sites
- Employees accommodation
- Reception & Admin Area
- Restaurant and Bar area

The proposed development layout is as follows:

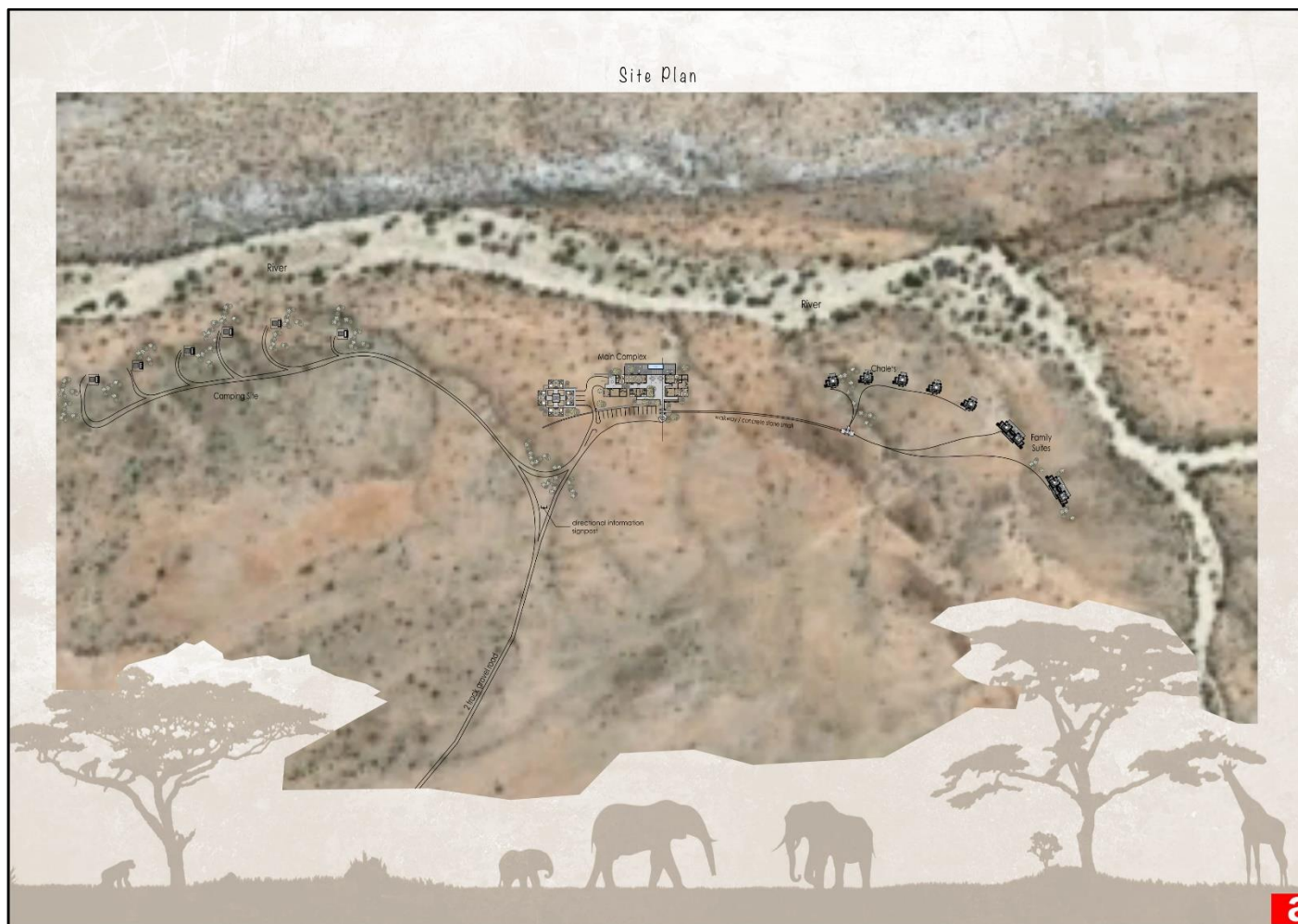


Figure 4: Lodge Layout Plan



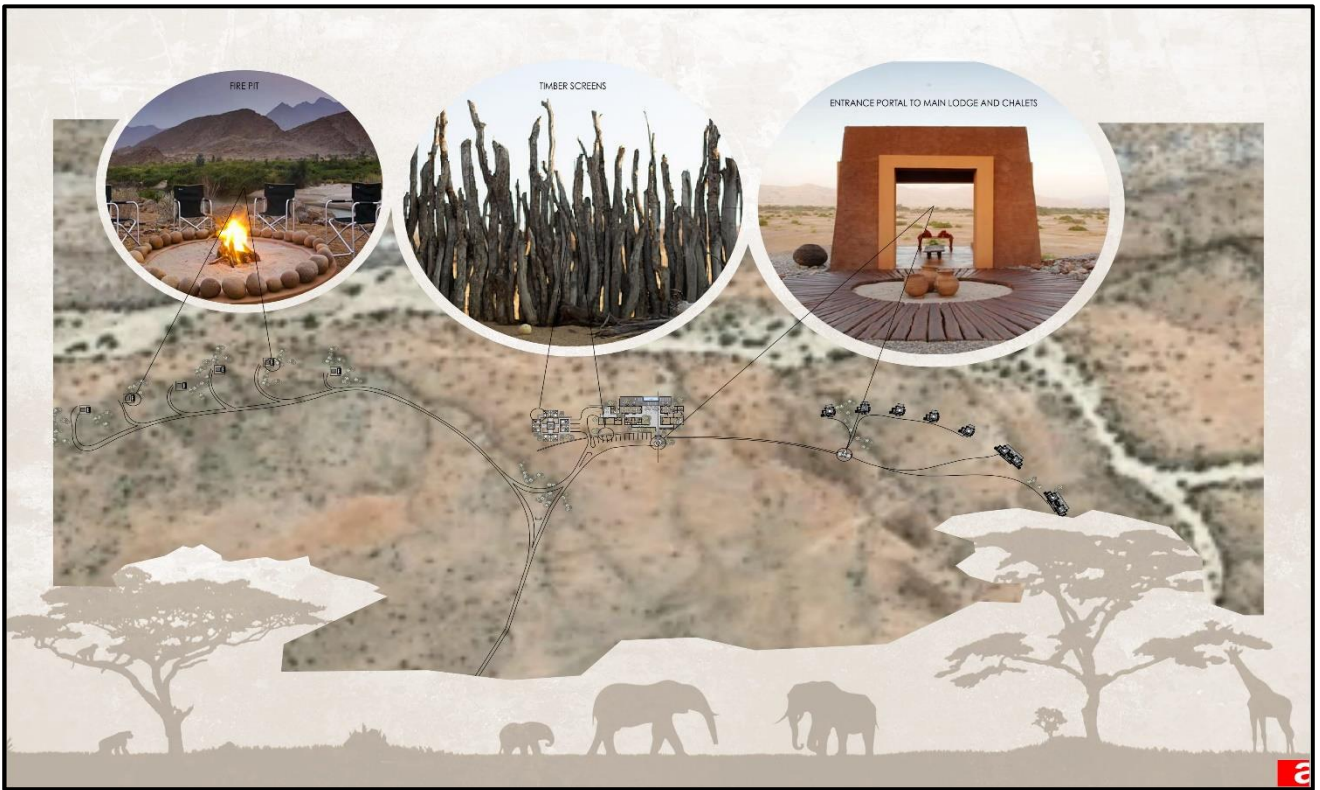


Figure 5: Construction Examples



Figure 6: Lodge Chalets Layouts

## 1.6. Accessibility

There is an existing farm road that is already in use, and the proponent will use this road to avoid road upgrades that will damage the environment.

## 1.7. Land Use and Ownership

The piece of land is owned by Hon C.G Bohitile the owner of Dinaledi Lodge and Campsites.

## 1.8. Infrastructure and Services

- **Water:** There are boreholes on site and in use for other activities on the farm and it is sufficient.
- **Ablution:** There are septic tanks on site and will be periodically maintained and emptied.
- **Electricity:** The farm has solar power, once electricity is planned for connection, appropriate processes will be undertaken.
- **Communication:** The site is connected with MTC, TN Mobile and satellite phones.

## **2. CHAPTER TWO: POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK**

### **2.1. Introduction**

An important part of the EIA is identifying and reviewing the administrative, policy and legislative frameworks concerning the proposed activity, to inform the proponent about the requirements to be fulfilled in undertaking the proposed project. This section looks at the legislative framework within which the proposed development will conform to; the focus is on the compliance with the legislation during the planning, construction and operational phases. All relevant legislations, policies and international statutes applying to the project are highlighted in the table below as specified in the 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).

**Table 1: Policies, legal and Administrative regulations**

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

Aspect	Legislation	Relevant Provisions	Relevance to the Project
<b>The Constitution</b>	Namibian Constitution First Amendment Act 34 of 1998	<ul style="list-style-type: none"> <li>- 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.</li> <li>- "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." (Article 95(I)).</li> </ul>	<ul style="list-style-type: none"> <li>- 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.</li> <li>- Through implementation of the environmental management plan, the proponent will ensure conformity to the constitution in terms of environmental management and sustainability.</li> </ul>
<b>National Development Plans</b>		<ul style="list-style-type: none"> <li>- 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.</li> </ul>	<ul style="list-style-type: none"> <li>- The proposed project will propel NDP4 targets in tourism development. Adding on, this will create employment which will work towards the NDP and Vision 2030.</li> </ul>
<b>Archaeology</b>	National Heritage Act 27 of 2004	<ul style="list-style-type: none"> <li>- 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"</li> </ul>	<ul style="list-style-type: none"> <li>- Any heritage resources discovered would require a permit from the NHC for relocation.</li> </ul>



	National Monuments Act of Namibia (No. 28 of 1969) as amended until 1979	<ul style="list-style-type: none"> <li>- “No person shall destroy, damage, excavate, alter, remove from its original site or export from Namibia:</li> <li>- Meteorites, fossils, petroglyphs, ornamental infrastructure graves, caves, rock shelters, middens, shells that came into existence before the year 1900 AD; or</li> <li>- any other archaeological or palaeontological finds</li> </ul>	<ul style="list-style-type: none"> <li>- 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.</li> </ul>
<b>Environmental</b>	Environmental Management Act 7 of 2007	<ul style="list-style-type: none"> <li>- Requires that projects with significant environmental impacts are subject to an environmental assessment process (Section 27).</li> <li>- 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)).</li> <li>- 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.</li> <li>- Details principles which are to guide all EIAs</li> </ul>	<ul style="list-style-type: none"> <li>- This Act and its regulations should inform and guide this EIA process.</li> </ul>
	EIA Regulations GN 57/2007 (GG 3812)	<ul style="list-style-type: none"> <li>- Details requirements for public consultation within a given environmental assessment process (GN No 30 S21).</li> <li>- Details the requirements for what should be included in a Scoping Report (GN No 30 S8) an EIA report (GN No 30 S15).</li> </ul>	<ul style="list-style-type: none"> <li>- This Act and its regulations should inform and guide this EIA process.</li> </ul>
	Pollution and Waste Management Bill (draft)	<ul style="list-style-type: none"> <li>- 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.</li> </ul>	<ul style="list-style-type: none"> <li>- The project should be executed in harmony with the requirements of the act to reduce negative impacts on the surrounding environs from waste during construction or operation. Erongo Regional Council waste management by</li> </ul>

		<ul style="list-style-type: none"> <li>- 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.</li> </ul>	<p>laws will be abide to during construction and operation.</p>
	Soil Conservation Act 76 of 1969	<ul style="list-style-type: none"> <li>- This acts 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.</li> </ul>	<ul style="list-style-type: none"> <li>- 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.</li> </ul>
	National Biodiversity Strategy and Action Plan (NBSAP2)	<ul style="list-style-type: none"> <li>- 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.</li> </ul>	<ul style="list-style-type: none"> <li>- 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.</li> </ul>
<b>Forestry</b>	Forest Act 12 of 2001	<ul style="list-style-type: none"> <li>- Tree species and any vegetation within 100m from a watercourse may not be removed without a permit (S22(1))</li> <li>- Provision for the protection of various plant species.</li> </ul>	<ul style="list-style-type: none"> <li>- The clearing of vegetation is prohibited (subject to a permit) 100m either side of a river. Certain tree species occurring in the area are protected under this Act. Permits must be obtained from MAWF in accordance with the Act. However, on site there are no trees that require clearing permit.</li> </ul>
<b>Water</b>	Water Act 54 of 1956	<ul style="list-style-type: none"> <li>- The Water Resources Management Act 24 of 2004 is presently without regulations; therefore, the Water Act No 54 of 1956 is still in force:</li> <li>- 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.</li> <li>- Prohibits the pollution of underground and surface water bodies (S23(1)).</li> </ul>	<ul style="list-style-type: none"> <li>- The protection of ground and surface water resources should guide development's layout plans, since the lodge will rely on groundwater.</li> </ul>

		<ul style="list-style-type: none"> <li>- Liability of clean-up costs after closure/ abandonment of an activity (S23(2)).</li> <li>- Protection from surface and underground water pollution</li> </ul>	
<b>Health and Safety</b>	Labour Act (No 11 of 2007) in conjunction with Regulation 156, 'Regulations Relating to the Health and Safety of Employees at work'.	<ul style="list-style-type: none"> <li>- 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 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).</li> <li>- 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.</li> </ul>	The proponent will employ several people from the local community and shall ensure securing a safe environment and preserving the health and 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	<ul style="list-style-type: none"> <li>- 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."</li> </ul>	<ul style="list-style-type: none"> <li>- The lodge construction and operations will ensure compliance to the terms of the Act.</li> </ul>
<b>Services and Infrastructure</b>	Road Ordinance 1972 (Ordinance 17 Of 1972)	<ul style="list-style-type: none"> <li>- Width of proclaimed roads and road reserve boundaries (S3.1)</li> <li>- Control of traffic during construction activities on trunk and main roads (S27.1)</li> <li>- Infringements and obstructions on and interference with proclaimed roads. (S37.1)</li> <li>- Distance from proclaimed roads at which fences are erected (S38)</li> </ul>	<ul style="list-style-type: none"> <li>- Although the project is a major boost for the constituency and the commodities market, the proponent needs to ensure that the development do not affect the major roads within their vicinity during construction and operation phases.</li> </ul>

### 3. CHAPTER THREE: ENVIRONMENTAL MANAGEMENT PLAN (EMP)

#### 3.1. Introduction

This section is aimed at describing the Environmental Management Plan (EMP) for the proposed lodge establishment project. The EMP stipulates the management of environmental programs in a systematic, planned and documented manner. The EMP below includes the organizational structure, planning and monitoring for environmental protection at the proposed farm area development and other areas of its influence. The aim is to ensure that the facility maintains adequate control over the project operations to:

- To prevent negative impacts where possible;
- Reduce or minimise the extent of impact during project life cycle;
- Prevent long term environmental degradation.

#### 3.2. EMP Administration and Training

There is a strong need to clearly outline the roles and responsibilities of all stakeholders to ensure that the EMP is fully implemented. There is also a need for the proponent to appoint an overall responsible person (**Environmental Control Officer**) to ensure the successful implementation of the EMP. The Environmental Control Officer needs to have qualifications and knowledge in environmental management /sciences, and understanding of EMP administration. Under the management actions, each action is allocated to a responsible entity to ensure that the specific action is managed and documented properly. All key role players such as contractors who will be involved during the construction of the services must be informed about the contents of this EMP and activities to be undertaken to mitigate the potential impacts identified. All key personnel who will be involved in project management and implementation will be informed about the contents of this EMP through structured training programs; this will form part of the regular site meetings and briefings.

#### 3.3. Construction Phase Impacts

The lodge construction phase forms an integral part of the project development cycle. It is however crucial to note that the development entails activities that will pose threats to the surrounding environs and impacts will range from vegetation removal, construction waste, noise and air pollution among other impacts. As assessed in the impact assessment chapter the EAPs noted crucial environmental impacts associated with the construction phase and as follow up to the impacts identified and assessed, the following impact management plan has been crafted:



**Table 2: Impacts associated with the Construction Phase**

IMPACT	DESCRIPTION	EFFECTS	CLASS	TIME FRAME	RESPONSIBILITY	ACTION
Noise pollution	Noise will be generated through: -Access road upgrading -Construction of site administration offices -Moving vehicles.	- The health of working personnel could be disturbed. - Residents could be disturbed by the noise. - General annoyance -Driving away of local animal species near the project site	Environmental	2-3 months	Environmental Control Officer	- A construction interval will be established, and adhered to. - Workers will be issued and provided with personal protective equipment. - Public will be notified through printed timetable stating planned operational activities. - Construction activities will be conducted during daytime.
Dust Generation	Dust will accumulate because of the land preparation and ground excavation by movement of construction equipment	- Can lead to respiratory illnesses especially to those working in the area. -increase Particulate matter levels in the air and cause visual pollution	Environmental / occupational	2-3 months	Environmental Control Officer Contractor	- Dust suppression will be done through watering dust source surfaces.
Debris Accumulation	Debris will accumulate due to construction activities, removal of existing dilapidated infrastructure on site	- Can be an eyesore. - Can be source of water and soil pollution. -can result in scenic pollution	Environmental	2-3 months	Environmental Control Officer	- Reuse reusable material such as bricks. - Collect all non-reusable debris and dispose applying appropriate waste management procedures.
Occupational health and safety risks and accidents	Construction related Safety and Health hazards	-Injuries to workers such as Occupational dermatitis, slips and fall of humans and objects, musculoskeletal disorders, etc.	Health and safety	Project life time	Environmental Control Officer	- Equip workers with Personal Protective Equipment (PPE). - provide trainings on how to effectively use the PPE. -Provide platforms for briefings and meetings about possible safety and health hazards in the work place

IMPACT	DESCRIPTION	EFFECTS	CLASS	TIME FRAME	RESPONSIBILITY	ACTION
Employment creation	The construction exercise provides an opportunity of outsourcing work	- Improves disposable income to those employed and their immediate families.	Socio-economic	Project life time	Environmental Control Officer	- Work with local councillor on acquiring non-skilled labour from the residents.

### **3.4. Operational Phase**

The operational phase is the most critical component of project implementation and it is normally associated with several severe impacts. The phase comprises of the actual operation of the lodge facility. This phase is expected to last for over 50 years of operation if the venture is still viable. There will be several impacts that will occur daily or other sequential routine. The phase forms the basis of an Environmental Management Plan that is detailed in Chapter. The major impacts identified by this study for the operation phase are as detailed in the previous chapter.

**Table 3: Impacts associated with the Operation Phase**

IMPACT	DESCRIPTION	EFFECTS	CLASS	TIME FRAME	RESPONSIBILITY	ACTION
Noise pollution	-Vehicle movements -Periodic road upgrading	- The health of working personnel could be disturbed. - Residents could be disturbed by the noise. - General annoyance -Driving away of local animal's species near the project site.	Environmental	Project life time	Environmental Control Officer	- Schedule road maintenance during day time and avoid upgrades over short periods of time. - Provide public notices through printed timetable showing schedule of planned work
Solid waste pollution	Solid waste emanating from food wastes, packaging materials, containers, household waste, glass, wood, etc	- Can result health issues and some waste can be highly hazardous and toxic to the environment	Environmental	Project Life time	Environmental Control Officer	-An initial waste audit will be conducted to identify areas type and volume of waste. -When it is appropriate, materials will be reused and/or sent to recycling agents based in Windhoek to minimize the amount of waste generated. -Biodegradable waste will be composted and used on lawns and flowers on and around the site as part of environmental responsibility of the company.
Human movements	Visitors/ tourists to the site will have interests in moving around the lodge environs for scenic views.	-Movements may drive away animals within the radius of the site. - This can also result in vehicle vibrations which maybe a nuisance to some people in the surrounding area.	-Ecological -Social	Project life time	Operations manager	-Come up with a social contact policy guiding the movement of visitors around the area -Promote the use of wild tracks and no vehicle tracks in the bushes to avoid driving away wild animals. -Ensure that nearby residents do not feel social intrusion.



Occupational Hazards / Work place accidents	Operating of restaurant equipment such as stoves, irons, boilers etc can cause workplace injuries	-Potential accidents and illnesses.	Health, social	-Project life time	Ministry of Labour	<ul style="list-style-type: none"> <li>-Health and safety regulations should be enforced on all the workers.</li> <li>-Safety regulations include life and health insurance, first aid kits; protective clothing such as uniforms and gloves.</li> <li>-Proper storage of highly flammable products such as gas etc, and installation of fire extinguishers. Workers should not be allowed to exceed working hours.</li> </ul>
Employment creation	Employment creation for the residents	<ul style="list-style-type: none"> <li>- Increases disposable income.</li> <li>- Decreased Rural to urban migration.</li> </ul>	Socio-economic	Project Life Time	Local Councillor	<ul style="list-style-type: none"> <li>- Provide information to the local community detailing labour requirements.</li> <li>- Conduct transparent recruitment process of workers and of contractors, providing preferences to the locals where feasible.</li> </ul>
Immoral Behaviour	Increased inflow of people into the area may result in immoral behaviour and increased sexual activities.	<ul style="list-style-type: none"> <li>-Increased infection of HIV/AIDS and other sexual diseases.</li> <li>-Increased unwanted and teenage pregnancies</li> <li>-Increase in thieving incidences, assaults and robberies.</li> <li>-Increased incidences of drugs and alcohol abuse.</li> </ul>	Socio-economic	Project Life Time	Operations manager and Tyeye Village Headman	<ul style="list-style-type: none"> <li>- Conduct awareness campaigns on promiscuity and HIV/AIDS issues.</li> <li>-Educate tourists and travellers on social decency and sexual health.</li> </ul>

### 3.5. Solid Waste Management

Dinaledi Lodge and Campsite's solid waste management plan will follow the waste management principles of reusing, recycling and reducing. This will imply that at waste generation on site will be minimal to ensure that there is no waste management problem. Waste that can be reused will be put to appropriate use at the lodge such as reusing plastic packages, and containers.

Waste segregation will be done in relation to biodegradable and non-biodegradable waste. Biodegradable waste such as vegetables, food leftovers and paper will be composted on site and the compost will be used on lawn and flowers to be planted on site. All recyclable waste will be separated and delivered periodically by the proponent to waste recycling companies.

### 3.6. Sewage and Effluent Waste Management

In the absence of the municipal sewage system, sewage is highly environmental dangerous and remains a hazard to human health if not properly managed according to public health and environmental standards. For this development, a Bierock Sewerage Technology using high grade conservancy tanks will be used for managing of the lodge and campsites sewage. The system enhances and combines the principles of primary separation (septic tank) and aerobic biological filtration (conventional trickling filters). This type technology is usually used for domestic purposes including lodges and can work independently from the municipal system. The treating process is biological and doesn't require power and produce odour. Treated water from the system will be recycled and used for watering the lawn and the plants while the sludge will be sucked out.

The installation is environmentally friendly and requires servicing twice less than the traditional septic tanks. The tank material is waterproof and durable; however, on enhance environmental safety the holding pit for the tanks will be lined with Structural Epoxy technology which incorporates a high build, fibre reinforced polymer (FRP) epoxy. This Epoxytec system is the highest build liner that is leachate and acid proof. This liner is being used because of the flooding risk of the area and thus there is need for an airtight system that will not be compromised during flooding periods. The Structural Epoxy System offers high flexural strength properties, impressive modulus and 16,000psi compressive strength for structural reclaiming needs and lining as an all-in-one-shot single system. The system is often specified for structures experiencing ultra-high levels of I&I pressure with ultra-high levels of H<sub>2</sub>S (up to 800 ppm).

**In relation to the sewerage system management on site the following guidelines are recommended:**

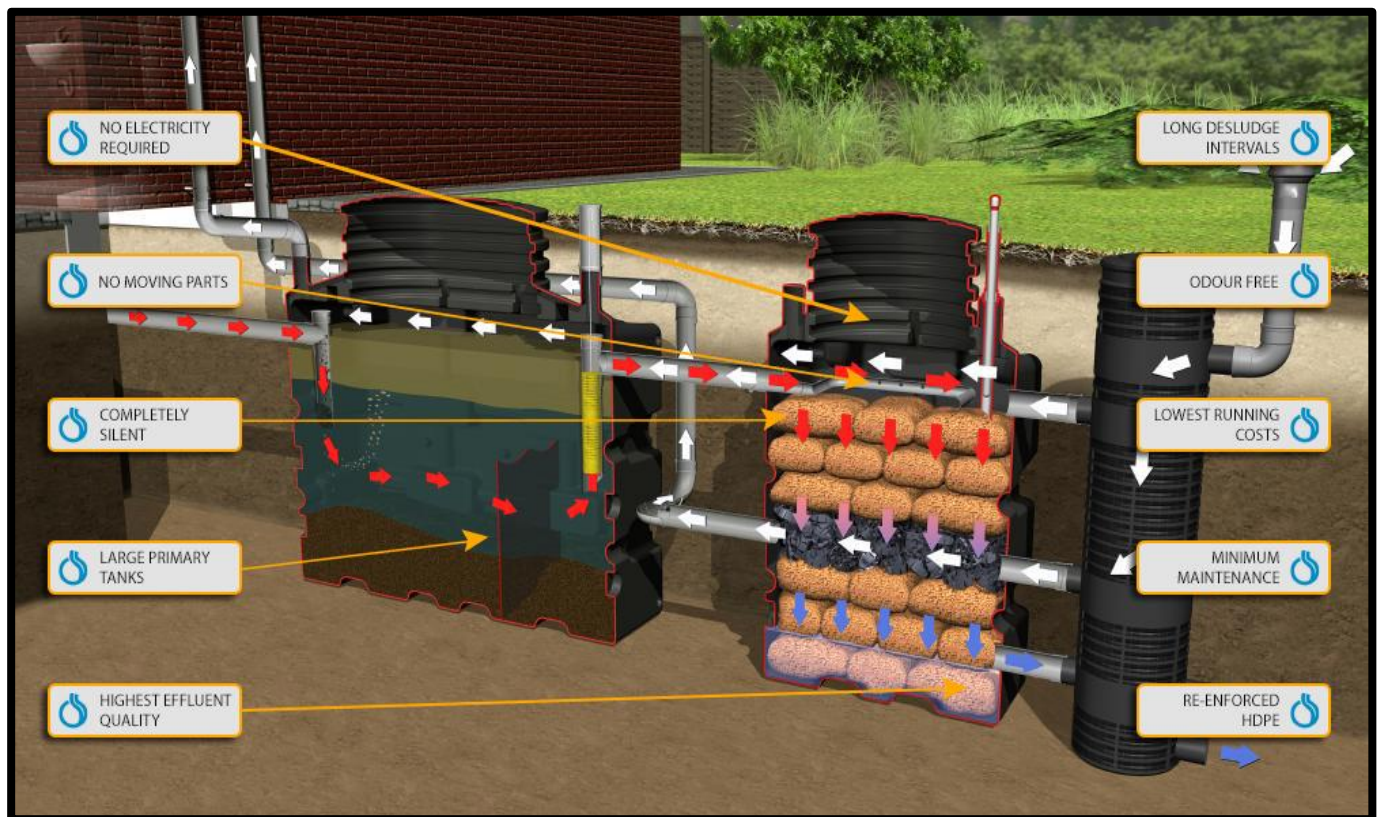
- i. A contingency plan must be drawn up to protect against overflow of the conservancy tank. A sump or lined pond can be designed below the conservancy tanks to contain any overflows.
- ii. Ingress of storm water into the conservancy tanks must be prevented by providing appropriate drainage.

- iii. The tanks siting will be located more than 200m from the river bank
- iv. The tanks must have airtight manhole covers to allow access to the tanks for the removal and safe disposal of the tank's contents.

**Furthermore, in relation to flooding risk the following specifications will be followed:**

- i. All sewage pipe penetrations through walls/foundations shall be sealed using an expansive sealant, a moulded sleeve, an elastomeric seal, or a neoprene seal.
- ii. The septic tank access cover shall be sealed with a neoprene gasket and bolted down.
- iii. The septic tank inspection pipe shall have a watertight cover (i.e. a screw-on lid).
- iv. The sewage connection pipe exiting the structure shall be either strapped to a vertical supporting component of the structure or embedded in the foundation to protect the pipe from flood damage.

All operations and maintenance activities will be responsibility of Dinaledi Lodge and Campsite's management. When the tank is full the management should engage an experienced contractor to evaluate if the tank needs to be pumped often. Leaks occurring in the toilets and dripping faucets will be checked and repaired promptly. Soil around the treatment area should regularly check for wet or spongy soil around treatment area. Additionally, an alarm system can be installed to signal when there is a problem.



**Figure 7: Poly Biorock sewerage system flow diagram, source: Biorock Systems inc, 2014**

## 4. CHAPTER FOUR: CONCLUSION AND RECOMMENDATIONS

The environmental impact assessment process for the proposed lodge and camping sites establishment was conducted in accordance to the Environmental Management Act 2007 and EMA Regulation 2012. Further consideration was given to relevant legislation throughout the entire process to ensure a successful assessment process.

Impacts likely to occur during project phases (construction and operation) were assessed depicting a positive outlook despite limited details of the magnitude of the proposed development. Based on the assessment, the overall project is expected to have minimal negative impacts on the environment. The development is also anticipated to have positive impacts such as job creation opportunities and tourism development. Impacts with negative effects were also identified and summarized in a form of environmental management plan to ensure sustainable implementation.

The site has access to the road for accessibility and has minimal vegetation cover, such that no excess vegetation will be removed during the construction phase. It is important that the proponent observe and maintain accountability to both socio-economic and environmental sensitive activities from the project, such that the project is harmonized with policy, regulations, administrative frameworks and social interface with the public as proposed in the environmental management plan. Failure to observe these measures will significantly affect the local environment and lead to non-compliance. Therefore, implementation environmental protection measures should be executed in consultation with the key stakeholders.

EnviroPlan hereby recommends that MEFT: DEA grant the environmental clearance certificate for the proposed lodge establishment project, under the condition of full implementation of this EMP.