

**ENVIRONMENTAL MANAGEMENT PLAN: THE PROPOSED HARDAP RESORT TELECOMMUNICATION BASE TRANSCIEVER STATION (BTS) TOWER AT HARDAP RESORT, HARDAP REGION-NAMIBIA.**



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**D&P ENGINEERS  
AND ENVIRONMENTAL CONSULTANTS**  
*"Purpose with Passion"*



**PowerCom  
(PTY) LTD**

# **Proposed Construction & Operation of Hardap Resort Base Transceiver Station Tower - Hardap Region: Namibia**

## **Environmental Management Plan (EMP)**

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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 flaws associated with the proposed project, which were identified through 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 proposed by the development. 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 development 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

Powercom (PTY) LTD as subsidiary of Telecom Namibia herein referred to as the proponent has been approached by Namibia Wildlife Resorts (NWR) to rollout telecommunication towers on their sites that are not connected to mobile network. In this respect Powercom identified NWR sites that require improved communication alternatives due to projected growth in the tourism sector and crucial importance of connectivity within parks and resorts

To achieve the objective of improved telecommunication connectivity, Powercom intends to establish telecommunication towers across identified NWR sites. One of the identified areas that needs improved voice and data connectivity through the erection of a telecommunication mast is Hardap Resort located at Hardap Game Reserve.

In terms of the Namibian environmental legislation (Environmental Management Act (No. 7 of 2007)) and the Environmental Assessment Regulations of 2012; an EIA is required to obtain an Environmental Clearance Certificate from the Ministry of Environment and Tourism (MET) before the project can proceed.

Furthermore, as per the requirements of the Environmental Management Act No. 7 of 2007, Powercom has appointed D&P Engineers and Environmental Consultants (DPEE) to conduct an Environmental Assessment (EA) and develop an Environmental Management Plan (EMP) for the proposed tower establishment. This has been followed by an application for Environmental Clearance Certificate (ECC) to the Ministry of Environment and Tourism (MET): Directorate of Environmental Affairs (DEA).

In this respect, this document forms part of the application to be made to the DEA's office for an Environmental Clearance certificate for the proposed telecommunication tower at Hardap resort, in accordance with 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 tower is to be erected at NWR Hardap resort , within Hardap game reserve area. The site is located between the NWR Hardap Resort and the park employees residential area. This is to ensure that connectivity is accessed by NWR resort, park residence as well as the park management offices.

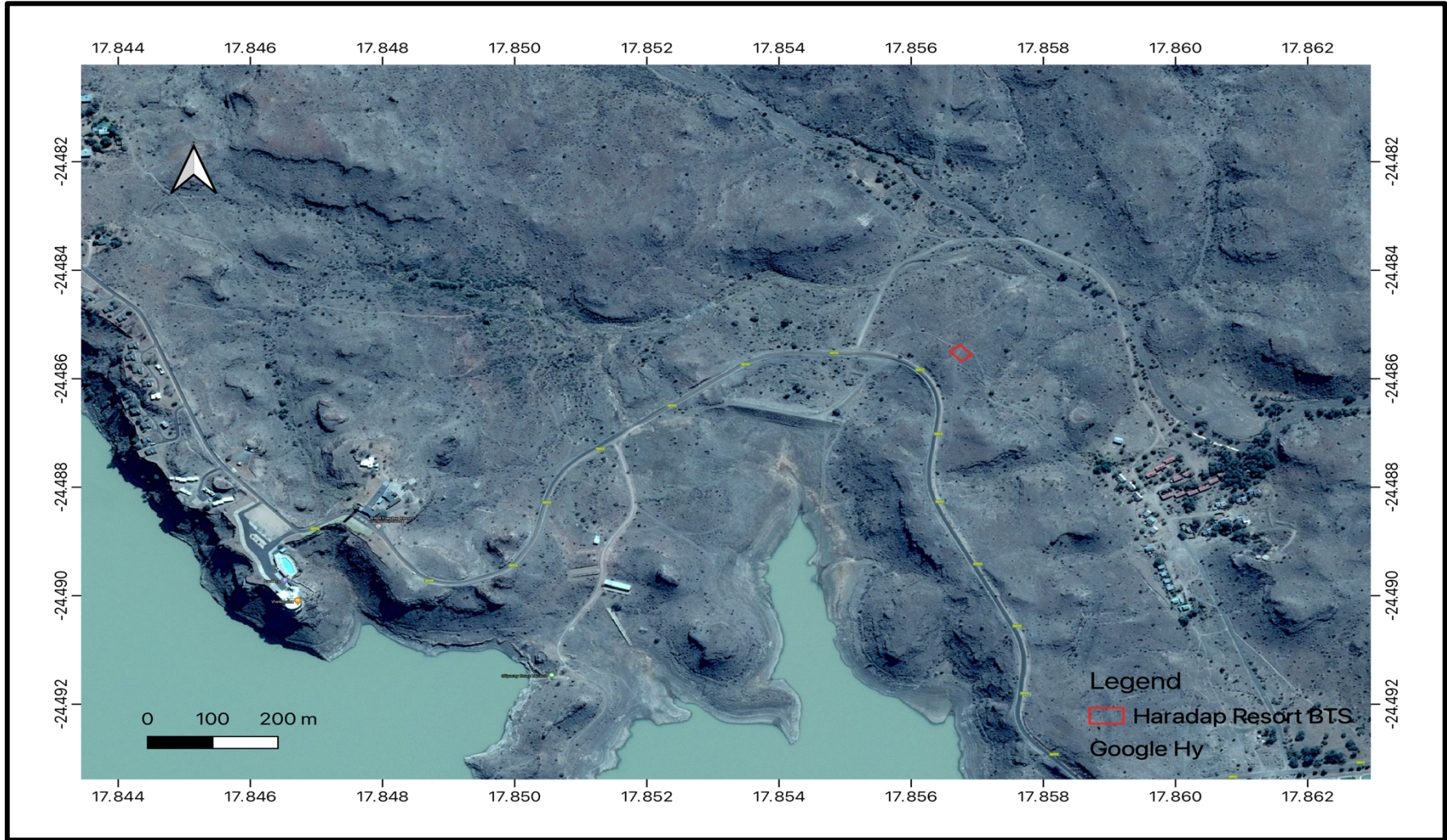


Figure 1: Proposed Project Site.



### 1.3. Project Overview

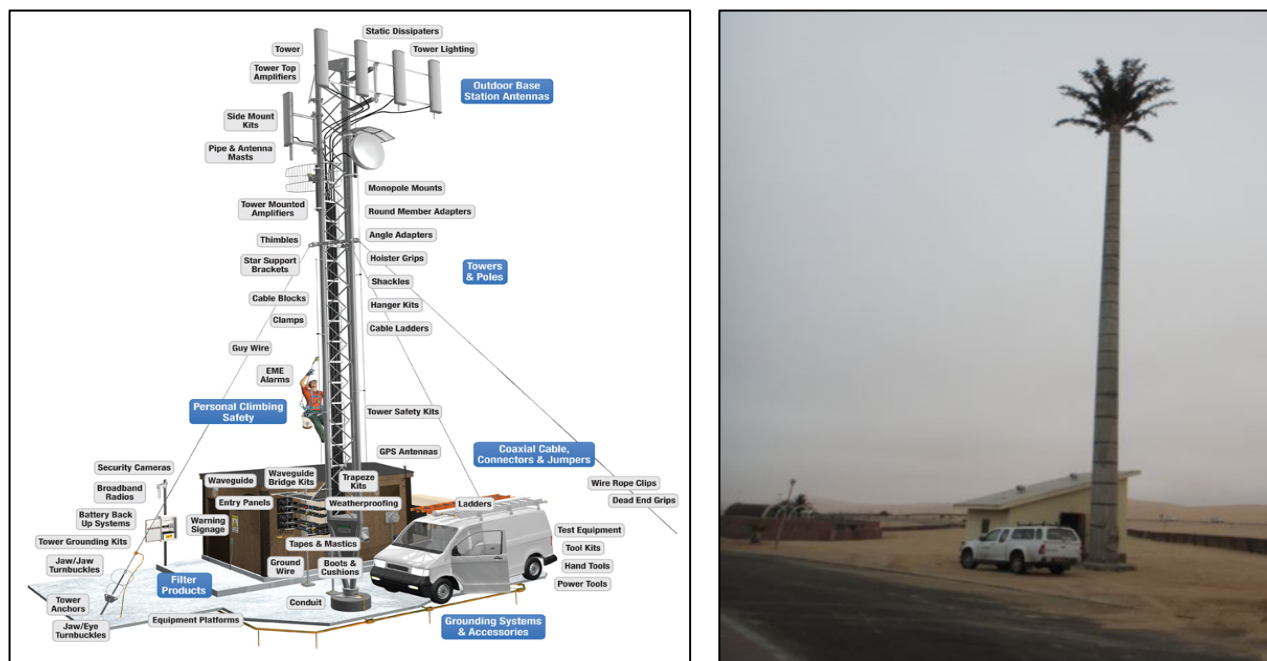
TELECOM Namibia's information and technology infrastructure development subsidiary, Powercom (Pty) Ltd is on a drive of construction network towers across the country. Powercom targets that, other than improving internet and voice connectivity in the regions, there is also a need to increase the company's footprint and asset base to best service ICT stakeholders and offer better connectivity in all regions of the country.

Powercom aims at providing different telecommunication service providers in Namibia with ready to use infrastructure as well as expand TN Mobile’s network coverage into the different areas where there is weak or no network connectivity at all.

Behind this backdrop, Telecom was approached by Namibia Wildlife Resorts to help and facilitate internet connectivity on their sites that are currently not serviced with telecom network. One of the sites identified is Hardap resort, and Powercom Pty Ltd intends to install a telecommunication tower at Hardap Resort. The development will include the following:

- The construction of a 30m Palm tree tower within the footprint size of a 20m x 20m
- A storage and communication structure for equipment

The structure will be fenced to limit public access to it. The base station will be a secured building and sufficient precaution will be made to prevent access to the antenna support structure. Access to the area will be strictly controlled through a locked gate as illustrated below;



**Figure 2: Typical Telecommunication tower (Left) Proposed tower (right).**

The proposed telecommunication tower is designed to blend into the Hardap game park, through installation of a Palm tree tower. This is aimed to also minimize visual aesthetics impacts and the design is below below:

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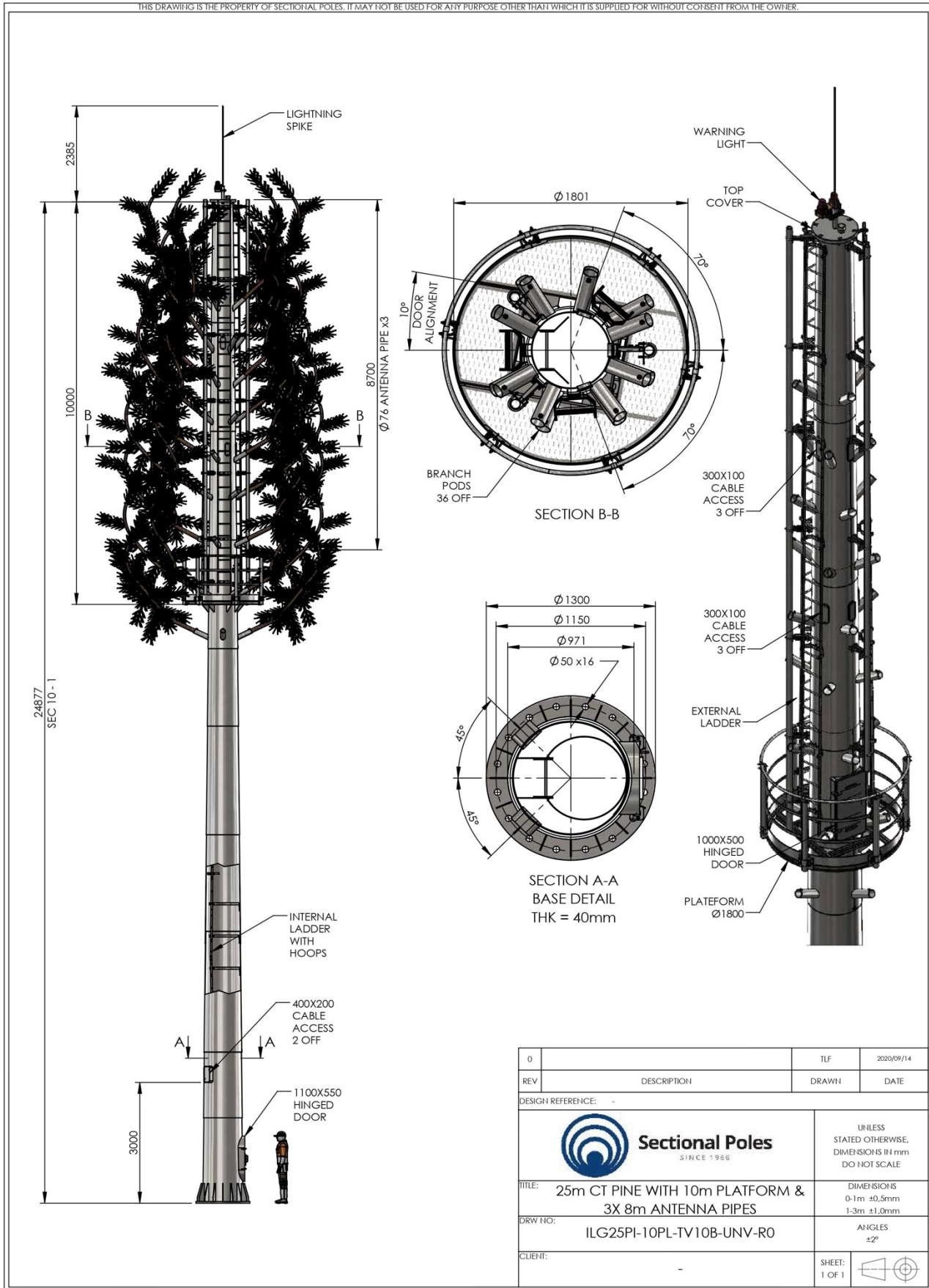


Figure 3: Proposed Pal tree design tower

## 2. PURPOSE OF THE ENVIRONMENTAL MANAGEMENT PLAN (EMP)

This EMP has been developed for the proposed establishment of a telecommunication base transceiver station at Hardap Resort. It forms the operational framework within which the proposed project is to operate within. All anticipated environmental and social impacts identified in the environmental scoping report are addressed, with a mitigation action, monitoring requirements, key indicator and responsibilities.

This EMP is incessant, and it requires compliance monitoring, updating and or amendment if the scope of operations change. All personnel working on the project will be legally required to comply with the standards set out in this EMP.

This section describes the Environmental Management Plan (EMP) for impacts associated with the proposed development. 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 proponent 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.
- Ensure public safety and health is protected

### 2.1. Legal and other requirements compliance

This report presents the EMP and has been undertaken in accordance with the requirements of the Environmental Management Act, No. 7 of 2007 and the Environmental Assessment regulations of 2012. As such, key requirements in accordance to this Act, classifies the proposed project as listed and invokes the need for an environmental management plan to sustainably implement this project. However, legal compliance is not only limited to the EMA, but also applies to all applying legal requirements identified in the ESR. When licenses are required such as wastewater discharge, the proponent should ensure that all licenses and permits are obtained and fulfilled as per conditions.

### 2.2. The EMP Administration

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 (Site Manager) to ensure the successful implementation of the EMP. It solely remains the responsibility of Powercom to ensure;

- That all members of the project team, including contractors, comply with the procedures set out in this EMP;
- That all personnel are provided with sufficient training, supervision, and instruction to fulfil this requirement; and
- Ensuring that any persons allocated specific environmental responsibilities are notified of their appointment and confirm that their responsibilities are clearly understood.

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

The BTS tower will have environmental impacts as indicated in the previous chapter. This section describes the Environmental Management Plan (EMP) for impacts associated with the proposed development. 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 project development and other areas of its influence. The aim is to ensure that the proponent 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.

#### 3.1. EMP Administration

There is a strong need to clearly outline the roles and responsibilities of all stakeholders to ensure that the EMP is fully implemented. To ensure that the EMP is effectively implemented, the consultant also recommends that MET: DEA also conduct regular inspection visits on site to enforce conducting of quarterly and biannual reports.

Furthermore, there is also a need for the proponent to appoint an overall responsible person (project manager) to ensure the successful implementation of the EMP as highlighted below:

**Table 1: Roles and Responsibilities in EMP Implementation**

<b>ROLE</b>	<b>ENVIRONMENTAL RESPONSIBILITIES</b>
Powercom Pty Ltd (Site Acquisition Manager)	Responsible to enforce EMP implementation during construction and operation phases.
Environmental Control Officer (ECO)	Implement, review and update the EMP. <ul style="list-style-type: none"> <li>• Ensure all reporting and monitoring required under EMP is undertaken, documented and distributed as needed</li> <li>• Conduct environmental site training (tool box talks) and inductions with the support of an environmental consultant.</li> <li>• Conducts environmental audit at work site with the support of environmental consultant.</li> <li>• Close out all non-conformances.</li> <li>• Ensure materials being used on site are environmentally friendly and safe.</li> </ul>
The Directorate of Environmental Affairs	Approve the EMP and any amendments to the EMP. <ul style="list-style-type: none"> <li>• Approve reports of environmental issues and non-conformances as issued.</li> <li>• Review and approve environmental reports submitted as part of EMP implementation</li> <li>• Ensure that the client is compliant to the EMP through biannual reporting on environmental performance.</li> </ul>
Project Manager (Site Engineer)	Control and monitor actions required by the EMP. <ul style="list-style-type: none"> <li>• Report all environmental issues to HSE Manager.</li> <li>• Ensure documented procedures are followed and records kept on site.</li> <li>• Ensure any complaints are passed onto the management within 24 hours of receiving the complaint.</li> </ul>
Contractor	Follow requirements as directed by the EMP when conducting work. <ul style="list-style-type: none"> <li>• Report any potential environmental issues to site engineer/project manager, indicating spilt oil, excess waste, excessive dust generation, dirty water running off the site and other possible non-conformances</li> </ul>

**Table 2 : Construction and Operation EMP (C&O EMP)**

Impact	Description	Effects	Class	Time frame	Responsibility	Action	Phase
<b>Noise pollution</b>	Noise will be generated through: -Construction activities -Moving vehicles.	- The health of working personnel could be disturbed. - Park residents could be disturbed by the noise. - General annoyance -Driving away of local animals' species near the project site	Environmental	4-6 months	-Environmental Control Officer -Site Manger	- A construction interval will be established, used and adhered to. - Workers will be issued earplugs to protect them from excessive noise. - Public will be notified through printed timetable stating planned operational activities. - Construction activities will be conducted during daytime. -Site notices will be erected on, around the site-notifying visitors, and nearby residents of different hazards on site. -No go areas marked as sensitive environments, especially for birds needs to be avoided during construction and operation.	<b>Construction&amp; Operation</b>
<b>Dust Generation</b>	Dust will accumulate because of the land preparation, onsite movements of vehicles and machines, wind blowing on loose material during construction and tipping.	- Can lead to respiratory illnesses especially to those working in the area. - General air pollution. -Nuisance to nearby residents -The process can also drive away wild animals within the project area surroundings	Environmental	6-8 months	-Environmental Control Officer -Site Manager	- Dust suppression will be done through watering dust sources surfaces. -Watering down dusty surfaces, -Ensure that protective equipment such as respirators are distributed to employees, and ensure their use. -Site notices to be erected on and around the site to inform visitors and surrounding residents.	<b>Construction&amp; Operation</b>
<b>Loss of Biodiversity</b>	-Vegetative plants on site will be removed -Habitat destruction for both ground dwelling species and tree dwelling species. -Soil disturbance on and around the site.	-The clearing of vegetation will result in the breaking of the ecosystem processes in the area. -Loss of aesthetic value of the proposed project area.	Environmental	Construction phase	-Environmental Control Officer -Site Manager	- The proposed project area is already disturbed, hence there is little vegetation to be affected by the development. - Ground disturbance will only be limited to the boundary area to avoid affecting a large area.	<b>Construction</b>

Impact	Description	Effects	Class	Time frame	Responsibility	Action	Phase
		-The few small animals still habiting the place such as small rodents and birds will be forced away.				-Upon completion of construction activities more regreening of the construction footprint affected area is recommended.  A local landscaper can be engaged.  <b>The park authorities, indicated the importance of ensuring rehabilitation of constructed areas.</b>	
<b>Greenhouse gas emissions</b>	Green House Gasses (GHGs) emissions will be produced from the following activities: <ul style="list-style-type: none"> <li>Fuels combustion for (construction vehicles and equipment)</li> <li>Ground excavation releases phosphorus found underground and releases particulate matter into the atmosphere.</li> </ul>	-Global climate change - Air pollution	Environmental	Construction phase	-Environmental Control Officer -Site Manager -Department of Environmental Affairs.	-Adopt the use of ethanol blended fuels wherever necessary. -Design an operation system that cuts on fuel consumption. - Use of solar energy system during construction for lighting and other minor energy needs.	<b>Construction &amp;Operation</b>
<b>Waste Generation</b>	-Construction and operation are associated with a lot of raw material and activities that results in pollution -The construction and maintenance activities may generate e-waste and this needs to be disposed of in a sustainable manner.	-Pollution from oil spills resulting from the handling of various machineries used during the construction phase -Construction rubble, empty packaging containers/bags and materials remnants.	Environmental	Construction phase	-Environmental Control Officer -Site Manager	- Ensure that all waste from construction activities is stored and contained in designated containers and transported to an approved waste disposal site. -Bulky waste such as building rubbles must be collected and disposed of for landfilling. -Visual inspections monitoring	

Impact	Description	Effects	Class	Time frame	Responsibility	Action	Phase
Safety and Health risks	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	Construction phase	ECO	<ul style="list-style-type: none"> <li>- Equip workers with Personal Protective Equipment (PPE), provide trainings on how to effectively use the PPE.</li> <li>-Provide platforms for briefings and meetings about possible safety and health hazards in the work place</li> <li>-Provide site signs warning and informing about different hazards on site.</li> </ul>	Construction and operation
	Electrical hazards	-Fatalities and fires	Health and safety	Construction and operation	ECO	<ul style="list-style-type: none"> <li>-Employees should be trained on electrical safety before working on site.</li> <li>-Safety representative with training on electrical hazards emergency management should be station on site always during construction</li> <li>-Safety signs during construction and operation should be put on site, no go areas should be labelled, PPE specifications should be clear to maintenance personnel.</li> </ul>	Construction and Operation
	Radiation (Non Ionizing)	Carcinogenic consequences	-Health -Social	Permanent	-Environmental Control Officer -Site Manager	<p>-Radiation is the emission of energy as electromagnetic waves or as moving subatomic particles and it is part of our everyday environment (Clegg et al.,2019).</p> <p>Non-ionizing radiation encompasses both natural and human-made sources of electromagnetic fields, for example, electrical power supplies and appliances are the most common sources of low frequency electric and magnetic fields in our living environment (ITU-T, 2014).</p> <p>The contractors to be installing the transmission are required to put on appropriate PPE to protect them from possible radiation.</p>	Operation



Impact	Description	Effects	Class	Time frame	Responsibility	Action	Phase
						Provisions of the Atomic Energy and Radiation Protection Act, 2005 (Act No. 5 of 2005) should be effectively be implemented, and 20 days before installation of the transmitters, communication should be made to radiation Protection Authority for authorization and supervision.	
	Avifauna	-Bird fatalities	-Environmental	Permanent	-Environmental Control Officer -Site Manager	<ul style="list-style-type: none"> <li>-New towers must be built below 60m height to avoid bird fatalities.</li> <li>-Construct unguyed towers with platforms that will accommodate possible future co-locations and build them at existing 'antenna farms', away from areas of high migratory bird traffic, wetlands and other known bird areas.</li> <li>-Where towers over 60m are absolutely necessary, use the minimum amount and intensity of lighting allowed under FCC regulations.</li> <li>-Minimize the tower 'footprint' on newly constructed towers.</li> <li>-If the tower is decommissioned, it should be removed as soon as possible.</li> <li>-Use visual daytime markers in areas of high diurnal birds.</li> <li>-Security lighting for on-ground facilities should be minimized, point downwards or be down-shielded.</li> <li>-Conduct on-site bird fatalities monitoring on the tower at least every month.</li> <li>-The use of white strobes results in less circling behavior by nocturnal migrants and thus fewer mortalities than red pulsating lights.</li> </ul>	Operation

Impact	Description	Effects	Class	Time frame	Responsibility	Action	Phase
	Aviation Impacts	-Bird fatalities -Air transports impacts	-Socio-economic -Environmental	Permanent	-Environmental Control Officer -Site Manager	-The towers should comply with aviation guidelines so that they do not impact air transport systems. -Air traffic visibility systems such as lighting at the tip of the tower. -The towers should be designed so that they are visible to birds.	<b>Construction and operation</b>
<b>Land use change</b>	-There will be change in land use and visual aesthetics	-The area will no longer be suitable for agriculture. -Sudden change in landscape appearances may be unfavourable to the conservatives.	-Social -Terrestrial environment	Permanent	-Environmental Control Officer -Site Manager	-The development should blend into the existing area through designing and colour coding. -Green designing will bring life to the site and blend with surrounding areas through the installation of a Palm Tree Tower, that fits into the coastal ecological composition.	<b>Construction and operation</b>
<b>Positive Impacts</b>							
<b>Employment creation</b>	The development provides an opportunity of outsourcing work	- Improves disposable income to those employed and their immediate families.	Socio-economic	Project life time	-Site Manager	- Work with local leadership (councillor) on acquiring non-skilled labour from the residents.	<b>Construction and operation</b>
<b>Business linkages</b>	-Raw materials acquiring and contracting companies provide an opportunity for businesses.	-Local suppliers will be presented with an opportunity to empower their businesses. -Construction workers can be provided with accommodation, food and services from the local community increasing business activities.	-Socio-economic	Construction phase	-Site Manager	-The proponent will outsource most of its materials and services from Walvis Bay.	<b>Construction and operation</b>
<b>Infrastructure development</b>	The development presents a unique opportunity for infrastructure development in Northern Namibia area.	-Improvement in connectivity. -Boost in local tourism since the NWR resort will receive more bookings since it will have reliable connectivity.	-Socio-economic	Construction phase	-Site Manager	-The new tower should cover a larger area, and they should also consider provision of infrastructure platform to other smaller companies such as security companies.	<b>Construction and operation</b>

## 4. CHAPTER FOUR: CONCLUSION AND RECOMMENDATIONS

### 4.1. Recommendation from Environmental Assessment Practitioner

Based on the information provided it is the opinion of D & P Engineers and Environmental Consultants cc that no fatal flaws have been identified for the proposed development and that the information contained in this report is sufficient enough to allow DEA to make an informed decision.

The Environmental Consultant therefore recommends that Environmental Clearance be granted for the proposed development based on the following recommendations:

- The proposed activity is not anticipated to have significant environmental impacts.
- There is however a visual impact.
- The following recommendations should be implemented in order to ensure that potential impacts associated with the establishment and operation of the site are minimised:
  - i. Any areas disturbed during construction and operation must be rehabilitated.
  - ii. The structure is to be removed when the structure ceased to be used for telecommunications purposes and the site rehabilitated.
  - iii. Construction to take place during working hours.
  - iv. Trampling and disturbance associated with construction should be limited to within 5m (five metres) of the footprint of the site.
  - v. Provisions of the Atomic Energy and Radiation Protection Act, 2005 (Act No. 5 of 2005) should be strictly abided to.
  - vi. On completion of the project all litter and construction debris shall be immediately removed from the site.
  - vii. Mitigation measures to reduce the potential visual impact should be implemented as far as possible.