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## REPORT:

# EMP FOR THE PROPOSED 66 KV OVERHEAD POWERLINE FOR THE TWIN HILLS GOLD PROJECT, ERONGO REGION, NAMIBIA

PROJECT NUMBER: ECC-103-443-REP-08-C

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## ABBREVIATIONS

Abbreviation	Description
DEA	Directorate of Environmental Affairs
ECC	Environmental Compliance Consultancy
ECO	environmental control officer
EIA	environmental impact assessment
EMP	environmental management plan
GPS	Global Positioning System
kV	kilovolt
Ltd.	Limited
m	metre
MEFT	Ministry of Environment, Forestry and Tourism
NamPower	Namibia Power Corporation (Pty) Ltd
Osino	Osino Gold Exploration and Mining (Pty) Ltd
PPE	personal protective equipment
Pty	proprietary
SOP	standard operating procedure
ToR	terms of reference

# 1 INTRODUCTION

## 1.1 PROJECT BACKGROUND

Environmental Compliance Consultancy (ECC) has been contracted Osino Gold Exploration and Mining (Pty) Ltd on behalf of NamPower (herein after referred to as 'the proponent') to conduct an environmental impact assessment (EIA) and compile this environmental management plan (EMP) for the proposed 66 kV overhead powerline for the Twin Hills Gold Project, Erongo Region, Namibia. The purpose of this EMP is to support the construction of the 66 kV powerline of Osino, on behalf of the Namibia Power Cooperation (NamPower) (Pty) Ltd.

The proposed 66 kV overhead powerline will be constructed from NamPower Erongo substation to the Twin Hills Gold Project. The NamPower Erongo substation is a new development master plan that falls within NamPower's transmission objectives. Two power line routes are proposed, with the preferred route covering a length of about 20.3 km whilst the alternative route covers about 24.6 km, shown in Figure 1.

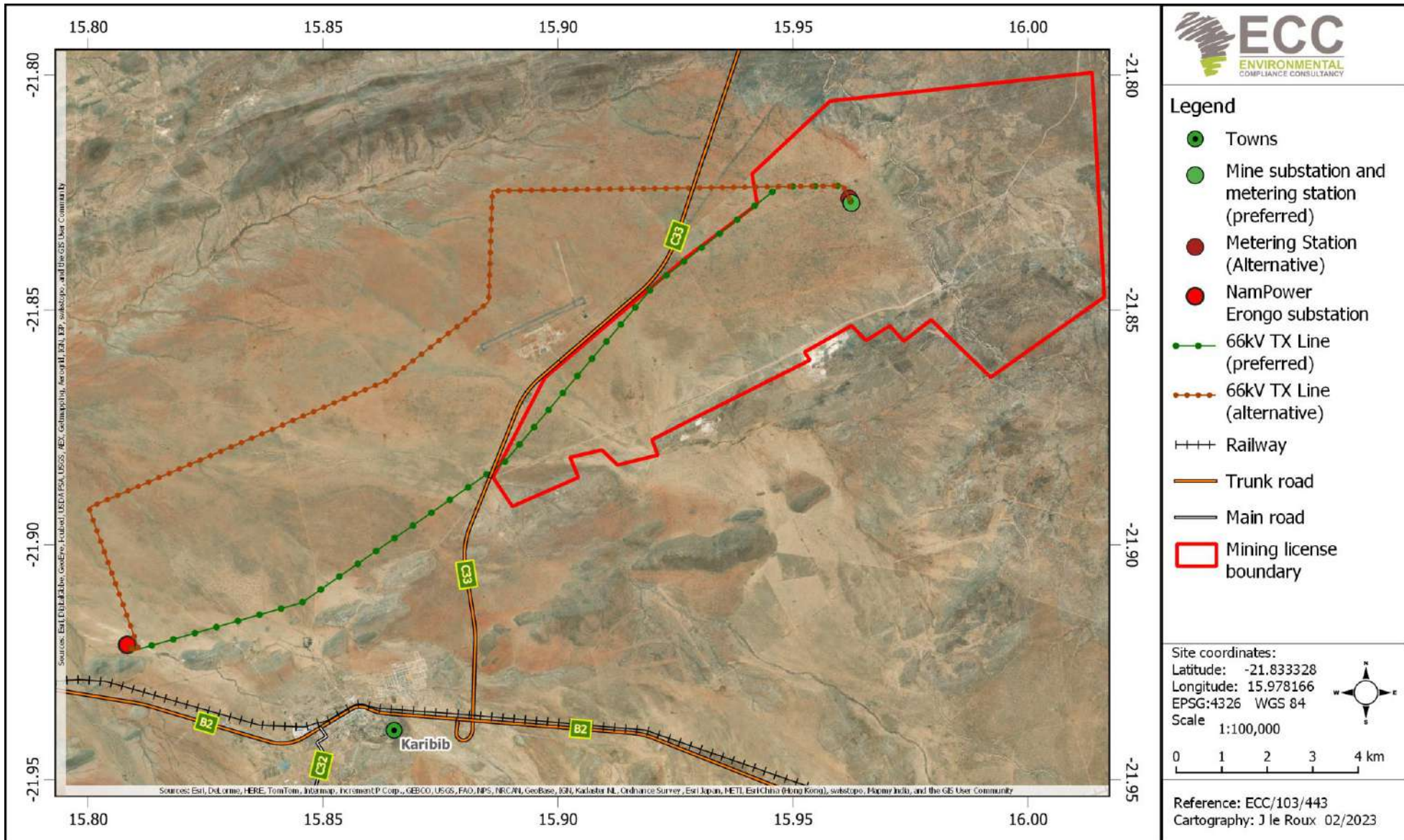


Figure 1: Locality map of the two proposed overhead powerline routes

## 1.2 ENVIRONMENTAL REGULATORY REQUIREMENTS

The proposed project triggers listed activities as stipulated in the Environmental Management Act, No. 7 of 2007 and its Regulations, promulgated in 2012. An environmental scoping report, environmental impact assessment (EIA) and environmental management plan (EMP) are required to be submitted as part of the application to support the decision-making process for issuing an environmental clearance certificate.

This report presents the EMP and has been undertaken in terms of the requirements of the Environmental Management Act, 2007 and its Regulations.

## 1.3 PURPOSE AND SCOPE OF THIS REPORT

The environmental management plan (EMP) provides a logical framework, mitigation measures and management strategies for the activities associated with the proposed project. In this way ensuring that the potential environmental impacts are curbed and minimised as far as practically possible and that statutory and other legal obligations are adhered to and fulfilled. Outlined in the EMP are the protocols, procedures and roles and responsibilities to ensure the management arrangements are effectively and appropriately implemented.

The EMP forms an appendix to the environmental scoping report and is based on the findings of the assessment. The environmental scoping report should be referred to for further information on the proposed project, assessment methodology and terms of reference (ToR), applicable legislation, and assessment findings.

This EMP is a live document and shall be reviewed at predetermined intervals, and or updated during the EIA process when or if the scope of work alters, or when further data or information is added. All personnel working on the project will be legally required to comply with the requirements set out in the final EMP that is approved by the competent authorities and Ministry of Environment, Forestry and Tourism (MEFT).

## 1.4 MANAGEMENT OF THIS EMP

The proponent, will hold the environmental clearance certificate for the proposed project and will be responsible for the implementation and management of this EMP. The implementation and management of this EMP, and thus the monitoring of compliance, will be undertaken through daily duties and activities, as well as monthly inspections.

## 1.5 LIMITATIONS, UNCERTAINTIES, AND ASSUMPTIONS RELATED TO THIS EMP

This EMP does not include measures for compliance with statutory occupational health and safety requirements. This will be provided in the safety management plan to be developed by the Proponent.



Where there is any conflict between the provisions of this EMP and any contractor's obligations under their respective contracts, including statutory requirements (such as licences, project approval conditions, permits, standards, guidelines, and relevant laws), the contract should be amended, and statutory requirements are to take precedence.

The information contained in this EMP is based on the project description as provided in the environmental scoping report. Where the design or operation method is different, this EMP may require updating and potential further assessment may be undertaken.

## 1.6 ENVIRONMENTAL ASSESSMENT PRACTITIONER

The report has been prepared by Environmental Compliance Consultancy (Pty) Ltd (ECC) (Reg. No. 2022/0593) on behalf of the Proponent. Authored by ECC employees with no material interest in the report's outcome, ECC maintains independence from the Proponent and has no financial interest in the project apart from fair remuneration for professional fees. Payment of fees is not contingent on the report's results or any government decision. ECC members or employees are not, and do not intend to be, employed by the Proponent, nor do they hold any shareholding in the project. Personal views expressed by the writer may not reflect ECC or its client's views. The environmental report's information is based on the best available data and professional judgment at the time of writing. However, please note that environmental conditions can change rapidly, and the accuracy, completeness, or currency of the information cannot be guaranteed.

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## 2 ENVIRONMENTAL MANAGEMENT FRAMEWORK

### 2.1 OBJECTIVES AND TARGETS

Environmental objectives and targets have been developed so that construction activities can minimise potential impacts on the environment, as far as reasonably practicable.

Environmental objectives for the project are as follows:

- Zero pollution incidents.
- Minimal vegetation clearing and earthworks.
- Minimal impact on avian receptors.
- Protect avian habitat, and
- Use natural resources effectively and efficiently.

### 2.2 ORGANISATIONAL STRUCTURE, ROLES, AND RESPONSIBILITIES

The Proponent shall be responsible for:

- Ensuring all members of the project team, including contractors, comply with the procedures set out in this EMP
- Ensuring that all persons are provided with sufficient training, supervision, and instruction to fulfil this requirement
- Ensuring that any persons allocated specific environmental responsibilities are notified of their appointment and confirm that their responsibilities are clearly understood
- Contractors shall be responsible for ensuring and demonstrating that all personnel employed by them are compliant with this EMP, and meet the responsibilities listed above.

Table 1 lists the roles and responsibilities allocated to different management levels in the company and specific personnel.

**Table 1 – Roles and responsibilities**

Role	Responsibilities and duties
<b>Proponent</b>	<ul style="list-style-type: none"> <li>- Responsible for the overall management and implementation of the EMP.</li> <li>- Ensure environmental policies are drafted/updated and communicated to all personnel throughout the company.</li> <li>- Responsible for providing the resources required to effectively run operations and comply with the EMP.</li> </ul>
<b>Project manager</b>	<ul style="list-style-type: none"> <li>- Responsible for ensuring compliance with this EMP including overseeing the construction work, day to day activities during operations, and routine and non-routine maintenance work during operations, as well as the decommissioning of the infrastructure.</li> <li>- Ensure all personnel are aware of the commitments made in the EMP and any other relevant regulatory requirements applicable to the project</li> <li>- Responsible for the management, maintenance and revision of the EMP</li> <li>- Ensure adequate resources are made available for implementation of this EMP</li> <li>- Maintain the community issues and concern register, and keep records of complaints</li> <li>- Ensure all employees and contractors participate in a site induction process before commencing work on the project and maintain an up to date register</li> <li>- Provisioning of environmental awareness/management training and inductions for all employees, including impacts of the powerline on avian fatalities</li> <li>- Ensure that the best environmental practice is undertaken throughout the project, and</li> <li>- Report any non-compliance or accidents to the regulatory authority.</li> </ul>
<b>Site manager</b>	<ul style="list-style-type: none"> <li>- Appointed to manage the performance of the construction and operational maintenance activities,</li> <li>- Responsible for implementation and compliance of this EMP</li> <li>- Managing the preparation and implementation of method statements for certain activities, and ensuring the environmental manager reviews all method statements and the relevant environmental protocols are incorporated</li> <li>- Reporting any non-compliance or accidents to the project manager and environmental manager;</li> </ul>

Role	Responsibilities and duties
	<ul style="list-style-type: none"> <li>- Ensuring that all staff have attended a site induction session before the commencement of any work on-site and that they are adequately informed of the requirements of this management plan</li> <li>- Ensuring that all contract workers, sub-contractors and visitors to the site are conversant with the requirements of this EMP, relevant to their roles on site and adhere to this EMP at all times, and</li> <li>- Receiving, responding to and recording complaints.</li> </ul>
<b>Employees/contractor employees</b>	<ul style="list-style-type: none"> <li>- Responsible for being compliant with this EMP throughout the construction work, in addition to:</li> <li>- Ensuring they have undertaken a site induction and are conversant with the requirements of this EMP,</li> <li>- Ensuring appropriate briefings for certain activities have been provided and fully understood</li> <li>- Adherence to this EMP at all times, and</li> <li>- Reporting of any operations and conditions that deviate from the EMP or any non-compliant issues or accidents to the environment manager and site manager/contractor.</li> </ul>
<b>Environmental control officer</b>	<ul style="list-style-type: none"> <li>- An environmental control officer (ECO) will be appointed or nominated responsible for the project.</li> <li>- The ECO will be available, as required, throughout the construction and operation of the project.</li> <li>- Ensuring that the site and project manager are well aware of the EMP procedures</li> <li>- For monitoring of the site and enforcing health and hygiene measures</li> <li>- Investigate when there's an incident, such as pollution and a noise problem</li> <li>- Conserving the environment and the resources</li> </ul>
<b>Safety officer</b>	<ul style="list-style-type: none"> <li>- A safety officer for the project will be available, as required, throughout the construction of the project.</li> <li>- Ensuring and maintaining zero loss injuries</li> <li>- Assessing risks on the construction site</li> <li>- Ensuring a safe working environment</li> <li>- Carrying out inductions to employees and or contractors for construction and operations activities.</li> </ul>

## 2.3 CONTRACTORS

Any contractors hired during the construction work or maintenance activities in the operational phase shall be compliant with this EMP and shall be responsible for the following:

- Undertaking activities in accordance with this EMP as well as relevant policies, procedures, management plans, statutory requirements, and contract requirements.
- Implementing appropriate environmental and safety management measures.
- Reporting of environmental issues, including actual or potential environmental incidents and hazards, to the site manager.
- Ensuring appropriate corrective or remedial action is taken to address all environmental hazards and incidents reported by employees and subcontractors.

## 2.4 EMPLOYMENT

The Proponent and all contractors shall comply with the requirements of the Republic of Namibia's regulations for Labour, Health and Safety, and any amendments to these regulations. The following shall be complied with:

- In liaison with local government and community authorities, the Proponent shall ensure that local people have access to information about job opportunities and are considered first for construction/maintenance contract employment positions.
- The number of job opportunities shall be made known together with the associated skills and qualifications.
- The maximum length of time the job is likely to last for shall be indicated.
- Foreign workers with no proof of permanent legal residence shall not be hired.
- Every effort shall be made to recruit from the group of unemployed workers living in the surrounding area.

## 2.5 REGISTER OF ENVIRONMENTAL RISKS AND ISSUES

An environmental review of the project has been completed to identify all the commitments and agreements made. A list of environmental commitments and risks has been produced, which details including measures identified for the prevention of pollution or damage to the environment during the construction and operational phase.

Table 2 provides a list of environmental risks and issues, as well as associated mitigation (as derived from the EIA) and monitoring measures, and the roles responsible for compliance. It will be subject to regular review by the project manager and updated when necessary. The project manager and site manager will use this register to undertake monthly inspections (see next section) to ensure the project is compliant with this EMP.

**Table 2 – A list of environmental risks and issues, as well as associated mitigation and monitoring measures**

Receptors	Potential impacts	Management/mitigation measures	Monitoring requirements	Responsibility
<b>Avifauna</b>	Possible bird disturbance, collision and electrocution due to the overhead transmission powerline construction	<p>The powerline infrastructure is likely to have impacts on the avifauna, especially on large birds, therefore the following should apply:</p> <ul style="list-style-type: none"> <li>- Pre-inspection of any avifauna nesting areas, especially vulture and bustard nests before vegetation removal and powerline construction.</li> <li>- Design the powerline structures in accordance with the South African National Standards 10280 standards, in which the safety clearances between phase and earth are specified.</li> <li>- The use of bird deterrent that are environmentally friendly, safe and sustainable.</li> <li>- Use of SWAN-FLIGHT diverters in order to increase the visibility of the line.</li> <li>- The top horizontal cable (OPGW/earth) of a powerline should be marked, for the full length of each span</li> <li>- The Bird Flight Diverters should be alternating grey and yellow and fitted at a distance of 5 – 10 m apart and the full length of each span should be marked.</li> <li>- Disturbance of nesting birds, in particular, large raptors/vultures, or bustards should be avoided, if encountered during operations.</li> <li>- Ensure that the entire powerline route is monitored for any signs of bird mortalities resulting from the</li> </ul>	<ul style="list-style-type: none"> <li>- Daily</li> <li>- Weekly and</li> <li>- Annual observations</li> </ul>	<ul style="list-style-type: none"> <li>- Project manager</li> <li>- Site manager</li> </ul>

Receptors	Potential impacts	Management/mitigation measures	Monitoring requirements	Responsibility
		<p>operation of the line e.g. regular monitoring patrols should be carried out once a month for at least the first year after construction, and thereafter at least once per quarter.</p> <ul style="list-style-type: none"> <li>- Record all bird mortalities on a standardised form, with GPS coordinates and power line structure and other details, and photographs of the carcass (especially the head of the bird), power line structure and general habitat.</li> <li>- Should collisions still take place after mitigation, other methods should be considered, more stringent and regular monitoring is recommended, and</li> <li>- Mitigation should take place during the construction stage, rather than the operational stage; regular monitoring would be important during the operational stage.</li> </ul>		
<p><b>Terrestrial environment and ecology</b></p>	<p>Loss of biodiversity and habitat.</p>	<ul style="list-style-type: none"> <li>- Use existing roads for access to avoid new tracks and create cut lines; with due regard for the existing ecosystem functions in the area.</li> <li>- Minimise clearance areas through proper planning of the construction activities.</li> <li>- Route new tracks around established and protected trees, and clumps of vegetation.</li> <li>- Identify rare, endangered, threatened, and protected species.</li> </ul>	<ul style="list-style-type: none"> <li>- Daily</li> </ul>	<ul style="list-style-type: none"> <li>- Project manager</li> <li>- Site manager</li> <li>- Environmental Manager</li> </ul>

Receptors	Potential impacts	Management/mitigation measures	Monitoring requirements	Responsibility
		<ul style="list-style-type: none"> <li>- During toolbox talks and induction, highlight to workers so that the removal of significant plants is avoided.</li> <li>- Where possible rescue and relocate plants of significance with the appropriate permits in place beforehand.</li> <li>- Promote revegetation of cleared areas upon completion of the construction activities</li> </ul>		
	Increase in invasive species in cleared areas.	<ul style="list-style-type: none"> <li>- All project equipment arriving on site from an area outside of the Project or coming from an area of known weed infestations (not present on the project site) should have an internal weed and seed inspection completed prior to equipment being used</li> <li>- Ensure the potential introduction and spread of alien plants is prevented, and</li> <li>- Ensure the correct removal of alien invasive vegetation and prevent the establishment and spread of alien invasive plants.</li> <li>- Eradicate weeds and alien species as soon as they appear.</li> <li>- Make workers aware about alien species and weeds.</li> </ul>		
	Residing, nesting and organisms such as reptiles and amphibians can be disturbed, injured, or killed by	<ul style="list-style-type: none"> <li>- Restrict movements to areas of activities only</li> <li>- Use existing tracks and routes only.</li> <li>- Identify rare, endangered, threatened, and protected species in advance.</li> <li>- Route new tracks around protected species and sensitive areas.</li> </ul>		



Receptors	Potential impacts	Management/mitigation measures	Monitoring requirements	Responsibility
	movement of vehicles and equipment.	<ul style="list-style-type: none"> <li>- Restrict movements to daytime hours.</li> <li>- Training and raise awareness to sensitise employees and notify them on avoiding some areas.</li> <li>- No driving off designated access routes (into the bush) / off-road driving.</li> <li>- No animals or birds may be collected, caught, consumed or removed from site.</li> </ul>		
<b>Community</b>	Construction of the powerline may increase the probability of complaints/ social discomfort or anxiety	<ul style="list-style-type: none"> <li>- Engage with the surrounding communities and/ or all stakeholders, especially the nearest residents about the construction activities.</li> </ul>	<ul style="list-style-type: none"> <li>- Daily</li> <li>- Weekly</li> <li>- Annually</li> </ul>	<ul style="list-style-type: none"> <li>- Project manager</li> <li>- Site manager</li> <li>- Employees</li> </ul>
	Occupational health and safety of construction workers and nearby community	<ul style="list-style-type: none"> <li>- Use the appropriate PPE,</li> <li>- Complying with SOP</li> <li>- Complying with all applicable national regulations and laws to minimise risks at the workplace</li> <li>- Comply with all applicable supervision of activities</li> <li>- Proper use and storage of material and equipment</li> <li>- Any accidents or incidents should immediately be reported to the project manager, and</li> <li>- All incidents should be recorded in an incidental register</li> </ul>		
<b>Waste management</b>	Waste pollution	<ul style="list-style-type: none"> <li>- Training and toolbox talks</li> <li>- Good housekeeping</li> <li>- Remove construction waste including general waste daily</li> </ul>	<ul style="list-style-type: none"> <li>- Daily observations</li> <li>- Weekly checks</li> </ul>	<ul style="list-style-type: none"> <li>- Project manager</li> <li>- Employees</li> </ul>

Receptors	Potential impacts	Management/mitigation measures	Monitoring requirements	Responsibility
		<ul style="list-style-type: none"> <li>- Marked bins should be provided across the site, if necessary, and</li> <li>- Littering by the construction workers will not be allowed</li> </ul>		
<b>Visual</b>	Visual disturbance	<ul style="list-style-type: none"> <li>- Engage with the surrounding residents about the construction activities</li> <li>- Good housekeeping</li> </ul>	<ul style="list-style-type: none"> <li>- Weekly</li> <li>- Monthly</li> </ul>	<ul style="list-style-type: none"> <li>- Site Manager</li> <li>- Employees</li> </ul>
<b>Noise</b>	Possible noise during construction	<p>Noise should be minimised during construction work. The following measures should apply:</p> <ul style="list-style-type: none"> <li>- Limit working hours to 7 am to 5pm weekdays and 7 am until 1 pm on Saturday</li> <li>- Regular maintenance of equipment</li> <li>- All equipment to be shut down or throttled back between periods of use, and</li> <li>- Hearing protection should be provided to employees operating equipment which produces excessive noise</li> </ul>	<ul style="list-style-type: none"> <li>- Daily observations</li> </ul>	<ul style="list-style-type: none"> <li>- Project manager</li> <li>- Employees</li> </ul>

### **3 COMMUNICATION AND TRAINING**

To ensure potential risks and impacts are minimised it is vital that personnel are appropriately informed and trained on how to properly implement the EMP. It is also important that regular communications are maintained with stakeholders (if applicable) and made aware of potential impacts and how to minimise or avoid them. This section sets out the framework for communication and training in relation to the EMP.

#### **3.1 COMMUNICATIONS**

During construction, the project manager and site manager shall communicate site-wide environmental issues to the project team through the following means (as and when required):

- Site induction
- Audits and site inspections
- Toolbox talks, including instruction on incident response procedure, and
- Briefings on key project-specific environmental issues, like feedback on complaints.

This EMP shall be distributed to the construction team including any contractors and to ensure that the environmental requirements are adequately communicated. Key activities and environmentally sensitive operations will be highlighted to workers and contractors.

During the construction phase, communications between the management team shall include discussing any complaints received and actions to resolve them, - any inspections, audits, or non-conformance with this EMP, and any objectives or target achievements.

### 3.2 ENVIRONMENTAL EMERGENCY AND RESPONSE

An emergency is any abnormal event, which demands immediate attention. It is any unplanned event, which results in the temporary loss of management control at site, but where functional resources can manage the response. An emergency response plan document will be put in place that manages the response in relation to emergencies including environmental emergencies. Table 3 contains a list of numbers to be contacted in case of an emergency.

**Table 3 - Emergency contact details**

Town	Ambulance	Police	Fire brigade
Karibib	+264 64 550073	+264 64 219001	+264 64 550020

### 3.3 COMPLAINTS HANDLING AND RECORDING

Any complaints received verbally by any personnel on the project site shall be recorded by the receiver including:

- The name of the complainant
- The contact details of the complainant
- Date and time of the complaint
- The nature of the complaint

The information shall be given to the project manager who is overall responsible for the management of complaints. The project manager shall do the following:

- Inform the site manager of issues, concerns, or complaints.
- Maintain a complaint register that required details of the complaint.
- Provide a written response to the complainant of the results of the investigation and action to be taken to rectify or address the matter(s). Where no action is taken, the reasons why are to be recorded in the register.

The workforce shall be informed about the complaints register, its location and the person responsible, to refer residents or the public who wish to lodge a complaint. The complaints register shall be kept for the duration of the Project and will be available for government or public review upon request.

### 3.4 TRAINING AND AWARENESS

All personnel working on the project shall be competent to perform tasks that have the potential to cause an environmental impact. Competence is defined in terms of appropriate education, training, and experience.

### 3.5 SITE INDUCTION

All personnel involved in the project shall be inducted to the site with specific environmental and social awareness training, and health and safety issues. The environmental and social awareness training shall ensure that personnel are familiar with the principles of this EMP, and the environmental impacts associated with their activities, the procedures in place to control these impacts and the consequences of departure from these procedures. The project manager shall ensure a register of completed training is maintained.

The site induction should include, but is not limited to the following:

A general site-specific induction that outlines:

- What is meant by “environment” and “social”?
- Why the environment needs to be protected and conserved?
- How can construction activities impact the environment?
- What can be done to mitigate against impacts?

The inductee's role and responsibilities concerning implementing the EMP:

- The site's environmental rules
- Details of how to deal with, and who to contact should any environmental problems occur.
- The potential consequences of non-compliance with this EMP and relevant statutory requirements, and
- The role of responsible people working on the project.

## 4 REPORTING, COMPLIANCE AND ENFORCEMENT

### 4.1 ENVIRONMENTAL PERFORMANCE MANAGEMENT

The current summary of a register of environmental risks and issues identifies mitigation and monitoring measures, as well as the roles responsible for execution. The project manager and site manager will use this register to undertake monthly inspections to ensure the project is compliant with this EMP.

### 4.2 CONSTRUCTION: ENVIRONMENTAL INSPECTION & COMPLIANCE MONITORING

#### 4.2.1 DAILY COMPLIANCE MONITORING

A copy of this EMP will be on-site throughout the construction work and will be available upon request. It is the responsibility of the project manager and site manager to ensure this EMP is complied with through their daily roles. Daily inspections will be undertaken by the site manager (or nominated site supervisor). Any environmental problems or risks identified will be reported to the project manager and actioned as soon as is reasonably practicable.

#### 4.2.2 MONTHLY COMPLIANCE MONITORING

Monthly inspections will be undertaken by the site manager to check that the standards and procedures set out in this EMP are being complied with and environmental control measures are in place and working correctly. Any non-conformance will be recorded, including the following details: a brief description of non-conformance; the reason for the non-conformance; the responsible party; the result (consequence); and the corrective action taken and any necessary follow up measures required.

### 4.3 OPERATIONS: ENVIRONMENTAL INSPECTIONS AND COMPLIANCE MONITORING

Annual inspections of the associated infrastructure will be managed and undertaken by the project manager. All infrastructure will be inspected to ensure that the equipment is operating as per specification, no damage has been caused, and no leaks or spills or rust have occurred. Any non-conformance will be recorded, including the following details: a brief description of non-conformance; the reason for the non-conformance; the responsible party; the result (consequence); and the corrective action taken and any necessary follow up measures required.

### 4.4 REPORTING

There will be a requirement to ensure that any incident or non-compliance, including any environmental issue, failure of equipment or accident, is reported to the project manager.

## 4.5 NON-COMPLIANCE

Where it has been identified that works are not compliant with this EMP, the project manager will implement corrective action to the extent that the works return to being compliant as soon as possible. In instances where the requirements of the EMP are not upheld, a non-conformance and corrective action notice will be produced. The notice will be generated during the inspections and the project manager will be responsible for ensuring a corrective action plan is established and implemented to address the identified shortcoming.

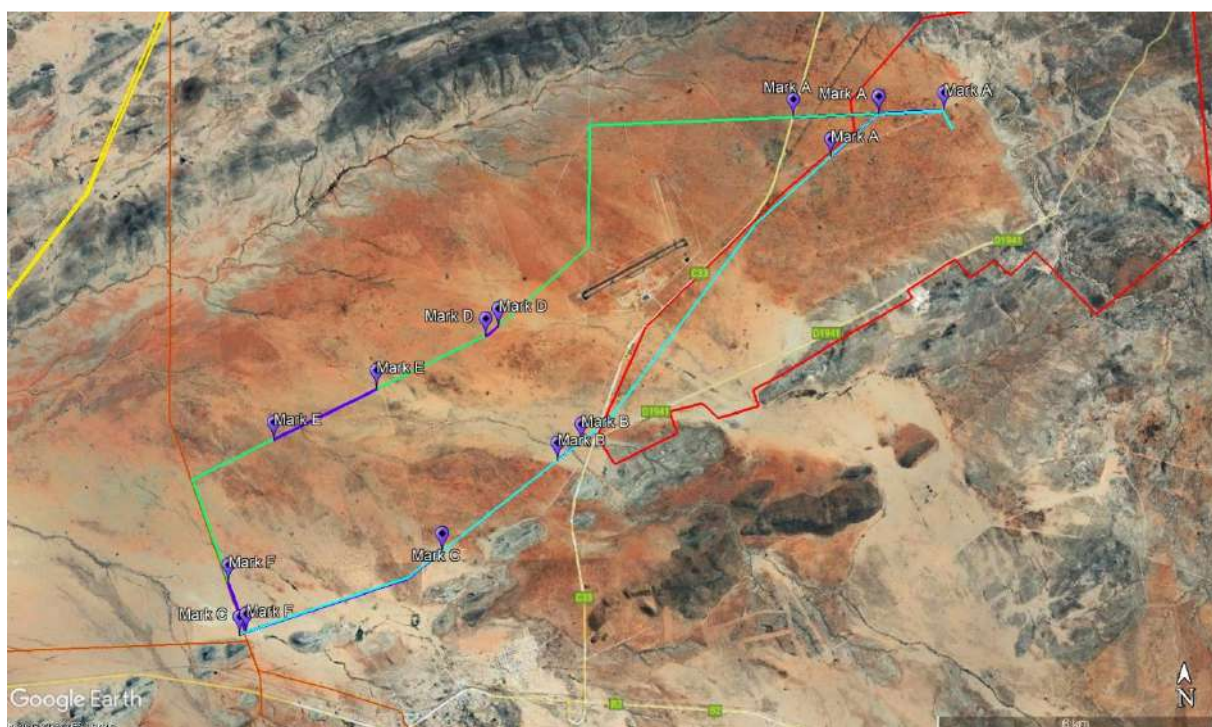
## 5 ENVIRONMENTAL AND SOCIAL MANAGEMENT

### 5.1 CRITICAL MITIGATION MEASURES

#### 5.1.1 AVIFAUNA

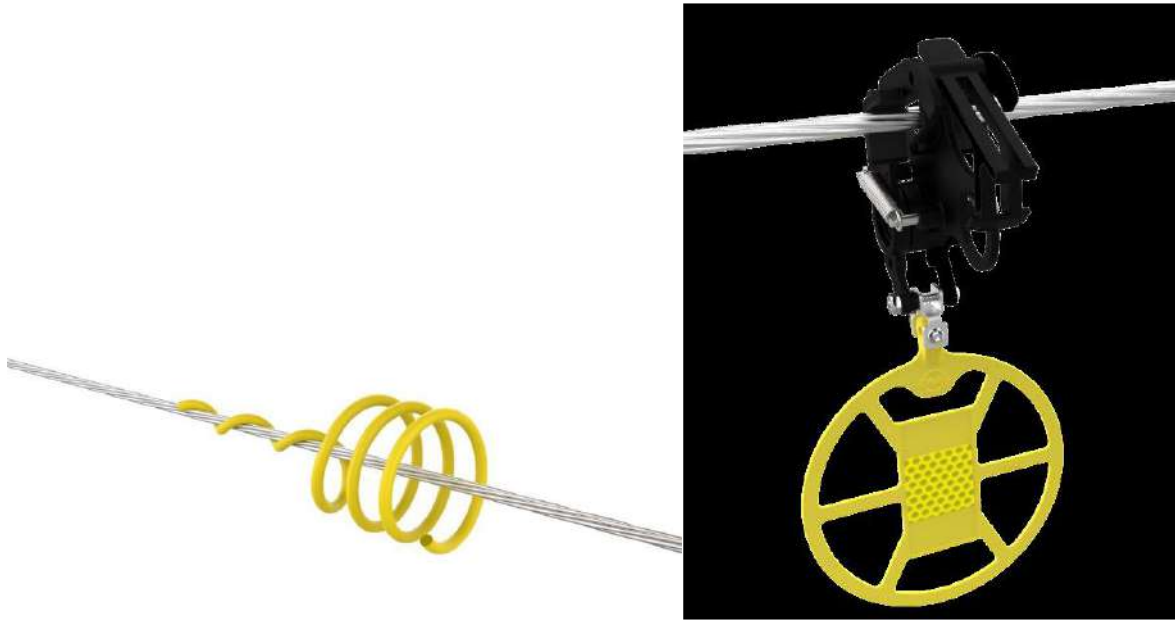
Endangered and protected bird species, namely the white-backed vulture, Ludwig bustard, lack harrier, lappet-faced vulture, martial eagle and Secretarybird may be found within the proposed area. The proponent and NamPower should avoid disruption of the critically endangered and endangered species. Some species of vultures use overhead powerlines as roosting and perching stops putting them at a higher risk of electrocution and accidental collision. The bustard birds are large, heavy flyers which lacks the ability to manoeuvre easily. It has been reported that there is an increased vulnerability of Ludwig bustards and Secretarybirds to overhead powerlines resulting in thousands of fatalities per year.

During the construction of the overhead powerlines, bird deterrents should be used. Recommended methods include plastic bird spikes and Bird-Flight Diverters. These bird spikes are designed to prevent bird landings, protecting the birds and the infrastructure. The top horizontal cable (OPGW/earth) of a powerline should be marked, for the full length of each span as seen in Figure 2 below. Bird-Flight Diverters resembles round wires and are specifically designed for overhead powerlines to reduce collisions by making the powerlines more visible (Figure 3). Bird-Flight Diverters should be alternating grey and yellow and fitted at 5 – 10 m apart and the full length of each span should be marked.



**Figure 2 - Recommended sections of the powerline to be marked for the proposed 66 kV powerline for the two routes**





**Figure 3 - Powerline marking devices: BIRD-FLIGHT Diverters (left) and RAPTOR-CLAMP Diverters (right)**

## **6 IMPLEMENTATION OF THE EMP**

This environmental management plan:

- A. Has been prepared according to a contract with the proponent
- B. Has been prepared based on information provided to ECC up to June 2023
- C. Is for the sole use of the proponent, for the sole purpose of an EMP
- D. Must not be used (1) by any person other than the proponent or (2) for any purpose other than an EMP
- E. Must not be copied without the prior written permission of ECC.