

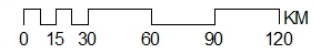
## ENVIRONMENTAL MANAGEMENT PLAN (EMP)

### TKNP RADIO MASTS



- Legend**
- Town
  - 📡 Radio Mast
  - River
  - Main Road
  - Trunk Road
  - Protected Area

No.	Name	Lat	Long	Elevation (m)	Mast Height (m)
1	Luderitz	-26.641	15.17341	89.70	25
2	Aus	-26.7635	16.40309	1,790.00	24
3	Grunau	-27.3457	18.01769	1,543.70	21
4	Zebrafontein	-27.8043	16.86526	1,632.40	12
5	Parks - TKNP	-27.3071	15.82377	1,105.40	21
6	Swartkop	-28.5569	16.4951	71.80	15



## UPGRADING OF THE TSAU //KHAEB (SPERRGEBIET) NATIONAL PARK (TKNP) AND /AI-/AIS RICHTERVELD TRANSFRONTIER PARK (ARTP) RADIO SYSTEM , //KARAS REGION



### NamParks IV Project (Namibia National Parks Programme)



July 2020



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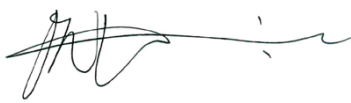
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DOCUMENT INFORMATION		
<b>Title</b>	Environmental Management Plan (EMP) for the upgradig of the Radio System for Tsau //Khaeb (Sperrgebiet) National Park (TKNP) and /Ai-/Ais and National parks, //Karas region	
<b>ECC Application Reference number</b>	<b>APP: 001681</b>	
<b>Listed Activity</b>	Activity 10: Infrastructure 10.1 (g) The construction of Communication networks including towers, telecommunication and marine telecommunication lines and cables;  10.1 (j) <b>Masts</b> of any material or type and of any height, including those used for telecommunication broadcasting and radio transmission, but excluding (i) Flag poles; and (ii) Lightning conductor poles	
<b>Location</b>	/Ai-/Ais and Tsau //Khaeb (Sperrgebiet) National Parks, //Karas region	
<b>Proponent</b>	Ministry of Environment, Forestry and Tourism Contact person: Mendes Vinte Private bag 13306 Windhoek Tel: +264 81 291 8501 E-mail: <a href="mailto:mendes.vinte@namparks.org">mendes.vinte@namparks.org</a>	
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## Executive Summary

Communication is a very important tool for protected area management and hence the construction of radio masts is necessary to enhance communication for the /Ais /Ais Richtersveld Transfrontier Park (ARTP) and Tsau //Khaeb (Sperrgebiet) National Parks (TKNP). However, such developmental activities should be conducted in a thoughtful and forward looking manner, in-order to minimize / mitigate negative environmental and socio-economic impacts.

The radio system comprise of six (6) VHF repeaters, which are recommended for Lüderitz, Parks, Zebrafontein, Grunau, Swartkop and Aus. In-addition, a link-repeater is recommended at Kowisberg.

The Environmental Management Plant (EMP) recommends mitigation measures in order to ensure that the recommended upgrading of the existing radio masts and associated activities are conducted in an environmental friendly manner, as prescribed by the Environmental Management Act of 2007 and EIA regulations of 2012.

Upon approval and issuance of the Environmental Clearance Certificate, the proponent (MEFT) should comply and adhere to the recommended mitigation and rehabilitation measures as prescribed in the Environmental Management Plant (EMP). The EMP outlines specific roles and responsibilities for the proponent (MEFT and sub-contractors) and non-compliance is punishable.

## ACRONYMS

<b>ARTP</b>	/Ai-/Ais Richtersveld Trans frontier Park
<b>BID</b>	Background Information Documents
<b>DEA</b>	Directorate of Environmental Affairs
<b>ECC</b>	Environmental Clearance Certificate
<b>EIA</b>	Environmental Impact Assessment
<b>EMA</b>	Environmental Management Act
<b>EMP</b>	Environmental Management Plan
<b>I&amp;APs</b>	Interested and Affected Parties
<b>JMB</b>	Joint Management Board
<b>MEFT</b>	Ministry of Environment, Forestry and Tourism
<b>PMC</b>	Park Managers' Committee
<b>TEC</b>	Tortoise Environmental Consultancy
<b>TKNP</b>	Tsau //Khaeb (Sperrgebiet) National Park

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# 1. INTRODUCTION

## 1.1. Terms of Reference

The /Ais /Ais Richtersveld Transfrontier Park (ARTP) and Tsau //Khaeb (Sperrgebiet) National Park (TKNP) radio system comprises of six (6) VHF repeaters, which are reference as **Lüderitz, Parks, Zebrafontein, Grunau, Swartkop** and **Aus**. In-addition, a link-repeater is recommended at **Kowisberg**.

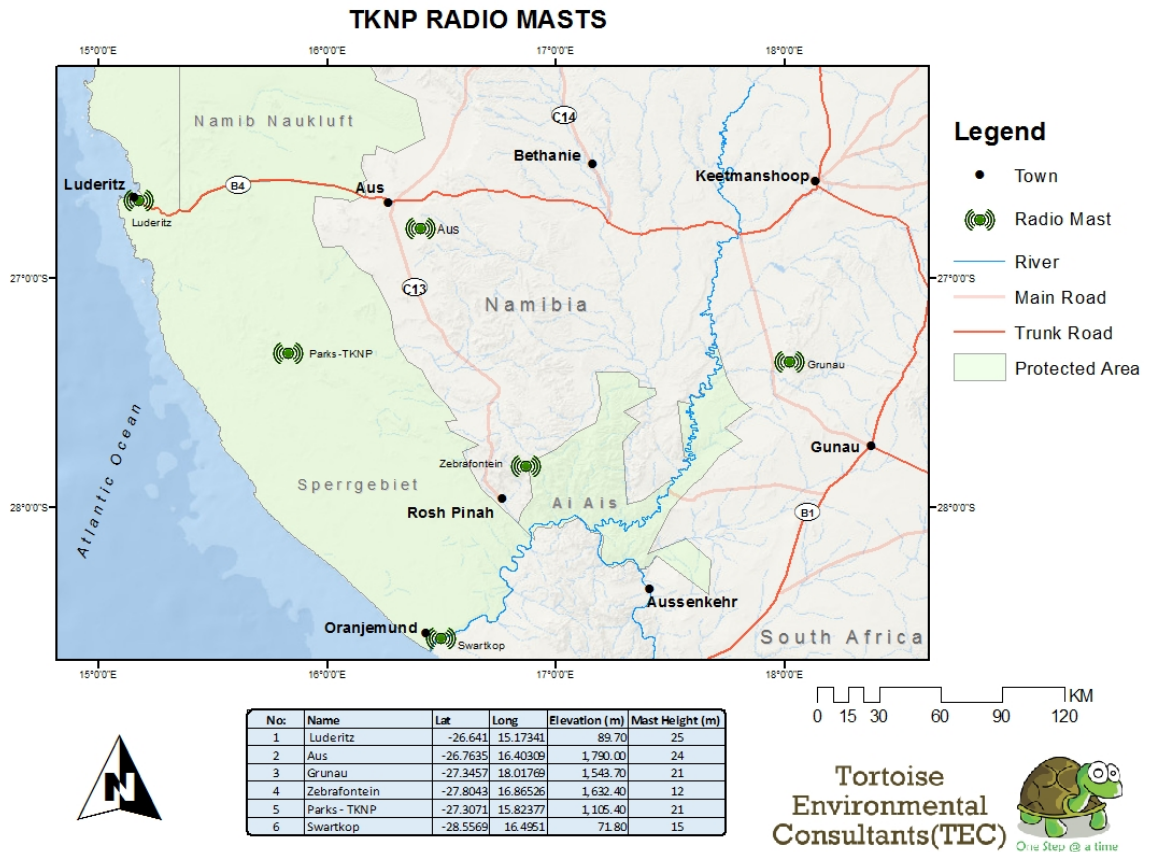


Figure 1-1: Location of TKNP and ARTP Radio Masts and Repeaters

The proposed sites are already existing and comprise of some sort of infrastructure and the proposal is to upgrade them with modern radio infrastructure.

## 1.2. EMP Context

This document constitutes the Environmental Management Plan (EMP) for the for the upgrading of existing radio masts in the Tsau //Khaeb (Sperrgebiet) National Park (TKNP) and /Ais /Ais Richtersveld Transfrontier Park (ARTP), for the following sites:

- a) Lüderitz

- b) Grunau
- c) Zebrafontein, and
- d) Swartkop
- e) Aus
- f) Parks

### 1.3. Objectives of the Radio System

The objectives of the radio system is to enhance communication in the selected landscapes (TKNP and ARTP), in-order to ensure that the national parks are managed effectively and efficiently, in collaboration with the park neighbours and other stakeholders. The aim is to protect the unique flora and fauna, secure national and transboundary migratory routes for wildlife, and become competitive tourism destinations in a way that neighbouring communities benefit economically.

### 1.4. What is an EMP?

The Environmental Management Plan (EMP) is a tool used to mitigate potential environmental risks associated with the proposed project / activity, and provides a risk management strategy and logical framework for implementation of the proposed construction activities, in order to mitigate potential environmental and social impacts identified during the EIA process, in accordance with the provisions of the Environmental Management Act (Act No.7 of 2007), EIA Regulations of 2012 and any other relevant / applicable legislation.

As a result, the EMP recommends mitigation measures in order to ensure that the recommended construction activities and associated activities are conducted in an environmental friendly manner, and in accordance with the provisions of the Environmental Management Act and EIA regulations

Furthermore, the EMP outlines specific roles and responsibilities for role-players against which they can be evaluated and non-compliance is punishable.

### 1.5. Purpose of the EMP

The purpose of the EMP is to identify potential environmental and social impacts associated with the construction activities, in-order to ensure compliance to the EMA.

The aim of the EMP is to ensure that the activities undertaken during the renewal of the construction activities are conducted in accordance with the following:



- i. Environmental Management Act (No. 7 of 2007),
- ii. EIA regulations of 2012 (GN: 30), and
- iii. Best environmental practices (benchmarks)
- iv. Any other applicable legislation (*as presented in Table 3.1 to 3.3*)

The EMP provides environmental guidelines to be followed throughout the lifespan of the construction activities and comprise of the following:

- a) Environmental Aspects,
- b) Management Objective,
- c) Mitigation Measures / Actions Required,
- d) Monitoring Indicators, and
- e) Party Responsible

## **1.6. Objective**

The objective of the EMP is to prevent / minimize, unacceptable and adverse environmental, social or economic impacts that may arise from the proposed development. Overall, the EMP aims to prevent any negative impact/s (real, potential or perceived) that may result from the proposed construction activities.

## **1.7. EMP Scope**

The EMP does not only focus, and it is not limited to the margins of the water sources, but it includes the bigger picture, and serve as the guiding tool to protecting the natural, bio-physical and socio-economic environment on both the specific site in the surrounding area. The bigger picture is important because, some impacts may not be confined to the margins of the construction site.

## **1.8. Possible adjustments to the EMP**

The EMP is an open-ended document and maybe considered inconclusive. In other words, the EMP should allow room for adjustments if new information becomes available at a later stage, in which new / additional mitigation measures may become necessary.

The necessity of possible adjustments to the EMP at a later stage may be attributed to:

- a) Lack of information at the time of drafting the initial EMP,
- b) Evolution or addition of new activities, or
- c) Unintended omission of potential impacts during the initial EIA scoping exercise and development of the initial EMP.

d) Development of industry best practice.

This implies that, in-addition to the information contained herein, any other relevant information that may surface during the construction operations, through internal monitoring or auditing by the Environmental Compliance Officers (ECOs), can be added to the EMP (evolution of activities), and such changes or inclusions will be binding to the proponent and all contractors / sub-contractors.

## 1.9. Implementation Framework and Accountability to the EMP

For effective implementation of the EMP, the Institutional roles are presented below. However, the specific roles and responsibilities are defined and broken down as presented in Sections 4 and 5, respectively.

Table 1-1: Role players, Institutional Framework

Role-player	Company / Institution	Role
Proponent	Ministry of Environment, Forestry & TouriPM(MEFT) – Department of Wildlife and National Parks (DWNP)	Compliance to the EMP
Environmental Consultant	Tortoise Environmental Consultants (TEC)	Development of the EMP
Environmental Compliance Officer/s (ECO)	Ministry of Environment, Forestry & TouriPM(MEFT) – Department of Environmental Affairs (DEA)	Monitoring Compliance to EMP: <ul style="list-style-type: none"> <li>➤ Un-announced spot checks,</li> <li>➤ Corrective measures, warning, penalties / fines, license suspension, etc</li> </ul>
Public	Interested and affected parties (I&APs)	Report to the ECOs, any activity of environmental concerns

## 2. STUDY AREA - ARTP AND TKNP

### 2.1 The Greater Fish River Canyon Landscape (GFRCL)

The Greater Fish River Canyon Landscape (GFRCL) comprises of the /Ai-/Ais National park (5,900 km<sup>2</sup>), Naute Game Park (225 km<sup>2</sup>) and adjacent land units (1,496 km<sup>2</sup>), totalling 7,621 km<sup>2</sup> (Figure 2.1).

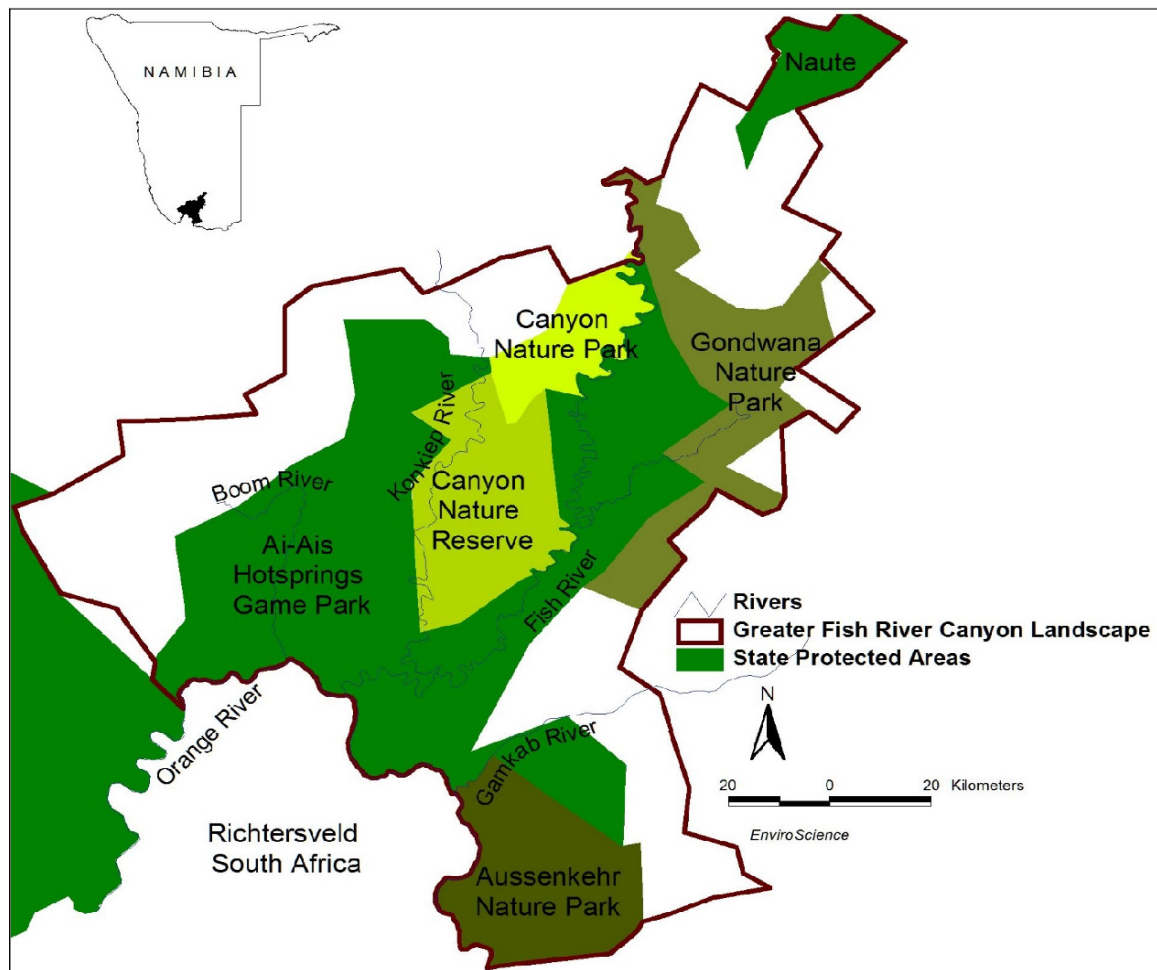


Figure 2-2-1: The Greater Fish River Canyon Landscape (GFRCL), (google, 2020)

### 2.2 The /Ai-/Ais – Richtersveld Trans-frontier Park (ARTP)

The /Ai-/Ais Richtersveld Trans-frontier Park (ARTP), also referred to as Trans-frontier Conservation Area (TFCA) comprises of the /Ai-/Ais National Park (Namibia) and Richtersveld National Parks (South Africa).

Since /Ai-/Ais is part of the GFRCL (7,621 km<sup>2</sup>), combined with the Richtersveld National Park (6,045 km<sup>2</sup>), the TFCA covers a total surface area of 13,666 km<sup>2</sup> (Figure 2.2).

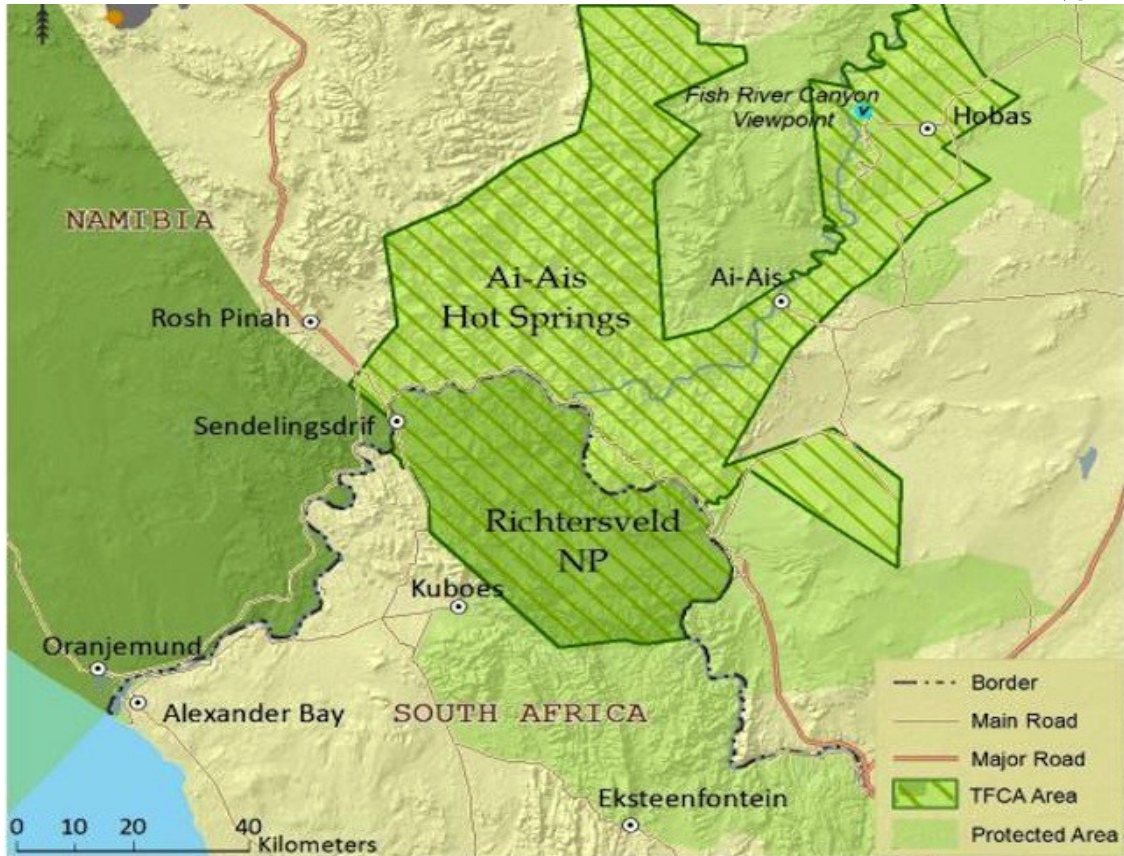


Figure 2-2-2: /Ai-/Ais – Richtersveld TFCA (google images, 2020)

### 2.3 The Tsau//Khaeb National Park (TKNP)

Formerly known as the Sperrgebiet, the Tsau//Khaeb National Park (TKNP) was proclaimed in 2008, and covers a total area of about 22,000 km<sup>2</sup> (Figure 2.3).

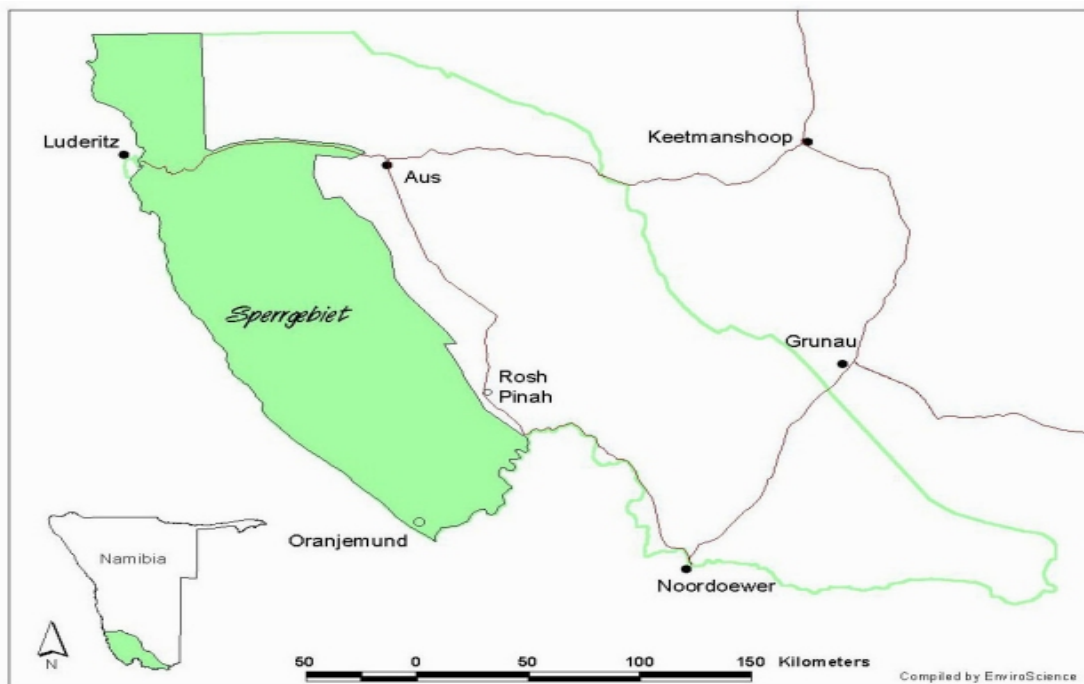


Figure 2-2-3: Tsau//Khaeb (Sperrgebiet) National Park (TKNP), (google, 2020)

After its proclamation in 2008, the Tsau//Khaeb National Park (TKNP) became an integral part of the /Ai-/Ais Richtersveld Transfrontier Park (ARTP). As a result, the total study area is the ARTP (13,666 km<sup>2</sup>), combined with the TKNP (22,000 km<sup>2</sup>) = 35,666 km<sup>2</sup> (Figure 2.4).



Figure 2-2-4: ARTP and TKNP Conservation Area (google images, 2020)

### 3. RADIO SYSTEM - ARTP AND TKNP

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#### 3.1 Need for Trans-boundary Radio System

The TKNP and ARTP presents an area of high importance for biodiversity conservation, touriPMand research and hence communication is essential for effective park management. (MEFT, 2020).

Due to the vastness of the landscape (35,666 km<sup>2</sup>) and limited radio network coverage, communication is a major challenge for park staff, tour operators and other stakeholders.

As a result, the Park Managers' Committee (PMC), identified the need for a transboundary radio communication system and submitted their recommendation to the ARTP Joint Management Board (which strategically includes the TKNP).

#### 3.2 The //Karas region

The //Karas region where TKNP and ARTP are located is very mountainous, with greatly varying topography, resulting in challenges with radio frequency coverage. As a result, a consultant (Lithon Project Consultants) was appointed to design a two (2) way radio system for the TKNP and ARTP landscape.

#### 3.3 Radio system design

The radio system comprise of six (6) VHF repeaters, which are recommended for Lüderitz, Parks, Zebrafontein, Grunau, Swartkop and Aus. In-addition, a link-repeater is recommended at Kowisberg (**Figure 3.1**).

The Swartkop repeater is to be installed on an existing MTC mast while the Lüderitz repeater is to be installed on an existing NamDeb Mast.

Whilst, the Zebrafontein and Aus repeaters will be installed on the existing privately-owned masts. The Grunau repeater will be installed on a new mast to replace the existing mast that broke down. The new mast will be constructed on the existing disturbed site.

The Kowisberg link repeater will be installed at the existing NAMDEB site (disturbed site).

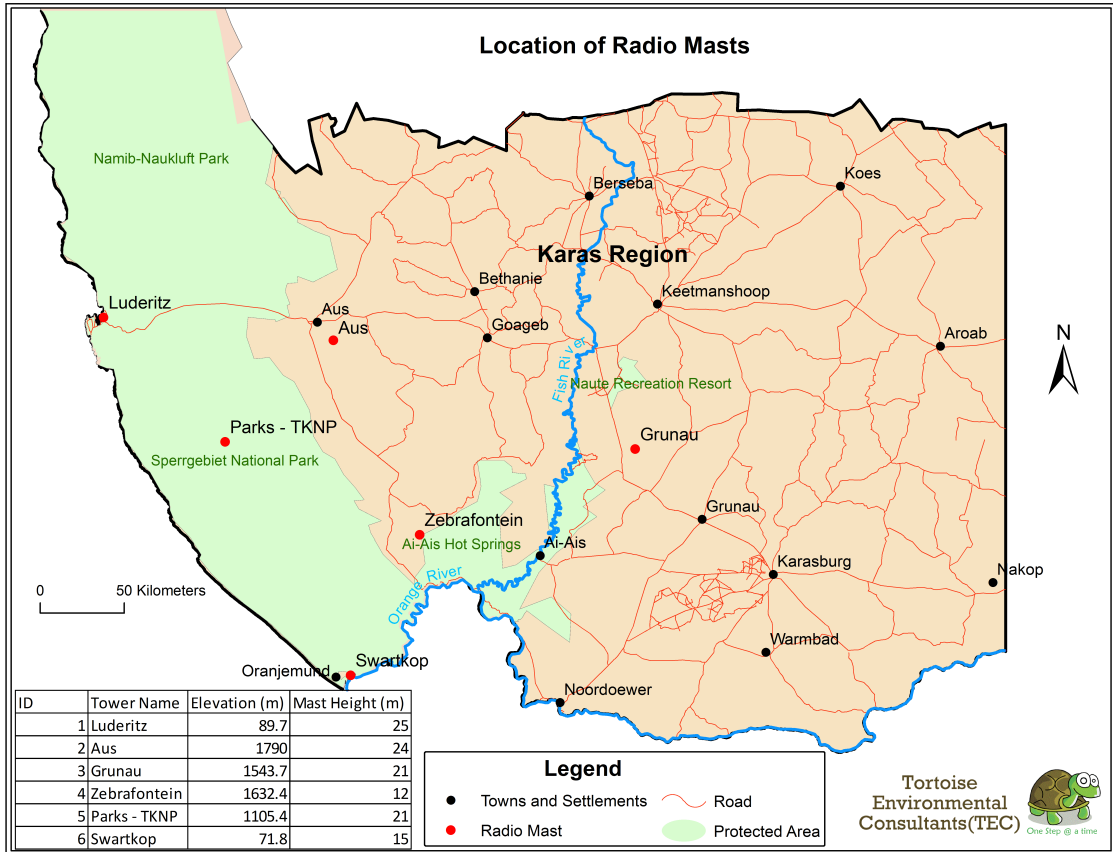



Figure 3-1: Recommended Radio Masts & Repeaters in TKNP and ARTP landscape

## 4. ASSESSMENT OF THE RADIO MAST SITES

Objectives of the site assessments:

- To assess the possible environmental /biodiversity impacts for each site
- To Identify possible source of construction materials (water and sand)

### 4.1 Lüderitz Radio Mast

EIA / EMP Context	<ul style="list-style-type: none"> <li>▪ Already disturbed site</li> <li>▪ Existing / old radio infrastructure</li> </ul>	
Location	<ul style="list-style-type: none"> <li>▪ 10 km east of Lüderitz (B4 towards Aus)</li> <li>▪ Approximately 50 meters from the main road</li> </ul>	
GPS Coordinates	Latitude	Longitude
	-26.641	15.17341
Elevation	89.7 m	
Mast height	25 m (new repeater to share the current MTC mast)	
Access Road	Existing 4x4 access road, but difficult terrain – Soft Sand	
Power	Grid power available	
Cubicle	Cubicle available, but sharing of floor space should be negotiated with MTC	
Biodiversity	<ul style="list-style-type: none"> <li>▪ Scattered desert adapted succulent plants</li> <li>▪ No endemic species identified</li> <li>▪ No additional environmental impacts expected</li> </ul>	
Infrastructure	<ul style="list-style-type: none"> <li>▪ Old radio tower repeater in good condition</li> </ul>	
Construction Material	<ul style="list-style-type: none"> <li>▪ There is a construction borrow pit close to the radio tower, which belongs to the town council</li> <li>▪ Site already fenced and in a good condition</li> </ul>	
Existing Radio Tower Infrastructure, Lüderitz		



## 4.2 Grünau

EIA / EMP Context	<ul style="list-style-type: none"> <li>▪ Already disturbed site</li> <li>▪ Existing / old radio infrastructure</li> </ul>	
Location	<ul style="list-style-type: none"> <li>▪ Located on one of the highest sites in the Grunau, Naute, Hobas triangle</li> <li>▪ Specifically located on farm Hoolog</li> <li>▪ 27 km from the C12 turn off into farm Holog (gravel road)</li> <li>▪ 56 km northwest of Grünau (C12)</li> </ul>	
GPS Coordinates	Latitude	Longitude
	-27.3457	18.1769
Elevation	1,543.7 m	
Mast height	21 m (new mast to be constructed on the same platform to replace old mast)	
Access Road	<ul style="list-style-type: none"> <li>▪ There is an existing access road (4x4)</li> <li>▪ Very difficult mountainous terrain (even with 4 x 4)</li> <li>▪ Use of Helicopter is recommended during construction</li> </ul>	
Power	None = new Solar PV required	
Cubicle	None = New pre-fabricated cubicle required to house RF equipment, regulators and batteries	
Biodiversity	<ul style="list-style-type: none"> <li>▪ Scattered small desert adapted plants</li> <li>▪ NO endemic or specially protected plant species identified</li> <li>▪ Site already disturbed and minimal no additional negative environmental impacts expected</li> </ul>	
Infrastructure	<ul style="list-style-type: none"> <li>▪ Old radio tower repeater lying on the ground (possibly damaged by wind)</li> </ul>	
Construction Material	<ul style="list-style-type: none"> <li>▪ No sand and concrete stones in the surrounding area (mostly big rocks)</li> <li>▪ Nearest water source is a about 8km (borehole)</li> <li>▪ Fencing recommended to keep livestock away</li> <li>▪ Explore use of helicopter to air lift construction material</li> </ul>	



(a) Terrain and biodiversity



(b) Old radio tower repeater

### 4.3 Zembrafontein

EIA / EMP Context	<ul style="list-style-type: none"> <li>▪ Already disturbed site</li> <li>▪ Existing / old radio infrastructure</li> </ul>	
Location	<ul style="list-style-type: none"> <li>▪ Located on farm Zembrafontein one of the highest points in vicinity</li> <li>▪ 90 km north of Rosh Pinah (C13)</li> </ul>	
GPS Coordinates	Latitude	Longitude
	-27.8043	18.86526
Elevation	1,632.4 m	
Mast height	21 m (suitable for VHF, but another mast = 12 m is required for IP links)	
Access Road	<ul style="list-style-type: none"> <li>▪ 4 x 4 access via a number of private farms and prior permission is required</li> <li>▪ Very difficult mountainous terrain (even with 4 x 4)</li> <li>▪ Use of Helicopter is recommended during construction</li> </ul>	
Power	NO power = new Solar PV required	
Cubicle	None = New pre-fabricated cubicle required to house RF equipment, regulators and batteries	
Biodiversity	<ul style="list-style-type: none"> <li>▪ High biodiversity and endemism</li> <li>▪ Considered to be a sensitive area, but not significant</li> <li>▪ Site already disturbed and minimal no additional negative environmental impacts expected</li> </ul>	
Infrastructure	<ul style="list-style-type: none"> <li>▪ Existing tower still intact and can be upgraded</li> </ul>	
Construction Material	<ul style="list-style-type: none"> <li>▪ No sand and concrete stones in the surrounding area (mostly big rocks)</li> <li>▪ Fencing recommended to livestock and wildlife away from the tower</li> <li>▪ Explore use of helicopter to air lift construction material</li> </ul>	



(c) Terrain and biodiversity



(d) Vegetation

#### 4.4 Swartkop

EIA / EMP Context	<ul style="list-style-type: none"> <li>▪ Already disturbed site</li> <li>▪ Existing / old radio infrastructure</li> </ul>	
Location	<ul style="list-style-type: none"> <li>▪ 500 m from the main entrance gate into the town of Oranjemund</li> </ul>	
GPS Coordinates	Latitude	Longitude
	-27.5569	16.4951
Elevation	71.8 m	
Mast height	15 m	
Access Road	<ul style="list-style-type: none"> <li>▪ Easily accessible</li> <li>▪ 4 x 4 recommended</li> </ul>	
Power	Grid power available	
Cubicle	None = New pre-fabricated cubicle required to house RF equipment, regulators and batteries	
Biodiversity	<ul style="list-style-type: none"> <li>▪ Low biodiversity: scattered Bushman Candle plants that are considered sensitive from a botanical perspective</li> <li>▪ Site already disturbed and minimal no additional negative environmental impacts expected</li> </ul>	
Infrastructure	<ul style="list-style-type: none"> <li>▪ Existing tower still in a good condition and can be upgraded</li> <li>▪ Permission required from NAMDEB</li> </ul>	
Construction Material	<ul style="list-style-type: none"> <li>▪ Sand is readily available from the surrounding area</li> <li>▪ If need be, Concrete stones and should be brought in from town (suppliers)</li> </ul>	



(e) Terrain and biodiversity



(f) Plants in the surrounding area

#### 4.5 Aus Radio Mast

EIA / EMP Context	<ul style="list-style-type: none"> <li>▪ Already disturbed site</li> <li>▪ Existing / old radio infrastructure</li> </ul>	
Location	<ul style="list-style-type: none"> <li>▪ 17 km southeast of Aus</li> <li>▪ Located on top of the mountain on farm Kubub</li> </ul>	
GPS Coordinates	Latitude	Longitude
	-26.7635	16.40309
Elevation	1,790.5 m	
Mast height	24 m (new mast to be constructed on the same platform to replace old mast)	
Access Road	<ul style="list-style-type: none"> <li>▪ 4 x 4 access through other farms (permission needed from other farm owners)</li> <li>▪ The tower is located on top of the mountain (about 2 hours' drive from the mountain foot to the top)</li> <li>▪ Use of Helicopter is recommended during construction</li> </ul>	
Power	None = new Solar PV required	
Cubicle	None = New pre-fabricated cubicle required to house RF equipment, regulators and batteries	
Biodiversity	<ul style="list-style-type: none"> <li>▪ Vegetation includes some quiver trees, busman candle and other succulent plants</li> <li>▪ Site already disturbed and minimal no additional negative environmental impacts are expected</li> </ul>	
Infrastructure	<ul style="list-style-type: none"> <li>▪ Old radio tower repeater lying on the ground (possibly damaged by wind)</li> </ul>	
Construction Material	<ul style="list-style-type: none"> <li>▪ Sand can be obtained from nearby dry stream</li> <li>▪ Explore use of helicopter to air lift construction material</li> </ul>	



#### 4.6 Parks Repeater

EIA / EMP Context	<ul style="list-style-type: none"> <li>▪ Already disturbed site</li> <li>▪ Existing / old radio infrastructure</li> </ul>	
Location	<ul style="list-style-type: none"> <li>▪ Located in Tsau //Khaeb National Park</li> <li>▪ About 100 km Southeast of Luderitz and 85 km Southwest of Aus</li> </ul>	
GPS Coordinates	Latitude	Longitude
	-27.30707945	15.82376718
Elevation	1,105.4 m	
Mast height	21 m (new mast to be constructed on the mountain)	
Access Road	<ul style="list-style-type: none"> <li>▪ 4 x 4 access only possible up to the foot of the mountain</li> <li>▪ The tower will be located on top of the mountain, which is only accessible by Helicopter</li> </ul>	
Power	None = new Solar PV required	
Cubicle	None = New pre-fabricated cubicle required to house RF equipment, regulators and batteries	
Biodiversity	<ul style="list-style-type: none"> <li>▪ Scattered desert vegetation around the mountain</li> <li>▪ No vegetation on the mountain and hence no environmental impacts are expected</li> </ul>	
Infrastructure	<ul style="list-style-type: none"> <li>▪ No infrastructure at present</li> </ul>	
Construction Material	<ul style="list-style-type: none"> <li>▪ Construction sand can be obtained from the mountain foot with minimal vegetation disturbance</li> <li>▪ Helicopter required to air lift construction material to the mountain top</li> </ul>	



## 5. COMPLIANCE AND LEGAL FRAMEWORK

This chapter outlines the regulatory framework applicable to the proposed project. Table 2 provides an overview of applicable policies, plans and strategies and Table 3.1 provides a list of applicable national legislation.

### 5.1 Compliance to the EMP

The EMP is binding to the proponent, and all contractors / sub-contractors. This implies that each and every entity that may have any kind of engagement or involved in / with the activities of the renewal of the construction activities should comply with the EMP throughout the project lifespan. Non-compliance may have serious consequences e.g License withdrawal.

### 5.2 Environmental Management Act (No.7 of 2007)

Section 27 of the Environmental Management Act 2007 (Act No. 7 of 2007) (EMA) provides a list of activities that may not be undertaken without an Environmental Clearance Certificate (ECC) (herein referred to as: listed activities). The proposed expansion of the hospital triggers the following listed activities.

The EMP should conform to the provisions of the Environmental Management Act (EMA), Act No. 7 of 2007 and EIA regulations of 2012 (Government Notice: 30).

The EIA Regulations defines a '*Management Plan*' as:

*"...a plan that describes how activities that may have significant impacts on the environment are to be mitigated controlled and monitored."*

### 5.3 EMP Requirements

Table 5-1: EMP Requirements as outlined in Section 8 of the EIA Regulations

<b>Requirement</b>
<i>(j) a draft management plan, which includes – (aa) information on any proposed management, mitigation, protection or remedial measures to be undertaken to address the effects on the environment that have been identified including objectives in respect of the rehabilitation of the environment and closure;</i>

*(bb) as far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of the activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and*

*(cc) a description of the manner in which the applicant intends to modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation remedy the cause of pollution or degradation and migration of pollutants.*

#### 5.4 Listed Activities

Listed Activities may not be undertaken without an Environmental Clearance Certificate (ECC), and hence an Environmental Impact Assessment (EIA) is required.

As the organ of state responsible for management and protection of its natural resources, the MET: DEA is committed to pursuing the principles of environmental management. The EMA provides a list of activities that require an EIA and the proposed construction is among the listed activities or activities that may not be conducted without at ECC. The purpose of listed activities for projects is to ensure that the associated impacts on the environment are carefully considered.

The proposed activities triggers a number of Listed Activities as set out in the Environmental Management Act, 2007 (Act No. 7 of 2007) (herein referred to as the EMA) and the Environmental Impact Assessment Regulation, 2007 (No. 30 of 2011) (herein referred to as the EIA Regulations).

*Table 5-2: Listed Activities triggered by the proposed project*

Listed Activity	Description of the Activity	Relevance to the Proposed activity
Activity 4. Forestry Activities	The clearance of forest areas, deforestation, afforestation, timber harvesting or any other related activity that requires authorization in terms of the Forest Act, 2001 (Act No. 12 of 2001) or any other law.	Getting to the foot of the mountain can entail vegetation clearing and protected species may not be removed without a harvesting permit
Activity 10- Infrastructure	10.1 The construction of- (g) Communication networks including towers,	The project entails the construction of a mast

	<p>telecommunication and marine telecommunication lines and cables;</p> <p>(j) <b>Masts</b> of any material or type and of any height, including those used for telecommunication broadcasting and radio transmission, but excluding</p> <p>(i) Flag poles; and</p> <p>(ii) Lightning conductor poles.</p>	
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## 5.5 Extended developmental and Legal Framework

In addition to the EMA and the Environmental Assessment Policy, there exists a host of legal and policy documents and guidelines that must be considered when undertaking an EIA as indicated in table 3.2, below. The proponent has the responsibility to ensure that the construction operations conforms to all other National developmental plans and legal framework.

Table 5-3: Policies, Plans and Strategies

Policy / Plan	Relevance	Applicability to the Proposed Project
5th National Development Plan (NDP) and Vision 2030	Outlines the country's National Development Plans (NDPs), in line with the Harambee Prosperity Plan (HPP) and vision 2030	The proposed project is a development that forms part of the bigger picture of achieving economic progression, social transformation and environmental sustainability.

Table 3.2: Other Legal Instruments / National Statutes

National Statutes	Relevance	Applicability to the Proposed Project
Environmental Assessment Policy (1995)	Promotes Sustainable development and Environmental Conservation emphasize the importance of	Environmental Protection



National Statutes	Relevance	Applicability to the Proposed Project
	environmental assessments as a key tool towards environmental sustainability	
Soil Conservation, 1969 (Act 76 of 1969) and the Soil Conservation Amendment Act (Act 38 of 1971)	Makes provision for the prevention and control of soil erosion	Monitor and apply the soil conservation mechanisms
Forest Act 12 of 2001 Forest Act Regulations 2015	To provide for the protection of the environment and the control and management of forest. Relevant sections: - Approval required for the clearance of vegetation on more than 15 hectares (Section 23, subsection 1 (b)). - Tree species and any vegetation within 100m from a watercourse may not be removed without a permit (Section 22, subsection 1 (b))	Forestry permits maybe required for vegetation clearing
Public Health Act (Act No. 36 of 1919)	Advocates for Public Health and safety	Protective clothing
The Occupational Safety and Health Act No. 11 of 2007	Advocates for employee and public safety, health	In the working context "SAFETY" implies "free from danger"
National Heritage Act, No. 27 of 2004.	The Act provides provision of the protection and conservation of places and objects with heritage significance.	Refer to handling procedures presented in the Scoping Report

## 6. ROLES AND RESPONSIBILITIES

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This section outlines the roles and responsibilities of the key personnel responsible for the day to day management of activities to ensure effective implementation of the EMP.

### 6.1 Roles and Responsibilities

Assignment of responsibilities is necessary to ensure that key procedures are followed. Ultimately, the overall responsibility for the implementation of the EMP lies with the proponent (MEFT - DWNP).

To ensure accountability, it is necessary to assign responsibilities. The key role-players for project implementation are;

- a) The **Environmental Compliance Officer (ECO)** representing the Ministry of Environment, Forestry and Tourism (MEFT), department of Environmental Affairs (DEA) or an appointed independent environmental officer, who is responsible for monitoring and auditing.
- b) **The Proponent: (MEFT - DWNP)**.
- c) **The Project Manager** the person responsible for the management of the construction activities project.

#### 6.1.1 The Environmental Compliance Officer (ECO):

The ECO refers to the party responsible for the environmental monitoring and auditing to ensure that the provisions of the EMP are complied with.

The ECO shall have adequate environmental knowledge to understand and interpret the EMP and pertaining environmental aspects associated with the project. The specific tasks of the ECO are as follows:

- To undertake all monitoring and auditing activities in-order to ensure compliance with the EMP.
- Conduct inspections and monitoring at reasonable intervals (e.g. every month, quarterly or annually), throughout the duration of the project. Depending on the risks, some projects may require regular inspections.
- Issue compliance or non-compliance orders to the proponent, contractors / sub-contractors.

- Compile compliance Reports pertaining to any non-compliance incident/s, and a Rehabilitation Report following the conclusion a specific activity.
- Liaise closely with all key stakeholders i.e. the Project Manager and the Environmental Commissioner.
- Provide guidance on any environmental management issues, incidents or emergencies that may arise throughout the project lifespan.
- Assist in providing recommendations for remedial action in the event of non-compliance.
- Auditing or monitoring activities may involve investigation, as well as structured observation, measurement, and evaluation of environmental data over a period of time.

### 6.1.2 The Proponent:

The proponent, hereinafter referred to as MEFT - DWNP , shall assume overall responsibility to ensure implementation of the EMP and will be held accountable against the remedial measures outlined herein. It is recommended that the client should appoint a Project Manager who will be responsible for monitoring of daily operations.

The specific responsibilities of The Proponent are as follows:

- Appoint a Project Manager (SM) to oversee the daily onsite activities.
- Liaise closely with the PM and ECO on any environmental management issues, incidents or emergencies.
- Ensure that all activities on and around the site are conducted in accordance with the requirements of the EMP at all times.
- Ensure that all sub-contractors and visitors to the site are conversant with the requirement of the EMP, relevant to their roles on site.
- Shall develop a **communication strategy** between The Proponent, Project Manager, Employees, the ECO and any other relevant stakeholder.
- Shall develop an **organisational structure** to ensure that:
  - There are clear channels of communication;
  - There is an organisational hierarchy for effective implementation of the EMP; and
  - Conflicting or contradictory instructions are eliminated;
  - Ensure that all instructions and official communications regarding environmental matters shall follow the organisational structure as determined

- Ensure that that EMP requirements are assigned to specific people / positions with the capacity and experience required for implementation.

### 6.1.3 The Project Manager:

The **Project Manager (SM)** should:

- Ensure that each team recruited to work at the sites, adheres to the EMP;
- Ensure that a **copy of the EMP is kept available during at each construction site, as it may be requested by authorities conducting spot checks at any time.**
- Ensure that all staff attend an induction session before commencement of any work on site and that they are adequately informed of the requirements of the EMP;
- Take special care to prevent irreversible damage to the environment

## 6.2 Instructions

All instructions and official communications shall follow the organisational structure as determined by the Proponent. Based on the adopted structure, it is essential that responsibilities outlined are assigned to specific parties with adequate capacity and experience required to implement the EMP.

## 6.3 Disciplinary Actions

The EMP is a legally binding document. Non-compliance with the EMP may result in disciplinary action being taken against the Proponent. Such actions may take the form of;

- Financial penalties, Legal action, fines, and/or Suspension of work.

The disciplinary action shall be determined according to the nature and extend of the non-compliance, and exact penalties are to be weighed against the severity of the incident.

## 7. POTENTIAL IMPACTS AND MITIGATION MEASURES

### 7.1 Approach to mitigation measures

To enable a systematic approach to impact identification, specific aspects have been identified and for each aspect, specific mitigation measures have been recommended Table 5.

**Table 4.** EMP Impact Identification Section and Associated Aspects

<b>EMP Implementation / Potential Impact Category</b>	<b>Specific Aspects</b>
A. Staff Induction	EMP Provisions (Do's and Don'ts)
	HIV / AIDS
	Communication Channels
B. Operational Phase	Access Roads
	Site Demarcation
	Notice Board
C. Environment and Pollution	Vehicle emissions
	Oil Spills
	Soil Erosion
D. Health and Safety	Safety at Work Place
	Dust
	Noise
E. Socio Economic	Employment opportunities for locals
	Drug and Alcohol abuse
	Working hours
	HIV / AIDS
F. Cultural Heritage	Heritage resources / artefacts

## SECTION A: STAFF INDUCTION

Aspect	Objective	Proposes Mitigation Measures	Monitoring Indicator	Party responsible
<b>Staff induction</b>	To ensure that all staff / employees are conversant with the requirements of the EMP	<ul style="list-style-type: none"> <li>• Induction for all staff / employees on the provisions of the EMP before work commencement, covering but not limited to: environmental awareness, emergency response, Reporting of incidents, HIV/AIDS awareness, alcohol and substance abuse, and Safety, Health and Environment (SHE) measures</li> <li>• Staff operating heavy duty / specialized equipment should be adequately trained and sensitized to any potential hazards associated with their tasks</li> <li>• Quarterly induction reviews</li> </ul>	Induction Minutes and Attendance Register, Signed by each and every staff member Staff members appointed at a later stage should also undergo induction Quarterly minutes	Project Manager
	Punitive measures for staff, to ensure compliance	<ul style="list-style-type: none"> <li>• Adopt a disciplinary system to discipline staff for non-compliance, such as littering, speeding, safety risk both to themselves and to others, not using ablution facilities, etc.</li> </ul>	Number of fines/warning issued daily/Monthly	Project Manager
	Availability of the EMP on site for ease of reference	<ul style="list-style-type: none"> <li>• Ensure that a copy of the EMP is kept on site and accessible to team leaders</li> </ul>	Availability of EMP on site and accessibility to team leaders	Project Manager
<b>Communciation</b>	To ensure effective communication throughout the project lifespan	<ul style="list-style-type: none"> <li>• Develop a communication strategy (Chanel and medium of communication)</li> <li>• All correspondence should be written and signed off by witnesses (e.g. Project Manager)</li> <li>• The contact numbers for the Project Manager or Site Foreman must be available onsite (displayed) in case of emergencies.</li> </ul>	Communication Strategy  Letters, e-mail, Notices, Minutes	Project Manager

## SECTION B: OPERATIONAL PHASE

Aspect	Objective	Action Required	Monitoring Indicator	Party responsible
<b>CRAN</b>	Verify if permit is required for the radio masts	<ul style="list-style-type: none"> <li>Consult and verify if License is required from the Communication Regulatory Association of Namibia (CRAN)</li> </ul>		MEFT / Project Manager
<b>Access Roads</b>	Prevent driving all over the place	<ul style="list-style-type: none"> <li>Use already established access roads</li> <li>New roads may only be established if extremely necessary (An amendment to the EMP must be done)</li> <li>Access roads should be repaired and maintained at acceptable standards</li> <li>All driving must strictly be on access roads</li> </ul>		Project Manager
<b>Site Demarcation</b>	Contain all project activities within the site boundaries	<ul style="list-style-type: none"> <li>The construction area must be clearly demarcated by means of pegs/markers (where practical).</li> <li>Permanent pegs/markers must be firmly erected and maintained in their correct position throughout the life of the operation.</li> <li>The construction site maybe be fenced off for public and animal safety</li> </ul>	Visible boundary markings around the tower site	Project Manager
<b>General Notice Board</b>	To notify and warn the public of the project activities (if necessary)	<ul style="list-style-type: none"> <li>A general notice board is on site, and must be well maintained</li> </ul>	Notice Board – Visible and Clear	Project Manager

## SECTION C: ENVIRONMENT AND POLLUTION

Aspect	Objective	Action Required	Monitoring Indicator	Party responsible
<b>Radiation</b>	To ensure community safety against potential radiation from the repeaters (signals)	<ul style="list-style-type: none"> <li>Towers should be far from residents to mitigate any potential risk of radiation</li> <li>All the radio towers are far from residents</li> <li>No further mitigation measures required</li> </ul>	Radiation effect reports from health departments	ECO
<b>Avifauna (Birds)</b>	To ensure that the radio towers do not present danger or risk to birds	<ul style="list-style-type: none"> <li>Install reflectors for tower visibility at night</li> <li>Monitor bird mortality around the radio towers (difficult to do, but it is a recommendation from the Avifauna protection guidelines)</li> </ul>	Bird mortality around the radio towers	Project Manager and ECO
<b>Vehicle emissions</b>	Reduce greenhouse gas (GHG) emissions from poorly maintained or malfunctioning equipment (vehicles / machinery)	<ul style="list-style-type: none"> <li>All vehicles and equipment shall be kept in good working condition and serviced regularly (in accordance with the servicing frequency of the specific machinery), in order to prevent leakage and emission of poisonous smoke etc</li> </ul>	Vehicle servicing records	Project Manager
<b>Oil Spills</b>	Manage oil spills and leak from heavy vehicles and Machinery	<ul style="list-style-type: none"> <li>Provide drip trays to prevent potential oil leakage</li> <li>There must be an immediate spill response kit on site</li> <li>If an oil spill occurs, collect the contaminated soil, store in drums and dispose at appropriate waste disposal site (e.g. MEFT - DWNP disposal site)</li> </ul>	Observation of soil contamination	Project Manager
<b>Soil Erosion</b>	To mitigate soil erosion	<ul style="list-style-type: none"> <li>Drive cautiously</li> <li>Only use the existing access road to and from the site, do not establish new tracks, unless really necessary</li> </ul>	Physical Observation	Project Manager
<b>Solid Waste</b>	To prevent littering, pollution, and general environmental health hazards	<ul style="list-style-type: none"> <li>No waste should be disposed in the field</li> <li>Adopt the principle of what goes in, comes out</li> <li>Contain and carry the solid waste in the vehicle and dispose in demarcated facilities in towns</li> </ul>	Scattered waste, Littering	Project Manager



## SECTION D: HEALTH AND SAFETY

Aspect	Objective	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
<b>General Safety at Work Place</b>	Ensure that the safety of workers is not compromised and adhere to the Health and Safety Regulations, Government Notice 156/1997 (GG 1617)	<ul style="list-style-type: none"> <li>Develop a Health and safety Plan (should be part of the induction)</li> <li>Ensure that every employee goes through a safety induction;</li> <li>Employees must be equipped with all necessary Personal Protective Equipment (PPE). These includes, Helmet, Overall, Safety Shoes, Safety Glasses, Gloves, Welding shield, Earmuff etc;</li> <li>Provide first aid kits to operators;</li> <li>Only qualified personnel must be allowed to operate special machinery (e.g earthmoving machinery)</li> <li>Adequate safety signs must be displayed on site.</li> </ul>	<p>Health and Safety included and reflected in the Induction Minutes</p> <p>Adequate protective gear for all staff</p> <p>Availability of the first aid kit onsite</p> <p>Visible safety signs on site</p>	Project Manager
<b>Dust</b>	Mitigate dust and noise impacts to both employees and the public	<ul style="list-style-type: none"> <li>Provide dust masks and ear muffs to all employees operating in a dusty or noisy environment</li> <li>Reduce vehicle speed on gravel roads</li> <li>All vehicles transporting sand or gravel should be covered with a tarpaulin, or any other suitable material, and,</li> </ul>	Incident Report Public Complains	Project Manager
<b>Noise</b>		<ul style="list-style-type: none"> <li>Employees must NOT be exposed to noise levels above the required -85dB (A) limit over a period of 8 hours.</li> </ul>		
<b>Ablution</b>	Reduce health risks and environmental pollution	<ol style="list-style-type: none"> <li>Ensure adequate, hygienic (clean) and user friendly ablution facilities for all staff.</li> <li>Inspect ablution facilities regularly</li> </ol>	availability, cleanliness and hygienic ablution facilities	Project Manager

## SECTION E. SOCIO ECONOMIC ASPECTS

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
<b>Employment opportunities for Locals</b>	Promote benefits to the local community	<ul style="list-style-type: none"> <li>Recruit locals for unskilled labour</li> <li>Where possible, procure materials from local suppliers</li> </ul>	Employee structure and proportion of local employment	ONPTC
<b>Alcohol and Drug use</b>	Prevent alcohol and drug use at work	<ul style="list-style-type: none"> <li>Warn the employees against the use of alcohol and drug at work</li> <li>Provide awareness on the dangers and health impacts of alcohol and drug use</li> </ul>	Drunk / Misbehaving employees  Monitor presence of alcohol at work	Project Manager
<b>Working hours</b>	Adhere to the Labour Act No. 11 of 2007	<ul style="list-style-type: none"> <li>Operate within the prescribed working days and hours as per the Namibian Labour laws and regulations</li> </ul>	Verification of working hours against the labour Act	Project Manager
<b>HIV / AIDS</b>	Provide HIV / AIDS awareness to employees	<ul style="list-style-type: none"> <li>The Ministry of Health and Social Services provides free condoms to all public amenities and health care centres.</li> <li>Arrange for HIV awareness for employees;</li> </ul>	Availability of condoms at work  Minutes for induction course	Project Manager

## SECTION F. HERITAGE AND ARCHAEOLOGY

Aspect	Objective	Action Required	Monitoring Indicator	Party responsible
<b>Heritage Resources / artefacts</b>	Reduce the impacts borehole drilling and associated earthworks on heritage resources / artefacts	<ol style="list-style-type: none"> <li>Heritage remains or artefacts discovered on site must be reported to the National Museum (+264 61 276800) or the National Forensic Laboratory (+264 61 240461).</li> <li>No artefacts must be removed or be interfered with prior to authorisation from the Namibian National Heritage Council (NHC)</li> <li>Recovery of heritage remains or artefacts discovered and removal thereof should be directed by the National Museum</li> </ol>	Sighting report/s of heritage resources / artefacts	Project Manager

## 8. REHABILITATION PLAN

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Communication is a very important tool for protected area management and hence the construction of radio masts is necessary to enhance communication for the /Ais /Ais Richtersveld Transfrontier Park (ARTP) and Tsau //Khaeb (Sperrgebiet) National Parks (TKNP). However, such developmental activities should be conducted in a thoughtful and forward looking manner, in-order to minimize / mitigate negative environmental and socio-economic impacts.

As a result, rehabilitation should be part and parcel of any developmental activity right from the project inception to project closure to ensure environmental protection and maximise socio-economic benefits.

### 8.1 What is Rehabilitation?

Rehabilitation is the process of repairing and taking all necessary actions to limit the damage caused by the developmental activity, to minimise potential danger, to make the land suitable for other uses or simply to beautify the affected area (so that it does not become an eyesore). Rehabilitation can also be referred to as the measures taken to repair damaged environments (example refilling of borrow pits with the overburden, re-vegetating, removal of unwanted infrastructure / cleaning up, etc).

### 8.2 Designing a Rehabilitation Plan

A rehabilitation plan refers to a set of steps or measures to be taken in-order to ensure that negative impacts associated with the development at hand are mitigated. This however requires prior planning and integration of rehabilitation activities throughout the project lifespan. Meaning, rehabilitation measures should be taken right from the beginning of the project.

The environmental characteristics of an area where a project is located plays a vital role in designing a rehabilitation plan.

Table 8-1: Rehabilitation Plan

Aspect	Management Objective	Management Action	Action Frequency	Indicator / Data Source	Party responsible for implementation
<b>Rehabilitation</b>	To ensure disturbed areas are rehabilitated	All areas disturbed as a result of the construction activities, irrespective of whether they occur within the defined Working Area or not, shall be subject to the requirements outlined in this EMP.	Monthly report	Physical verification and routine monitoring	MEFT - DWNP
	Access roads	Stick to existing access roads and no new roads should be made, unless absolutely necessary All access roads to the sites should be maintained			
	Although land can rarely be rehabilitated back to its former natural state, every effort shall be made to address resultant impacts.	Remove any oil spills or any other pollutant and all foreign objects from the construction site and surrounding areas. Oil spills can lead to underground water pollution, can affect both plants and animals.			
		The overburden (unwanted sand, usually the top soil) should be collected and piled up so that it can be used for re-filling.			
		Landscaping – refers to re-shaping man-made landforms to blend in with the natural environment and all activities should be done in a gentle manner in order to limit the damage to the environment and the landscape at large.			

## 9. CONCLUSION

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Communication is a very important tool for protected area management and hence the construction of radio masts is necessary to enhance communication

The EMP has identified and recommend measures to be adopted by the proponent (MEFT - DWNP ), contractors and sub-contractors during the construction of radio masts is necessary to enhance communication for the /Ais /Ais Richtersveld Transfrontier Park (ARTP) and Tsau //Khaeb (Sperrgebiet) National Parks (TKNP).

The aim of the EMP is to ensure legal compliance to prevent environmental fatal flaws. Non-compliance against the EMP is punishable and specific responsibilities has been assigned to role players in-order to ensure that the EMP is implemented. The key role-players are defined under section 4 should:

- **Read** the EMP (particularly the Project Manager) and ensure that they are fully conversant with provisions of the EMP,
- If need be, **Ask for clarity** from the Environmental Assessment Practitioner (EAP), Environmental Compliance Officer (ECO) or relevant authority,
- Ensure implementation of the recommended mitigation measures, and
- Communicate defaults / challenges to the ECO timely.

The ECO should monitor (conduct periodic and unannounced EMP audits) in-order to ensure compliance against the recommended mitigation measures.

## 10. REFERENCES

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Burke, A. (2011). Eleven Steps to Mining Rehabilitation, Windhoek, Namibia