

# ENVIRONMENTAL MANAGEMENT PLAN: FOR THE PROPOSED 44KV LINE FROM ROSSING MOUNTAIN TO ARANDIS, ERONGO REGION- NAMIBIA.



DATE: JANUARY 2024



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



# **The Proposed 44kv Line from Rossing Mountain to Arandis, Erongo Region-Namibia:**

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

### **Environmental Management Prepared for Erongo Regional Electricity Distributor Company (Pty) Ltd**

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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
OHL	Overhead Line
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 OHL upgrade, 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 EMPr 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. EMPr PRINCIPLES**

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

- The environment is considered to be composed of both biophysical and social components.
- Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.
- Development must be socially, environmentally and economically sustainable.
- Construction, in general, is a disruptive activity and all due consideration must be given to the environment, particularly the social environment, during the execution of the project to minimize the impact on the affected parties.
- Minimization of areas disturbed by construction activities will reduce the severity of the construction related environmental impacts and reduce rehabilitation requirements and costs.
- As minimum requirements, relevant standards relating to international, national, regional and local legislation, where applicable, shall be adhered to. This includes

requirements relating to waste emissions (e.g. hazardous, airborne, liquid and solid), waste disposal practices, noise regulations, road traffic ordinance etc.

- Reasonable measures to avoid pollution and environmental degradation are to be provided for.
- The costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling, or minimizing further pollution, environmental damage or adverse health effects must be paid for by the person responsible for harming the environment.
- The responsibility for the environmental, health and safety consequences of the proposed development exists throughout its life cycle

# 1. CHAPTER ONE: BACKGROUND

## 1.1. Introduction

The proponent, Erongo Regional Electricity Distributor Company (Erongo RED) (Pty) Ltd is a dynamic and efficient commercialized electricity distributor for the Erongo Region, Namibia. In this respect and as part of Erongo RED's mandate to supply electricity in Erongo Region, the proponent intends to upgrade the existing 22KV power line to 44 KV Overhead Line (OHL) connected from Rossing Mountain T-Off to Arandis including a T-Off to NamPower, Lithops Sub-Station.

This development is envisaged, because the existing 22kv OHL is nearing its life-span and old since it is over 45 years, which has already passed its life expectancy, making it unreliable and inefficient, with high operating costs. The upgrade is also meant to ensure that Arandis has its power requirements catered for, since the town has been growing and developing lately.

A site inspection was conducted on the 11<sup>th</sup> of October 2023, to take note of any changes and if there have been any activities conducted to date and this resulted in no changes and activities being conducted yet for the project on the demarcated project area.

In terms of the Namibian environmental legislation (Environmental Management Act (No. 7 of 2007)), 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, Erongo Red has appointed **D&P Engineering and Environmental Consultants** to conduct an Environmental Assessment (EA) and develop an Environmental Management Plan (EMP) for the proposed project.

This has been followed by an application for Environmental Clearance Certificate (ECC) to the Ministry of Environment, Forestry and Tourism (MEFT): Directorate of Environmental Affairs (DEA).

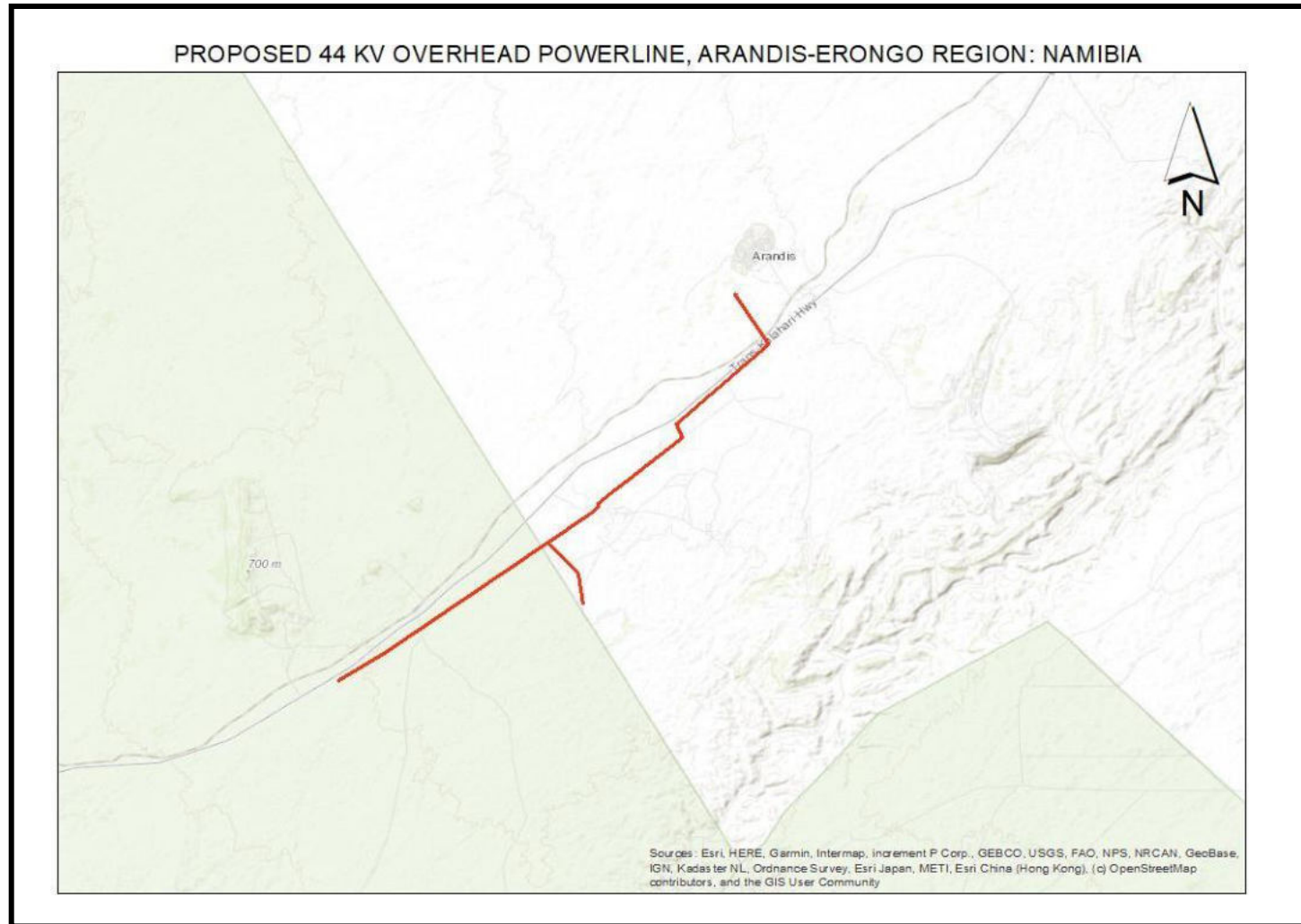
In this respect, this document forms part of the application to be made to the DEA's office for an Environmental Clearance certificate for the proposed upgrade of the existing 22KV power line to 44 KV Overhead Line (OHL) connecting from Rossing Mountain T-Off to Arandistown, including a T-Off to NamPower Lithops Sub-Station, 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 OHL will be connected from a point at the base of Rossing Mountain, following an existing servitude parallel to the B2 highway until Arandis town sub-station. A T-Off will be connected near the Husab Mine T-junction to connect to Lithops Substation. Please refer to

the map below (Fig 1) giving a locality layout of the site:





**Figure 1: Proposed Project Site**

### 1.3. Project Overview

Erongo RED proposes the design, construction and operation of a 44 KV Overhead Power line from Rossing Mountain T-off up to Arandis Town (22km), including a T-off up to the NamPower Lithops substation(4km) in Arandis, Erongo Region- Namibia. The construction and operations of the OHL will be conducted with a high degree of safety for employees, equipment and neighboring land uses. The proposed infrastructure will have minimal impacts on the natural resources, i.e. water, fauna and flora.

### 1.4. Proposed project infrastructure

There is an existing 22kV OHL which is over 45 years old, and has which has already passed its life expectancy, making it unreliable and inefficient, with high operating costs. Once the new 44kV designed, but 33kV operated OHL is constructed, the existing 22kV OHL will be de-commissioned, uninstalled and removed.

The upgrade will all be a phased approach, in order to connect to the new 33kV NamPower supply point at Lithops substation. The higher voltage level allows for larger loads to be supplied, with less volt drop problems with an entire new electrical network, making it more reliable, with less down time and a reduction in electrical losses occurring.

#### 1.4.1. Accessibility

The site OHL is running parallel to the B2 National highway and can be easily access during construction and for maintenance once it is operational.

#### 1.4.2. Infrastructure and Services

**Water:** Water for construction purposes will be obtained from Arandis Town Council

**Ablution:** During construction phase, temporary mobile toilets will be used, but upon completion, there are no permanent toilets needed on site

**Communication:** The site is well serviced with TN and MTC communication networks.

### 1.5. Project Environs

The proposed 44KV OHL upgrade will be installed on the existing servitude within which the existing 22 KV OHL is currently running, and the servitude is wide enough to allow for an additional line to run next to it. This means that the proposed upgrade will not result in new land clearances because the servitude is already cleared and always maintained for accessibility during power line maintenance and fault fixing. From Rossing Mountain substation there are several power lines branching from the substation, and it crosses the B2 highway to run on the Southern side of the road. The proposed T- OFF to Lithops substation is already going to follow the access road to Rossing Uranium, hence the proponent clearly planned the project to follow on existing servitude right of ways.



**Figure 2: Arandis Sub Station and existing Servitude connecting to B2 Highway**



**Figure 3: Existing 22KV OHL and cleared servitude**



**Figure 4: OHL Pylons connecting to Lithops Sub Station**



**Figure 5: Existing Lithops Substation and access road to be used for OHL ROW**

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

### **2.1. Introduction**

An important part of the EIA is identifying and reviewing the administrative, policy and legislative frameworks concerning the proposed activity, to inform the proponent about the requirements to be fulfilled in undertaking the proposed project. This section looks at the legislative framework within which the proposed development will conform to; the focus is on the compliance with the legislation during the planning, construction and operational phases. All relevant legislations, policies and international statutes applying to the project are highlighted in the table below as specified in the Environmental Management Act, 2007 (Act No.7 of 2007) and the regulations for Environmental Impact Assessment as set out in the Schedule of Government Notice No. 30 (2012).

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

LEGISLATION/POLICY/GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
<b>The Constitution of the Republic of Namibia (1990)</b>	<p>The articles 91(c) and 95(i) commits the state to actively promote and sustain environmental welfare of the nation by formulating and institutionalizing policies to accomplish the sustainable objectives which include:</p> <ul style="list-style-type: none"> <li>- Guarding against overutilization of biological natural resources,</li> <li>- Limiting over-exploitation of non-renewable resources,</li> <li>- Ensuring ecosystem functionality,</li> <li>- Maintain biological diversity.</li> </ul>	<p>Through implementation of the environmental management plan the proposed development will be in conformant to the constitution in terms of environmental management and sustainability, through bringing development in an environmentally sensitive way.</p>
<b>Vision 2030 and National Development Plans</b>	<p>Namibia's overall Development ambitions are articulated in the Nations Vision 2030. At the operational level, five-yearly national development plans (NDP's) are prepared in extensive consultations led by the National Planning Commission in the Office of the President. Currently the Government has so far launched a 4th NDP which pursues three overarching goals for the Namibian nation: high and sustained economic growth; increased income equality; and employment creation.</p>	<p>The proposed powerline project, is an important element in the industrialisation of the country as well as FDIs in Namibia.</p>
<b>Environmental Assessment Policy of Namibia 1994</b>	<p>The Environmental Assessment Policy of Namibia requires that all projects, policies, Programmes, and plans that have detrimental effect on the environment must be accompanied by an EIA. The policy provides a definition to the term "Environment" broadly interpreted to include biophysical, social, economic, cultural, historical and political components and provides reference to the</p>	<p>The construction and operation of the transmission line will only commence after being awarded an environmental clearance certificate, thus by abiding to the requirements of the Environmental Assessment Policy of Namibia. The EIA and EMP will cater for the sustainable management of biophysical environment.</p>

LEGISLATION/POLICY/GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
	inclusion of alternatives in all projects, policies, programmes and plans.	
<b>Environmental Management Act No. 07 of 2007</b>	<p>The Act aims at</p> <ul style="list-style-type: none"> <li>✓ Promoting the sustainable management of the environment and the use of natural resources by establishing principles for decision-making on matters affecting the environment;</li> <li>✓ To provide for a process of assessment and control of projects which may have significant effects on the environment;</li> </ul> <p>The Act gives legislative effect to the Environmental Impact Assessment Policy. Moreover, the act also provides procedure for adequate public participation during the environmental assessment process.</p>	This document is compiled in a nature that project implementation is in line with the objectives of the EMA. EIA guiding procedures developed by MET were also used in the course of this project.
<b>Electricity Act 4 of 2007</b>	<p>Requires that any generation and or distribution complies with laws relating to health, safety and environmental standards (s 18(4)(b))</p> <p>In the event that exemption from acquiring a license is granted, the Minister may impose conditions relating to public health safety or the protection of the environment.</p>	Obliges Erongo RED to comply with all relevant provisions of the EMA and its regulations.
<b>The Atomic Energy and Radiation Protection Act, Act 5 of 2005:</b>	Provides for the adequate protection of the environment and of people against the harmful effects of radiation by controlling and regulating the production, processing, handling, use, holding, storage, transport and disposal of radiation sources and radioactive materials, and controlling	Justifies the need for assessing the impact of electromagnetic radiation from the power line, on the nearby residents.

LEGISLATION/POLICY/GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
	and regulating prescribed non-ionising radiation sources according to the standards set out by the ICNIRP.	
<p><b>“Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300GHz)” (April 1998 developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP))</b></p>	<p>Provides international standards and guidelines for limiting the adverse effects of non-ionising radiation on human health and well-being, and, where appropriate, provides scientifically based advice on non-ionising radiation protection including the provision of guidelines on limiting exposure.</p>	<p>Justifies the need for assessing the impact of electromagnetic radiation from the power line, on the nearby residents and or animals</p>
<p><b>Public Health Act (No. 36 of 1919)</b></p>	<p>Under this act, in section 119:                      “No person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.”</p>	<p>The project proponent will ensure that all legal requirements of the project in relation to protection of the health of their employees and surrounding residents is protected.</p> <p>-Personal protective equipment shall be provided for employees in construction.</p> <p>-The development shall follow requirements and specification in relation to water supply and sewerage handling so as not to threaten public health of future residents on this piece of land.</p>
<p><b>Soil Conservation Act 76 of 1969</b></p>	<p>The objectives of this Act are to:</p> <ul style="list-style-type: none"> <li>▪ Make provisions for the combating and prevention of soil erosion,</li> <li>▪ Promote the conservation, protection and improvement of the soil, vegetation, sources and resources of the Republic.</li> </ul>	<p>The project will have a rather localized impact on soils and on the soil through clearance for powerline pylons. Soil protection measures will be employed and preservation of flora as much as possible.</p>



LEGISLATION/POLICY/GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
<b>Nature Conservation Ordinance 1996</b>	To consolidate and amend the laws relating to the conservation of nature; the establishment of game parks and nature reserves; the control of problem animals; and to provide for matters incidental thereto.	The proposed project implementation of the powerline will pass through a known or demarcated conservation area, however there are no new land disturbances within the area, as an existing servitude will be used. The project site was selected with this ordinance in mind to ensure that Namibian nature is conserved.
<b>Protected Areas and Wildlife Management Bill</b>	This bill, when it comes into force, will replace the Nature Conservation Ordinance 4 of 1975. The bill recognizes that biological diversity must be maintained, and where necessary, rehabilitated and that essential ecological processes and life support systems be maintained. It protects all indigenous species and control the exploitation of all plants and wildlife.	Environmental recommendations and considerations on this project has ensured that the proposed activities that fall within the boundaries of any protected area and that the project will not affect heavily endangered vegetation and animals on its site.
<b>Forest Act, 2001 (Act No. 12 of 2001)</b>	The Act gives provision for the protection of various plant species through the Ministry of Agriculture, Water and Forestry (MAWF), Directorate of Forestry).	-Land clearing of an extensive piece of land will be done upon approval from the Directorate of Forestry. -The proponent will also have to ensure that there is no indiscriminate cutting down of trees during construction and operation -The proposed site is not vegetated with any protected desert fauna species, as the powerline Right of Way was cleared before and any protected flora was relocated accordingly.
<b>National Rangeland Policy and Strategy, 2012</b>	The policy aims at enabling resource users (farmers and managers) to manage their rangeland resources in a sustainable manner and sustainable in that they are	-This proposed project will ensure that the local community benefits both economically and socially from the project, this in line with the recently declared Harambee Prosperity Plan and NDP 4&5.

LEGISLATION/POLICY/GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
	economically viable, socially acceptable, environmentally friendly and politically conducive.	
<b>National Biodiversity Strategy and Action Plan (NBSAP2)</b>	The action plan was operationalised in a bid to make aware the critical importance of biodiversity conservation in Namibia putting together management of matters to do with ecosystems protection, biosafety, biosystematics protection on both terrestrial and aquatic systems.	The project proponent has been advised by the D&P Engineers and Environmental Consultants and recognises the need for ecosystems protection to manage the changing climatic environment.
<b>Wetland Policy, 2004</b>	The policy provides a platform for the conservation and wise use of wetlands, thus promoting inter-generational equity regarding wetland resource utilization. Furthermore, it facilitates the Nation's efforts to meet its commitments as a signatory to the International Convention on Wetlands (Ramsar) and other Multinational Environmental Agreements (MEA's).	In compliance to this Policy, the development will ensure a standard environmental planning such that it does not affect any wetlands within its locale through recognition of wetlands to promote the conservation and wise utilization of wetlands resources. There are no existing wetlands/peatlands within the proposed project site.
<b>Water Resources Management Act, 2013 (Act No. 11 of 2013)</b>	This Act provides for the management, protection, development, use and conservation of water resources. This also forms the regulation and monitoring of water resources.	The nearby watercourse is 10km to the southern side of the powerline and the project activities are not anticipated to affect the watercourse in any way.
<b>National Heritage Act 27 of 2004</b>	Heritage resources to be conserved in development. (National Heritage	During the project implementation as soon as objects of cultural and heritage interests are observed such as graves, artefacts and any other object believed to be older than 50 years, all measures will be taken protect these objects until the National Heritage Council of

LEGISLATION/POLICY/GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
		Namibia have been informed, and approval to proceed with the operations granted accordingly by the Council.
<p><b>National Monuments Act of Namibia (No. 28 of 1969) as amended until 1979</b></p>	<p>“No person shall destroy, damage, excavate, alter, remove from its original site or export from Namibia:</p> <ul style="list-style-type: none"> <li>(a) any meteorite or fossil; or</li> <li>(b) any drawing or painting on stone or a petroglyph known or commonly believed to have been executed by any people who inhabited or visited Namibia before the year 1900 AD; or</li> <li>(c) any implement, ornament or structure known or commonly believed to have been used as a mace, used or erected by people referred to in paragraph (b); or</li> <li>(d) the anthropological or archaeological contents of graves, caves, rock shelters, middens, shell mounds or other sites used by such people; or</li> <li>(e) any other archaeological or palaeontological finds, material or object; except under the authority of and in accordance with a permit issued under this section.</li> </ul>	<p>The proposed site of development is not within any known monument site both movable or immovable as specified in the Act, however in such an instance that any material or sites or archeologic importance are identified, it will be the responsibility of the developer to take the required route and notify the relevant commission.</p>
<p><b>Pollution Control and Waste Management Bill</b></p>	<p>This bill has not come into force. Amongst others, the bill aims to “prevent and regulate the discharge of pollutants to the air, water and land” Of particular reference to the Project is: Section 21 “(1) Subject to sub-section (4) and section 22, no person shall cause or permit the discharge of pollutants or waste into any water or watercourse.”</p>	<p>To control air, water and land pollution as agitated by the Act the project proponent will ensure that all solid waste during construction is managed with an integrated waste management strategy following the EMP provided herein.</p>

LEGISLATION/POLICY/GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
	Section 55 “(1) No person may produce, collect, transport, sort, recover, treat, store, dispose of or otherwise manage waste in a manner that results in or creates a significant risk of harm to human health or the environment.”	
<b>Convention on Biological Diversity (CBD)</b>	Namibia is a signatory of the Convention on Biological Diversity and thus is obliged to conserve its biodiversity.	The project will preserve tree species on as part of their plans for greed and sustainable development.
<b>United Nations Convection to combat Desertification</b>	Namibia is bound to prevent excessive land degradation that may threaten livelihoods.	It will be the responsibility of the proponent to conserve vegetation on and around the area, to avoid encroachment of the desert environs in the area.

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

#### **3.1. Introduction**

The proposed OHL will have environmental impacts as indicated in the Environmental Scoping Report (ESR). 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 minimize the extent of impact during project life cycle;
- Prevent long term environmental degradation.

#### **3.2. 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 MEFT: 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 to ensure the successful implementation of the EMP as highlighted below:

**Table 2: Roles and Responsibilities in EMP Implementation**

<b>ROLE</b>	<b>ENVIRONMENTAL RESPONSIBILITIES</b>
Erongo RED	Responsible to enforce EMP implementation during construction and operation phases.
Environmental Control Officer (ECO)	<p>Implement, review and update the EMP.</p> <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>• Ensure compliance and Bi-Annual reporting</li> <li>• Ensure materials being used on site are environmentally friendly and safe.</li> </ul>
The Directorate of Environmental Affairs	<p>Approve the EMP and any amendments to the EMP.</p> <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>
Site/ Project Manager	<p>Control and monitor actions required by the EMP.</p> <ul style="list-style-type: none"> <li>• Report all environmental issues to Erongo RED.</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	<ul style="list-style-type: none"> <li>• Ensure strict compliance to the EMP and report to the ECO periodically.</li> </ul>
Site Employees	<p>Follow requirements as directed by the EMP when conducting work.</p> <ul style="list-style-type: none"> <li>• Report any potential environmental issues to site manager, indicating any possible non-conformances observed</li> </ul>

**Table 3 : Construction and Operation EMP (C&O EMP)**

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
Ensure contractors are aware of the required management measures stipulated in the EMPr.	1)	This EMPr must form part of the contractual agreements with the specific contractors.	Once Off	Project Manager	ECO	Construction & Pre-Construction
Ensure all construction staff is familiar with the Environmental awareness Plan.	2)	-The contractor is expected to have safety “tool box” talks in accordance with the risks and trends associated with the project. Proof of these talks shall be kept on site.	Daily	Contractor	ECO	Construction & Pre-Construction
	3)	- The contractor will develop a specific emergency procedure and plan.	Once Off	Contractor	ECO	Pre-Construction
Increase employment Opportunities.	4)	Labour (skilled and unskilled) and contractors employed for the proposed project should be sourced locally.	Once Off	Contractor	Project Manager	Construction & Pre-Construction
	5)	Local business will be used where unskilled labour is required. Reputable local business will be used where available.	Once Off	Contractor	Project Manager	Construction & Pre-Construction
Minimize the impact on surrounding land uses	6)	-Construction dust must be contained in the processing plant area, such that it does not affect neighboring land uses	Continuous	Project Manager	Project Manager	Construction, Operation and Maintenance

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
and employees due to dust emissions.	7)	Solid waste will be removed from site frequently so as to prevent the accumulation of waste on site.	Continuous	Project Manager	Project Manager	Construction, Operation and Maintenance
Minimize the potential exposure of employees and neighboring operations to diseases.	8)	-Dust suppression and provision of PPE will be prioritized to prevent dust related illnesses such as Bronchitis. -Prior to employment, employees should be medically tested for fitness.	When Required	Project Manager	Project Manager	Construction, Operation and Maintenance
	9)	Clean overalls, gumboots and face protection PPE will be provided for.	Continuous	Project Manager	Project Manager	Construction, Operation and Maintenance
	10)	Workers should be adequately trained to follow all safety procedures and wear protective equipment provided.	Once Off	Project Manager	Project Manager	Construction, Operation and Maintenance
Minimize the impact of migrant workers and possible crime increase.	11)	No recruitment "at the gate" will be allowed.	Daily	Contractors	Project Manager	Construction, Operation and Maintenance
Reduce misconduct by employees on site.	12)	No alcohol /drugs are permitted on the construction site.	On going	Contractor, Employees	Project Manager	Construction, Maintenance
	13)	Each contractor will employ their own Safety Officer to monitor the safety conditions during the construction phase.	Daily	Employees/Contractor	ECO	Construction, Operation and Maintenance



Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
	14)	No unauthorized ignition sources will be permitted on site and debris/waste shall not be burnt under any circumstances.	Daily	Employees/Contractor	ECO	Construction, Operation and Maintenance
	15)	All provisions of the Labour Act Nr 11 of 2007 in conjunction with Regulation 156, 'Regulations Relating to the Health and Safety of Employees at work' must be complied with	On-going	Employees/Contractor	ECO	Construction, Operation and Maintenance
Prevent the loss of soil resources as a result of soil stripping.	16)	The construction footprint will be restricted to the servitude area and unnecessary disturbance will be minimised.	On-going	Employees/Contractor	ECO	Construction
	17)	Topsoil stripped will be stockpiled and reused for rehabilitation purposes following construction activities.	On-going	Contractor	ECO	Construction
	18)	All excavations will be backfilled with sub soil and topsoil in the reverse order to which the soil profiles were removed.	On-going	Contractor	ECO	Construction
Prevent sterilization of soils as a result of hydrocarbon / chemical / waste contamination.	19)	No foreign matter such as rubble, waste or hazardous material will be mixed with the topsoil or used to backfill excavation.	On-going	Contractor	ECO	Construction
	20)	Spills will be cleaned up immediately after the incident. Contaminated soil will be disposed of as hazardous waste at a licensed hazardous landfill facility.	On-going	Contractor	ECO	Construction

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
	21)	Drip trays or a Polyvinyl chloride (PVC) lining shall be provided for equipment utilizing hydrocarbons.	On-going	Contractor	ECO	Construction
	22)	No waste will be buried or burned on site.	On-going	Project Manager	Project Manager	Construction & Maintenance
	23)	Under no circumstances may open areas or the surrounding vegetation be used as toilet facilities. Temporary toilets should be provided for at all times.	On-going	Project Manager	Project Manager	Construction & Operation
	24)	Toilets, permanent or portable/temporary, shall be Maintained in a hygienic state and serviced regularly.  Portable toilets, should they be required, should be serviced by a reputable contractor and the contents shall be removed to a licensed disposal facility.	On-going	Contractor	Project Manager	Construction
Prevent contamination of surface water resources and onsite erosion as a result of contained runoff.	25)	No project infrastructure will be located within the 1:100 year flood lines or within 100 m of any perennial tributaries.	On-going	Project Manager	Project Manager	Construction
	26)	The development footprint will be landscaped in order to prevent pooling of water.	On-going	Project Manager	ECO	Construction and Operation

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
Prevent the pollution of the surrounding environment as a result of waste generation, incorrect waste disposal and housekeeping.	27)	Waste will be sorted at source.	Daily	Employees/ Contractor	ECO	Construction and Operation
	28)	Waste receptacles will be kept closed at all times when not in use.	Daily	Employees/ Contractor	ECO	Construction and Operation
	29)	Littering on site is forbidden and the site must be cleared of litter at the end of each working day.	Daily	Employees/ Contractor	ECO	Construction and Operation
	30)	Where possible, materials used or generated by construction activities must be recycled.	Weekly	Employees/ Contractor	ECO/ Project Manager	Construction and Operation
	31)	Waste will not be stored for a period exceeding 90 days Or volumes exceeding 100 cubic meters.	Weekly	Employees/ Contractor		Construction and Operation
	32)	Waste generated on the proposed site should be collected by authorised waste contractors and frequently disposed of at a licensed landfill site as the last resort. Recycling/reuse of waste should be enforced where feasible.	Weekly	Employees/ Contractor	ECO/ Project Manager	Construction and Operation
Prevent the impact on water and soil resources through the accidental spillage or leakage of waste or the incorrect	33)					
	34)	Cleaning of equipment/vehicles should be done in a designated area to prevent soil and water pollution.	Weekly	Employees/ Contractor	ECO/ Project Manager	Construction and Operation
	35)	Remediation of spillages must be conducted as far as practically reasonable.	On-Going	Employees/ Contractor	ECO/ Project Manager	Construction and Operation

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
storage/handling of hazardous substance.	36)	When mortar is used on site, the following guidelines apply: - Carefully control all on-site operations that involve the use of mortar and concrete; - Limit mortar mixing to single sites where possible; - Use plastic trays or liners when mixing mortar and concrete: Do not mix mortar and concrete directly on the ground; - Dispose of in the approved manner	Daily	Employees/ Contractor	ECO/ Project Manager	Construction and Operation
Prevent possible sedimentation of water resources as a result of runoff from cleared areas.	37)	No alterations to banks or beds of watercourses is allowed (a dry gully is also recognized as a water course);	On-going	Contractor/Employees	ECO	Construction
	38)	Stockpile will be shaped to divert storm water around the site to minimise soil erosion of the site as well as to prevent the contaminated water runoff.	On-going	Contractor	ECO	Construction
Ensure conservation of Flora and vegetative plant species	39)	<b>Translocation of plants</b> The study area may have the following vegetation <i>Adenia pechuelii</i> , <i>Anacampseros</i> , <i>Lithops ruschiorum</i> and <i>Sarcocaulon marlothii</i> plants. As these are charismatic species of high conservation importance, transplanting	On-going	Proponent	ECO	Pre-Construction

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
		<p>trials would be a very valuable exercise enabling</p> <p>Erongo Red to demonstrate its commitment to biodiversity conservation. Once the site layouts for the 44 kV power line are available, affected specimens should be marked and a suitable site selected for a transplant trial. Involvement of the National Botanical Research Institute would be essential to obtain permits and relevant expertise.</p>				
	40)	<p>Design footprints of all facilities to be as small as is practically possible and restrict unnecessary collateral damage.</p> <ul style="list-style-type: none"> <li>• Mark out all construction footprints and clearly convey the rule of staying inside these boundaries to all construction crews; make environmental management of construction an explicit part of building contracts with non-performance linked to a meaningful penalty clause.</li> </ul> <p>Hold main contractor responsible for all transgressions of subcontractors.</p>	On-going	Proponent	ECO	Construction

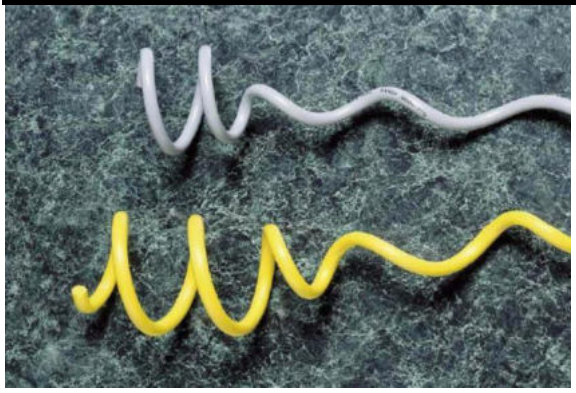
Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
		<ul style="list-style-type: none"> <li>• Use existing servitude as far as possible. Clearly mark the access tracks to be used, and designate turning points.</li> <li>• Try to use previously damaged areas for installation purposes. Avoid marble, granite and pegmatite ridges and drainage lines as much as possible. Unavoidable construction activities at such landscape features should be conducted as carefully as possible.</li> </ul>				
	41)	No new land clearances should be realised as development should be strictly on the existing servitude.	On-going	Contractor/Employees	ECO	Construction
	42)	<p>The contractor must seek permission to use the Husab mine access road prior to and during commencement with decommissioning work at the Lithops Substation.</p> <p>A liaison meeting with the contractor/proponent and Swakop Uranium Ltd must be held to ensure traffic safety on the Husab mine access road prior to commencement of decommissioning work.</p> <p>Furthermore, the maintenance tracks/road must be used whenever possible as it has the</p>	On-going	Contractor/ Proponent	ECO	Construction

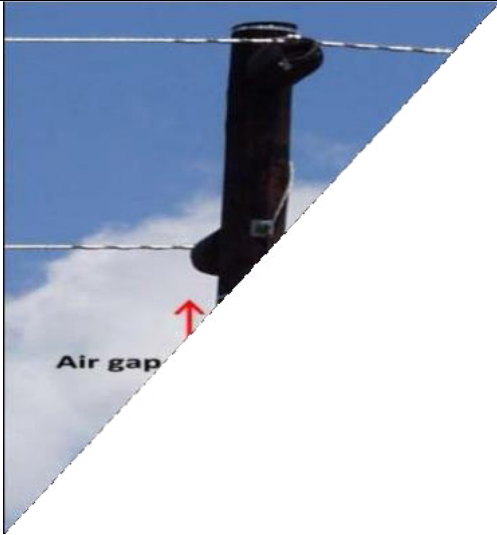
Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
		least traffic impact. Speed limits must be enforced on the B2 main road between Swakopmund and Arandis at all times.				
	43)	<ul style="list-style-type: none"> <li>Clearly demarcate access roads.</li> <li>Educate staff about track control and familiarise them with roads and boundaries of construction area.</li> <li>Avoid excessive use of water during construction to reduce the attraction to animals.</li> </ul>	On-going	Contractor/ Proponent	ECO	Construction
	44)	<ul style="list-style-type: none"> <li>Before construction starts, the proposed power line route should be inspected in collaboration with the Chief Control Warden for the National Park for any vegetation. Where possible, the unnecessary destruction of habitat (including vegetation) or degradation of the environment, including the sensitive drainage lines and other vegetated areas, should be avoided.</li> <li>A Biodiversity Inspection Report should be compiled by the Proponent or an Environmental Practitioner of the biodiversity inspection along proposed power line route/corridor.</li> </ul>	On-going	Contractor/ Proponent	ECO	Construction

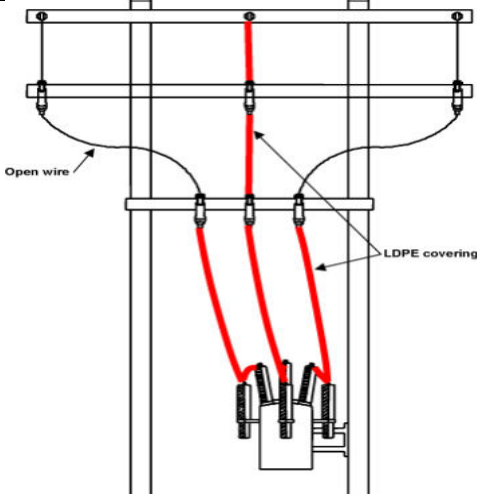
Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
		<ul style="list-style-type: none"> <li>• Avoid disturbance to sensitive vegetation (Adenia pechuelii, Anacampseros, Lithops ruschiorum and Sarcocaulon marlothii) wildlife (springbok, ostrich).</li> <li>• When disturbance to sensitive vegetation cannot be avoided, rehabilitation (replanting of sensitive vegetation) must be considered.</li> <li>• Avoid disturbance to the Husab Sand Lizard (Pedioplanis husabensis) and Sand Lizard (Meroles) is classified as Threatened due to data deficiency</li> <li>• On-going awareness should be promoted about the value of biodiversity and the negative impacts of disturbance, especially poaching and road kills. At the same time, the need for reporting incidents should be stressed, and reporting procedures clarified. Biodiversity awareness and training must be provided to the contractor before to construction commences.</li> <li>• The contractor is to report all biodiversity (fauna and flora) related incidents in report format and incident investigation must be completed. Report incidents to MEFT and/or Directorate of Forestry.</li> </ul>				



Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
		<ul style="list-style-type: none"> <li>• Anti-poaching measures should be strictly enforced, with zero tolerance, and this should be emphasised during induction to contractors; construction workers should be under supervision at times to prevent poaching; offenders should be prosecuted.</li> </ul>				
Ensure fauna conservation and protection is included in project execution	45)	No new land clearances should be realised from the OHL upgrade, since the project is within an existing servitude line.	On-going	Project manager	ECO	Construction
	46)	Habitat conservation of both avifauna and terrestrial fauna should be ensured that no modifications to habitats outside of the construction footprint	On-going	Contractor/Employees	ECO	Construction
	47)	Marking of more sensitive sections of power line to increase visibility using bird flight divertors should be adopted.	On-going	Contractor/Employees	ECO	Operation

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
						
	48)	<p>“Gapping” of pole earth wires to reduce contact of the wire with the ground except for lighting conditions and insulation of live components that can be a threat to birds should be ensured to avoid electrocution risks.</p>	On-going	Contractor/Employees	ECO	Operation

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
						
	49)	<p>To avoid bird nesting on OHL infrastructure, anti-perch devices should be installed, and with the help of MEFT after the nesting season, nests should be removed and or relocated to avoid power outages and damage to the OHL components.</p> <p>The insulation of OHL connections should also be ensured to avoid electrocution.</p>	On-going	Contractor/Employees	ECO	Operation

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
						
Prevent possible groundwater contamination as a result of hazardous waste spillage and uncontrolled waste handling.	50)	No equipment or tools with oil or grease is allowed to be placed on bare ground, these must always be placed on a lined surface.	Weekly	Contractor/Employees	ECO/ Project Manager	Construction, Operational and Maintenance
	51)	Cement mixing will take place on a lined surface. No Cement will be mixed on a bare surface.	Weekly	Contractor/Employees	ECO/ Project Manager	Construction, Operational and Maintenance
	52)	No waste will be allowed to be disposed of into excavations.	Weekly	Contractor/Employees	ECO/ Project Manager	Construction, Operational and Maintenance
	53)	Cleared areas will be rehabilitated as soon as these areas are not in use anymore.	Following Construction	Proponent	ECO	Operations

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
Reduce the impact of noise on surrounding land uses and employees.	54)	Construction activities should be restricted to 07:00hrs to 17:00hrs during weekdays and 08:00hrs to 13:00hrs during weekends.	Daily	Contractor/Employees	ECO	Construction
	55)	Machinery will be kept in good working order to reduce noise emissions.	Daily	Contractor/Employees	ECO	Construction
	56)	Should noise be problematic, silencers will be fitted to construction vehicles and generators.	Weekly	Contractor/Employees	ECO	Construction
	57)	Demolish and remove all infrastructure not required post construction.	Following Construction	Contractor/Employees	ECO	Construction
	58)	Any complaints received must be recorded in the Complaints Register.	Daily	Contractor/Employees	ECO	Construction
Protect artefacts of cultural or archaeological importance.	59)	If any human remains (or any other concentrations of archaeological heritage material) are exposed during construction, all work must cease and it must be reported immediately to the nearest museum/archaeologist or to the NHC, so that a systematic and professional investigation can be undertaken	Daily	ECO	Project Manager	Construction,
	60)	Construction workers will be made aware of the requirement to report archaeological discoveries	Weekly	ECO	Project Manager	Construction,

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
Minimise the impact on the visual character of the surrounding areas by the construction of the plant infrastructure.	61)	Artificial lighting will be restricted to areas under construction. Yellow sodium lights will be recommended on site as they do not attract as many invertebrates at night and will not disturb the wildlife.	Once Off	Project Manager	Project Manager	Construction & Operation
	62)	Natural vegetation, wherever possible, must be retained.	On-going	Project Manager	Project Manager	Construction & Operation
	63)	The structures on site must be designed to minimise visual intrusion.	Once Off	Project Manager	Project Manager	Construction & Operation
	64)	The colour selection and tone must be carefully considered to mitigate visual impacts.	Once Off	Project Manager	Project Manager	Construction & Operation
Minimise the safety risks due to increased possibility of crime and safety conditions of employees.	65)	Clear sign boards should be erected at the entrance to the site to indicate that a construction area is being entered and safety precautions should be followed;	Once Off	Contractor/Employees	Project Manager/ECO	Construction
	66)	Notification signs must be posted around the site warning residents and visitors about the hazards around the construction site;	Once Off	Contractor/Employees	Project Manager/ECO	Construction
	67)	Workers should be adequately trained to follow all safety procedures and wear protective equipment where required;	Continuous	Contractor/Employees	Project Manager/ECO	Construction & Operation

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
Prevent the impacts resulting from traffic intrusion (Air and Road)	68)	Reduce the amount of trucks entering the premises by transporting larger loads;	Continuous	Contractor/Employees	Project Manager/ECO	Construction
	69)	Speed limits will be restricted on the access road to 10 km/h.	Continuous	Contractor/Employees	Project Manager/ECO	Construction & Operation
	70)	Air traffic intrusion should be avoided through visible towers and a blinking tower light.	Continuous	Contractor/Employees	Project Manager/ECO	Construction & Operation
	71)	The operational footprint will be kept as small as possible. All disturbed areas will be rehabilitated.	Continuous	Project Manager	Project Manager/ECO	Construction & Operation

## 4. Environmental Monitoring Programme

### 4.1. Overview

The following monitoring programme need to be implemented during construction, operation and maintenance of the OHL and its associated infrastructure envisaged.

Many of the issues to be addressed in these plans are regulated in existing laws, regulations and guidelines. In addition, it is recognized that the content of several plans will be generic, in the sense that existing procedures are documented in standard code of practice, and that adaption of such generic plans will only be possible as a dynamic process during construction, operation and decommissioning.

#### 4.1.1. Environmental and Social Monitoring

The following monitoring initiatives should be conducted by Erongo RED, in collaboration with and with the support of other partners including the NamPower/NNF Strategic Partnership.

1. Ensure that the entire power line route is monitored in an acceptable way for any signs of bird mortalities resulting from the construction and operation of the line; ideally, regular dedicated monitoring patrols should be carried out once a month for at least the first year after construction, and thereafter at least once per quarter.
2. Record all bird mortalities on a standardised form, with the 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; forward a copy of each report to the NamPower/NNF Strategic Partnership for further investigation.
3. Monitor the effectiveness of mitigation measures; retrofit further mitigation if further problem areas are identified, and replace devices as and when necessary.
4. Monitor perching activities of live birds on power line structures.
5. The contractor shall comply will all relevant laws and regulations concerning water provision, sanitation, wastewater discharge and liquid and solid waste handling and disposal. The contractor is referred to the requirements of the EMA
6. The construction camp will be access controlled to prevent the access of livestock and local fauna.
7. The contractor shall not locate the campsite, or sanitation facilities, in any areas in which vegetation is pristine, nor within 100 m from any watercourse.
8. The contractor shall at all times carefully consider the machinery required for the desired task while minimizing the extent of environmental damage.
9. Ensure that the entire power line route is monitored in an acceptable way for any signs of reptile and mammal mortalities resulting from the construction and operation of the line;



ideally, regular dedicated monitoring patrols should be carried out once every quarter for at least the first year after construction, and thereafter at least once per year.

10. Record all reptile and mammal mortalities on a standardised form, with the GPS coordinates and power line structure and other details, and photographs of the carcass, power line structure and general habitat; forward a copy of each report to the MEFT for further investigation.
11. Monitor the effectiveness of mitigation measures; retrofit further mitigation if further problem areas are identified, and replace devices as and when necessary.
12. Monitor perching activities of live fauna on power line structures.
13. The contractor shall keep construction campsites clean and tidy at all times.

## 5. External Auditing

The key to a successful EMP is appropriate monitoring and review to ensure effective functioning of the EMP and to identify and implement corrective measures in a timely manner. In the event where discrepancies are identified, the problem must be investigated and attended to. All the results obtained during environmental monitoring must be documented for audit purposes.

An audit of the environmental management actions undertaken is essential to ensure that it is effective in operation, is meeting specified goals, and performs in accordance with relevant regulations and standards. Audits should be conducted during the construction phase of the facility to ensure adherence to the management measures contained in the EMP. The construction audit schedule will be determined by the conditions of the ECC such as Biannual reports. The frequency of the construction and operational audits may vary and will be synchronised with the construction schedule.

During Operation, audits will also be undertaken by an appointed consultant, in addition every 6 months from the awarding of the Environmental Clearance Certificate a report will be compiled on environmental performance. It is imperative to understand a clearance certificate is valid for 3 years only, after which a renewal will have to be applied for along with performance report over the past years in terms of environmental compliance to existing legislation and this EMP.