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ENVIRONMENTAL MANAGEMENT PLAN FOR THE OPERATION AND MAINTENANCE OF AN EXISTING 220kV HARDAP - KOKERBOOM 1 & 2 TRANSMISSION LINES.

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NamPower

Table of Contents

1 LIST OF TERMS, ACRONYMS AND ABBREVIATIONS

APD	Anti-Perching Devices
BFD	Bird Flight Diverters
EAP	Environmental Assessment Practitioner
ECC	Environmental Clearance Certificate
EIA	Environmental Impact Assessment
EMA	Environmental Management Act no 7 of 2007
EMP	Environmental Management Plan
GIS	Geographical Information System
HIV/AIDS	Human immunodeficiency virus/ acquired immunodeficiency syndrome
MEFT	Ministry of Environment, Forest and Tourism
NHC	National Heritage Council
REDs	Regional Electricity Distributors
SAPP	Southern African Power Pool
SHE	Safety, Health and Environment
SHEW	Safety, Health, Environment and Wellness
kV	Kilovolt

2 INTRODUCTION

NamPower's core business activities include electricity generation, transmission, and energy trading, which are conducted within the framework of the Southern African Power Pool (SAPP), the largest multilateral energy platform on the African continent. As Namibia's national utility, NamPower supplies bulk electricity to Regional Electricity Distributors (REDs), mining operations, agricultural entities, and Local Authorities in areas where REDs are not operational.

To fulfil its mandate of electricity transmission and distribution, NamPower has established an extensive transmission network that spans all regions of the country, along with distribution networks in areas not served by REDs. The continuous operation of these networks is essential for ensuring a reliable and uninterrupted supply of electricity, which contributes to improving the living conditions of Namibian citizens and supports national economic development.

The 220 kV Hardap – Kokerboom 1 & 2 transmission lines were constructed in 1981 and span a total length of 199.3 kilometres. These lines run from the Hardap Substation to the Kokerboom Substation, located within the Hardap and //Karas Regions respectively. The transmission towers are constructed using steel self-supporting lattice structures. Figure 1 illustrates the locality map of the 220 kV Hardap – Kokerboom 1 & 2 transmission lines.

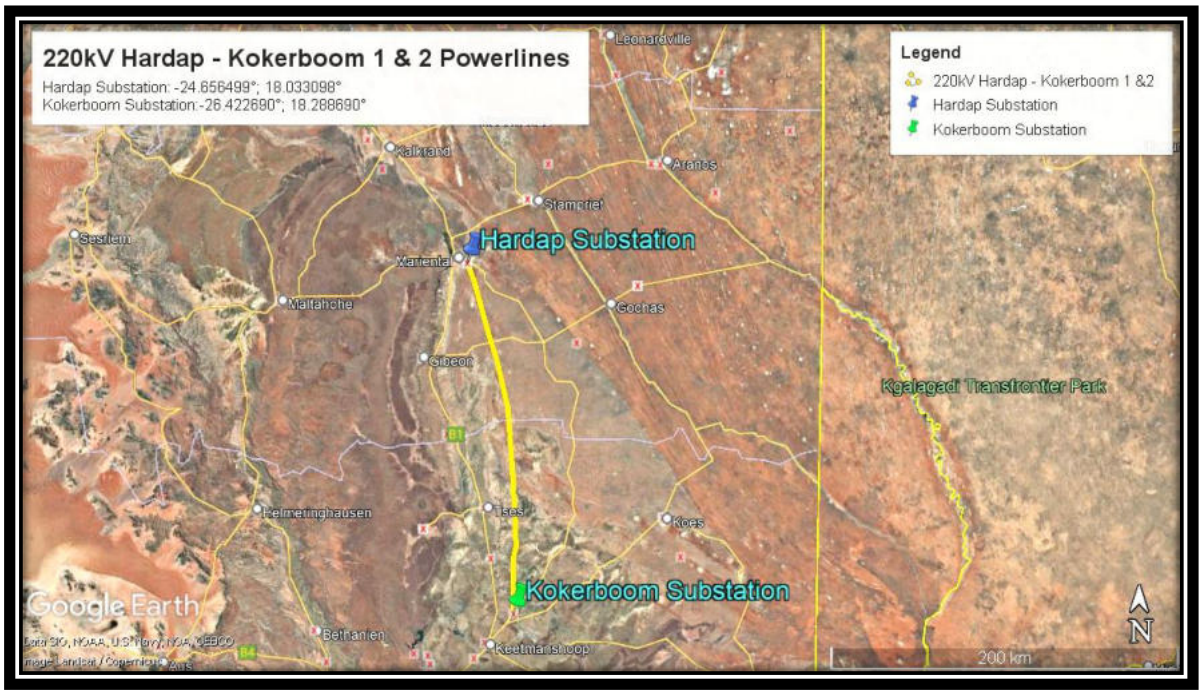

Figure 1: Locality map showing the 220kV Hardap – Kokerboom 1 & 2 transmission line

2.1GENERAL AREA DESCRIPTION

The 220kV Hardap - Kokerboom 1 & 2 transmission lines fall within the vegetation type known as the Dwarf Shrub Savannah or Karas Dwarf Shrubland, (Cunningham, 2021). The area is sparsely to moderately vegetated and comprises of sandy to gravel/rocky terrain with ephemeral drainage lines. This section passes through freehold and large sections of communal farmland areas northeast of Keetmanshoop, dominated by *Vachellia nebrownii*, *Boscia foetida*, *Caesalpinia rubra*, *Phaeoptilum spinosum*, *Rhigozum trichotomum* and *Zygophyllum prismatocarpum* shrubs, (Cunningham, 2021). The most important tree/shrub species encountered along the route are viewed as *Vachellia erioloba*; *Albizia anthelmintica; Aloe dichotoma* as well as *Aloe hereroensis*, (Cunningham, 2021).

The general 220kV Hardap - Kokerboom 1 & 2 transmission lines route is impacted by some anthropogenic activities such as transmission lines, roads/tracks and farm fences, making it not a pristine habitat, (Cunningham, 2021). The impact of line inspections and general maintenance activities would be site specific and have a relatively small environmental "footprint" and is not expected to have a major impact to the environment, (Cunningham, 2021).

The route passes through seven "hotspot" areas of which two areas are classified as "medium" sensitivity and five areas classified as "high" sensitivity, with potential medium and high biodiversity, (Cunningham, 2021). 0.5% of the route is viewed as "medium" sensitivity, 0.7% is viewed as "high" sensitivity while 98.8% is "low" sensitivity. The areas of importance are ephemeral drainage lines, well-vegetated pan as well as the rocky calcrete escarpment. Figure 2 – 12 show the sensitive areas and some of the protected plant species found along and in the vicinity of the line servitude.

Figure 2. The 220kV line in the vicinity of the Kokerboom Substation on flat sandy/gravel terrain dominated by dwarf shrubs and *Stipagrostis* spp. grasses.

Figure 3. Ephemeral drainage lines (trees in background) with associated floodplain areas are dominated by *Anisostigma schenckii* (kinkelbos) shrubs.

Figure 4. The calcrete escarpment area along the route is associated with *Aloe dichotoma* (quiver tree) trees.

Figure 5. A section of the route passes through a sandy dune area east of Asab.

Figure 6. *Aloe dichotoma* (quiver tree) observed in the calcrete escarpment area.

Figure 7. *Aloe hereroensis* individual east of Asab area in dune habitat.

Figure 8. *Boscia albitrunca* (shepherd's tree) as scattered individuals along the route.

Figure 9. *Hoodia gordonii* individual observed in the calcrete escarpment area.

Figure 10. The invasive alien *Prosopis* spp. was observed in some of the larger drainage lines along the route (See arrows).

Figure 11. The rocky calcrete escarpment areas were viewed as either "medium" or high" sensitive habitat, dependant of associated habitat and flora.

Figure 12. A well vegetated pan area is viewed as "high" sensitive habitat.

3 OBJECTIVES AND SCOPE OF THIS ENVIRONMENTAL MANAGEMENT PLAN (EMP)

The operation of the transmission line can have a negative impact on the receiving environment. However, the impacts are limited to the line servitude. It is thus important that good management measures are implemented to ensure that environmental damage is minimized. This Environmental Management Plan (EMP) seeks to manage and keep to a minimum the negative impacts associated with the transmission line and at the same time, enhance the positive and beneficial impacts.

The scope of this EMP includes all activities associated with the operation of the transmission line and substation. It is necessary to highlight that the EMP is a living document that should be periodically reviewed and updated. It should also be noted that the EMP should be read in conjunction with laws and regulations outlined in section 5, Table 1 and all other applicable laws.

The aim of this EMP is to detail the management actions required to implement the mitigation measures identified thereby ensuring that any operational phase activities are carried out in a manner that takes cognizance of environmental protection and is in line with National

legislation. This EMP has the following objectives:

- To outline mitigation measures to be implemented during the operation phase, to manage and minimize the extent of environmental impacts.
- Minimize negative impacts and enhance positive impacts associated with the operations.
- To ensure that the operational activities do not result in undue or reasonably avoidable adverse environmental impacts and ensure that any potential environmental benefits are enhanced.
- To identify key personnel who will be responsible for the implementation of the measures, outline functions and responsibilities.
- To propose mechanisms for monitoring compliance and preventing long term or permanent environmental degradation.
- To ensure that the concerns and complaints of Interested and Affected Parties (I&APs) with regards to the operational activities are addressed effectively and timely.
- Ensure compliance to legislative requirements.

4 POLICY AND LEGISLATIVE FRAMEWORK

The key legislative requirements relevant to the operational and maintenance activities of the powerline include, but are not limited to, those listed in Table 1 below. It is important to review each legislative instrument in full to gain a complete understanding, as the table only provides brief summaries.

Table 1 The legislative requirements which are applicable to the operational and maintenance activities

Legislation:	Section (s) applicable:	Implications:
Environmental Management Act no 7 of 2007	Section 3	• All activities performed should be in line with the following principles: o Interested and affected parties should have an

	Section 27 Section 33 onwards And all other applicable sections.	opportunity to participate in decision making ○ Listed activities should be subject to an EIA ○ Polluter should pay for rehabilitation ○ Pollution should be minimized • Environmental assessments should be carried out for listed activities. The proposed activity can be classified under the following range of activities: ○ Generation of electricity ○ Transmission of electricity • These sections detail the process to be followed to obtain a clearance certificate. • All existing listed activities must obtain a clearance certificate within one year of the law coming into effect. Therefore, all existing activities which can be considered a listed activity should apply for clearance.
EMA Regulations GN 28-30 (GG 4878) (February 2012)	• Listed activity: • 5.1 • 6 – 9; 13; 15; 21 -24 • Any other applicable	• This activity can be considered as electricity generation and transmission. • These sections detail the process to be followed in terms of producing an Environmental Assessment and this process should be adhered to during

	sections	the generation of information for this document.
No. 156 Labour Act, 1992: Regulations relating to the health and safety of employees at work.	All applicable regulations	All regulations applicable to different activities must be complied with.
Labour Act no 11 of 2007	• Section 3 • Section 4 • Section 9 • Section 39 – 42 • All other applicable sections	• Children under the age of 16 may not be employed • Forced labour may not be used. • Basic conditions of employment as stipulated by the law must be met. • The employer shall ensure the health and safety of all employees and non-employees on site. Employees must fulfil their duties to ensure their own health and safety and that of other employees and people. Employees may leave the workplace if reasonable measures to protect their health are not taken.
Electricity Act no 4 of 2007	• Section 33	• Installations used for the provision of electricity should be operated with due compliance with the requirements of laws relating to health, safety and environmental standards. Therefore – any company involved within the Electricity Supply Industry must adhere to the laws covering the previously stated aspects or stand to lose their licenses to operate.
Public and Environmental Health Act no 1 of 2015	• Section 52 • Section 53	• A person generating waste must ensure that the waste generated is kept and stored under conditions that causes

	• All other sections applicable to different activities.	no harm to human health or damage to the environment. • Waste must only be disposed of at a waste disposal site, including an incinerator approved by the local authority concerned.
Water Resources Management Act no 24 of 2013	• Section 89 • All other sections applicable to different activities.	• The owner or occupier or other person in control of land where an incident that causes or is likely to cause a water resource to be polluted must take all reasonable measures to contain and minimize the effects of the incident; and to clean up polluted areas and remedy the effects of the incident.
Hazardous Substances Ordinance 14 of 1974	• Section 27 • All other sections applicable to different activities.	• To provide for the control of substances which may cause injury or ill-health to or death of human beings, by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure thereby in certain circumstances; • To provide for the division of such substances into groups in relation to the degree of danger. • To provide for the prohibition and control of importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such substances; and • To provide for matters connected therewith.

Fertilizers, farm feeds, agricultural remedies and stock remedies Act no 36 of 1947	• Definitions • Section 7 • Section 10 • All other sections applicable to different activities.	• Arborocides application is defined as an agricultural remedy under this Act • Only registered pesticides may be used. • May only buy herbicides in a container that complies with the prescribed requirements and is sealed and labelled. • Only allowed to use herbicides in the prescribed manner. • Landowners must be notified about applications, and the following information must be supplied: o Purpose of administration o Registered name and number of the product • Precautions to be taken before, during and after each administration.
The Nature Conservation Ordinance (1975) as amended through the Nature Conservation Amendment Act of 1996.	• Chapter 11: Game Parks, Nature Reserves, Conservancies and Wildlife Councils	• Permits are required to enter the National Park. Permits are also required for the removal of any protected plant or tree. It also stipulates that no damage may be done to any object of geological, ethnological, archaeological, historical or other scientific interest without the appropriate permits.
National Heritage Act No 27 of 2004	• Section: 46, 48, 55 • All other sections applicable to different activities.	• All heritage resources are to be identified and either protected or removed/mitigated with a permit from the National Monuments Council, before any development may take place • A chance find procedure should be followed in case of discovery of a

		heritage resource.
Soil Conservation Act no 76 of 1969	• Section 4 • Section 13 • Section 21 • And other applicable sections	• Institutions may be ordered by the relevant Minister to construct soil conservation works when and where necessary. • Fire protection schemes may be implemented to regulate the prohibition of veld burning as well as the prevention, control and extinguishing of veld and forest fires. • It is illegal to damage, destroy / fail to maintain any soil conservation works; fire belts; works constructed in terms of a fire protection scheme.
Forest Act no 12 of 2001	• Section 66 • Section 41 • And other applicable sections	• Vegetation may not be removed within 100 m of a river, stream or water course • A person shall be liable for damage caused by any fire which arises because of activities carried out on site without having taken reasonable measures to prevent a fire.

5 ROLES AND RESPONSIBILITIES

It is the responsibility of NamPower and/or contractor to ensure that all the environmental management actions are carried out effectively and timeously. It is important to note that the successful implementation of the EMP is, however, dependent on clearly defined roles and responsibilities by several stakeholders. Below are the key employees that are responsible for the management of environmental and social issues during the operational phase:

Table 2: The roles and responsibilities for operational and maintenance activities:

Responsible person	Responsibilities
The Area Superintendent	• Is responsible for the enforcement of the EMP • To ensure that environmental requirements are adequately covered in any external service provider contracts. • To ensure that SHE requirements are included in the tender documents sent to the contractors. A copy of this EMP should also form part of the tender documents. • To ensure that corrective actions are implemented for non-compliances. • To ensure that appropriate records and information regarding compliance with environmental requirements are maintained. • To ensure that the line remain in compliance with the requirements of this EMP, through regular communication and monitoring. • To ensure that all incidents, accidents and complaints are reported. To also ensure that incidents and accidents are investigated to prevent re-occurrence.
Project Manager	• Is responsible for the enforcement of the EMP. • To ensure that SHE requirements are included in the tender documents sent to the contractors. • Must ensure that the contractor/NamPower Team remain in compliance with the requirements of this EMP throughout the project.
NamPower SHEW	• To ensure that all requirements with regards to this

	EMP are fulfilled. • Communicate NamPower SHEW requirement to the contractors and NamPower employees. • Provides SHEW inductions to NamPower and contractor employees. • Implement monitoring, conduct inspections and audits in consultation with the Project Manager/Area Superintendent. • Document and communicate monitoring, audit and inspection findings to project manager and area superintendent. • Communicate the final inspection report to the Project manager on project team compliance to the EMP before the project close-off and final payment is made to the contractor.
Contractor	• Is responsible for the implementation of the EMP • To appoint an environmental officer responsible for the implementation of this EMP. • To ensure that all tasks undertaken under the scope of work, are in accordance both with NamPower's SHEW policies and procedures as well as to the requirements of this EMP. • Ensure that employees are regularly trained and awareness built relating to environmental and social management. • To ensure that all incidents, accidents and complaints are reported to the project manager. The contractor to ensure that incidents and accidents are investigated to prevent re-occurrence. • Ensuring that all employees receive a SHEW

	induction before the start of the project. • Ensuring that the work being done does not create a nuisance to any being working, residing or living on adjacent properties or within the immediate surroundings of the site.

6 DESCRIPTION OF OPERATIONAL ACTIVITIES TO BE UNDERTAKEN AND ASSOCIATED IMPACTS

The activities associated with operational, and maintenance (the socio-economic and environmental impacts) include but not limited to the ones listed in table 3 below.

Table 3: Description of the activities related to the operational activities.

Activity	Description	Associated potential impacts
General functioning and presence of the powerline.	• Physical presence and functional characteristics of the powerline.	• Animal (including birds) mortalities through collisions and electrocution. • Visual impact. • Community impacts in a form fatalities or injuries caused by electrocution. • Meeting electricity demand (positive impact).
Maintenance of the line	• The maintenance of the line entails but not limited to: • General line components repairs/replacements. • Construction or repairing of access roads.	• Soil and water contamination • Waste generation leading to filling up of landfill space • Loss of biodiversity • Loss of sensitive habitats,

	• Repair or replacement of towers or tower components and others. • Upgrades	flora and fauna. • Social issues related to the introduction of new workers in the area, e.g. HIV/AIDS spreading • Loss of human life (through electrocution)
Periodic inspections and monitoring	• Inspecting the line and substation conditions and assess compliance to procedures and legal requirements.	• Soil and ground water contamination as a result of oil spills • Soil contamination as a result of improper waste handling and disposal. • Loss of biodiversity if existing access roads are not used.
Installation of Optic Fiber networks	• Design, Supply, Delivery, Installation and Commissioning of Optic Fiber networks for communication purposes.	• Loss of biodiversity • Soil contamination because of improper waste handling and disposal. • Loss of sensitive plants and habitats.
Vegetation Management	• Removal of trees and bushes to maintain access to the line servitude.	• Loss of biodiversity • Conflict with stakeholders • Loss of topsoil • Soil and water contamination • Loss or damage to heritage

		and cultural resources.

7 MANAGEMENT AND MITIGATION MEASURES

To ensure that the potential impacts are eliminated and/or minimised, it is necessary to ensure that the various activities related to the operation and maintenance of the power lines are adequately managed and monitored. Table 4 below outline mitigation measures as well as objectives to be achieved. A responsible person (s) has been assigned to each mitigation measure (s).

Table 4: Proposed mitigation measures for the general operational activities

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
Safety Health and Environmental (SHE) Awareness	• All employees shall undergo general environmental awareness training prior to commencing any work on-site, to ensure understanding of environmental responsibilities and compliance with the Environmental Management Plan (EMP) • All personnel shall undergo a Safety, Health, and Environmental (SHE) induction prior to the commencement of any on-site activities. • Regular SHE toolbox talks shall be conducted, and detailed records of these sessions shall be maintained.	• Area superintendent • Project manager • SHEW • Contractor
Safety Management	• A SHE file must be submitted and reviewed by the SHEW section in case of projects in accordance with NamPower SHE requirements. • NamPower Procedures, policies and legal requirements pertaining to safety must be complied with.	• Area superintendent • Project manager • Contractor • SHEW
Fire Management	• All potential sources of ignition shall be identified and eliminated, and appropriate fire prevention equipment shall be provided to mitigate fire risks.	• Area superintendent • Project manager

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	• Fire extinguishers shall be readily accessible at all operational sites and in vehicles used for project activities. • Fire extinguishers must undergo regular inspection and servicing to ensure functionality. • All personnel shall receive basic fire fighting training, including the proper use of firefighting equipment and emergency response procedures. • Fire breaks shall be established and maintained in accordance with applicable regulations and site-specific risk assessments.	• Contractor
Air Quality	• Dust emissions resulting from all operational activities shall be minimized through appropriate control measures. • The excavation, handling, and transportation of erodible materials shall be avoided during periods of high wind or when visible dust plumes are present. • Speed limits shall be strictly enforced on-site to reduce dust generation from vehicular movement. • Dust suppression techniques, such as water spraying shall be implemented as necessary to maintain air quality standards.	• Area superintendent • Project manager • Contractor

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	• All vehicles, machinery, and equipment shall be maintained in optimal working condition to minimize exhaust emissions and ensure operational efficiency. • Servicing and maintenance of vehicles, machinery, and equipment shall be conducted by qualified personnel, and detailed service records shall be maintained and filed for audit purposes.	
Resources Efficiency	• Water usage shall be optimized by minimizing wastage and maintaining accurate records of consumption. • Materials shall be utilized efficiently, and any unnecessary or excessive use shall be avoided. • Where feasible, goods and services shall be sourced locally to support regional economies and reduce environmental impact associated with transportation.	• Area superintendent • Project manager • Contractor
Waste Management	• Waste generation shall be minimized through the application of the waste management hierarchy, prioritizing reduction, reuse, and recycling. • The transmission line servitude must be always maintained free of any waste materials. • The burning, burying, or unauthorized dumping of waste on-site is strictly prohibited.	• Area superintendent • Project manager • Contractor

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	• Clearly labelled waste bins with secure lids shall be provided at designated stations or campsites (where applicable), and all waste shall be disposed of at the nearest approved waste disposal facility. • Waste segregation shall be conducted at the point of generation to ensure proper handling and disposal of different waste streams. • Hazardous waste must be disposed of at a registered hazardous waste disposal site in accordance with applicable regulations. • Certificates confirming the safe disposal of hazardous waste shall be retained in the Safety, Health, Environment and Wellness (SHEW) file for record-keeping and compliance verification. • Concrete waste shall not be discarded on-site under any circumstances.	
Wastewater management	• Water containing environmental pollutants shall be appropriately collected and removed from the site to prevent contamination of surrounding areas. • The discharge of wastewater, including uncontrolled runoff from operational or working areas, is strictly prohibited. • In remote locations, mobile sanitation facilities such as portable toilets or septic tanks shall be provided to ensure compliance with hygiene and environmental	• Project manager • Contractor • Area superintendent

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	standards.	
Hazardous Substances	• The use, handling, storage, and disposal of hazardous chemicals shall strictly adhere to the specifications outlined in the relevant Material Safety Data Sheets (MSDS). • All containers used for hazardous substances must be clearly labeled to indicate their contents and quantities. • Designated storage areas for hazardous substances shall be equipped with bunding capable of containing at least 110% of the volume of the largest container stored within the area. • Diesel, oil, hydraulic fluids, and other liquid fuels must be stored in appropriate tanks or bowsers fitted with secondary containment systems. • Regular inspections and maintenance of hazardous storage areas and bund walls shall be conducted to prevent overflow or leakage. • Drip trays must be readily available and utilized beneath equipment prone to leakage. • Spill kits and absorbent materials shall be maintained on-site to facilitate	• Area superintendent • Project manager • Contractor

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	immediate clean-up of any spills. • Safety signage indicating the presence of hazardous substances must be prominently displayed in all relevant storage areas. • All spill incidents must be promptly reported, thoroughly cleaned, and remediated in accordance with NamPower's Safety, Health, Environment and Wellness (SHEW) requirements.	
Social Impact	• NamPower/ Contractor must sign land permission form and agreement with landowners 14 days prior to the commencement of any on-site activities. • NamPower and/or the appointed contractor shall enter into a formal land access agreement with the respective landowners at least fourteen (14) calendar days prior to the commencement of any on-site activities. • All employees shall receive appropriate education and awareness training regarding the impacts and implications of HIV/AIDS and unintended pregnancies. • The consumption or possession of intoxicating substances, including alcohol and narcotic drugs, by employees is strictly prohibited while on duty or within the project site.	• Area Superintendent • Project Manager • All NamPower employees • Contractor

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	• All stakeholder queries and complaints shall be systematically recorded, thoroughly investigated, and addressed in a timely and effective manner. • A formal complaints register shall be maintained, documenting all grievances received from stakeholders along with the corresponding actions taken to resolve each issue.	
Archaeology	• In the event that a heritage site or archaeological feature is uncovered during the operational phase, the "chance find" procedure outlined in Annexure 8 of this Environmental Management Plan (EMP) shall be strictly followed. • All chance finds must be promptly reported to the NamPower Environmental Section for appropriate action. • Should human remains or culturally significant artefacts be discovered, all work in the immediate vicinity shall cease immediately. The police (in case of human remains) and/or a qualified archaeologist shall be consulted to conduct a formal investigation and provide guidance on the appropriate course of action.	• Area superintendent • Project Manager • SHEW • Contractor
Fauna and Flora	• The site shall be maintained in a clean and orderly condition, free from any waste or debris that may attract animals or pests.	• Area superintendent • Project Manager

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	• The harvesting, collection, or destruction of any plant species is strictly prohibited. • The poaching or disturbance of any wild or domestic animals is not permitted under any circumstances. • Bird nests shall not be disturbed unless they pose a direct interference with the safe and effective operation of the transmission line. • Vehicles operating along the transmission line route must engage four-wheel drive to prevent soil disturbance caused by wheel spinning. • Protected flora species encountered during operations shall not be destroyed, damaged, or collected unless they directly interfere with the functionality of the transmission infrastructure. • Activities within ecologically sensitive areas shall be minimized to reduce environmental disturbance. • Vegetation removal or pruning shall be limited strictly to flora that directly affects the transmission line. • Areas prone to bird collisions shall be identified and monitored.	• Contractor

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	• Bird Flight Diverters (BFDs) must be installed in designated collision-prone zones where high bird mortality rates have been recorded. • All bird mortalities observed beneath the transmission line shall be systematically monitored and documented. • Any interactions between wildlife and electrical infrastructure, including incidents of animal or bird fatalities, must be promptly reported to the SHEW Section.	
Water Resources	• Appropriate measures shall be taken to prevent any form of water pollution during operational activities. • Naturally occurring water sources shall not be utilized for personal hygiene purposes under any circumstances. • The extraction of water from private or government-owned properties shall only be permitted upon the establishment of a formal agreement between NamPower, the appointed contractor, and the legal custodian of the respective water source.	• Area superintendent • Project Manager • Contractor
Erosion	• Erosion control measures shall be implemented and maintained as necessary along the access routes to prevent soil degradation and preserve land stability.	• Area superintendent

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	• All areas affected by erosion shall be rehabilitated effectively to restore the natural landscape and prevent further environmental impact.	• Project Manager • Contractor
Campsite Establishment	In case camping is required: • Adequate ablution facilities shall be provided on-site in proportion to the number of personnel, in full compliance with applicable legislative and health standards. • In remote areas, septic tanks or equivalent wastewater containment systems shall be utilized to manage sanitation effectively. • Ablution facilities shall not be located within 100 meters of any natural water source, including rivers, stream channels, pans, dams, or boreholes, to prevent contamination. • Fire extinguishers, first aid kits, designated assembly points, and emergency contact numbers shall be readily available and clearly displayed on-site to support emergency preparedness. • All waste generated on-site shall be managed in accordance with the NamPower Waste Management Procedure.	• Area superintendent • Project Manager • Contractor

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
Vegetation Removal	• A permit shall be obtained from the Ministry of Environment, Forestry and Tourism prior to the removal of any protected tree species, in accordance with the Forest Act No. 12 of 2001. • Erosion control measures shall be implemented, particularly at river crossings, stream channels, and areas with existing erosion scars or dongas, to prevent further land degradation. • Measures shall be taken to preserve the integrity of the topsoil structure during vegetation removal and site activities. • Any disturbed soil shall be properly levelled to restore site stability and prevent erosion. • Wood cut on-site shall not be removed, as this may disrupt local nutrient cycling. • In instances where vegetation clearing occurs near rivers, NamPower and/or the contractor shall ensure that no felled bushes, branches, or shrubs are left within the riverbed. • The burning of bush-cleared materials on-site is strictly prohibited. • Vegetation removal shall be conducted in accordance with NamPower's approved procedures and environmental standards. • The cutting of protected tree species, as defined under the Forestry Ordinance No. 37 of 1952, shall be avoided unless such vegetation directly interferes with the safe operation of the transmission line.	• Area superintendent • Project Manager • SHEW • Contractor

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
Herbicide Use	• The application of selected herbicides shall be strictly prohibited in ecologically sensitive areas, including those classified as “high” and “medium” sensitivity zones, which are typically characterized by high biodiversity e.g. well-vegetated drainage lines, and rocky habitats. • Avoid the spraying of protected tree [Forestry Ordinance No. 37 of 1952) not directly affecting the power lines during the line clearing operation. • All invasive alien plant species associated with the transmission line or substations shall be identified and eradicated as part of NamPower’s environmental stewardship commitments. • Herbicide application shall not be conducted during windy conditions to prevent drift and unintended impacts on non-target areas and species. Product-specific guidelines must be consulted prior to use. • Only herbicides that are officially recommended and approved for use shall be applied. • Herbicide application shall be carried out strictly in accordance with the manufacturer’s instructions to ensure safety and effectiveness. • Implement strict control over the storage, protective measures & application of the selected herbicide(s) throughout. • The Material Safety Data Sheet (MSDS) for each herbicide must be consulted and adhered to at all times. • Herbicide must be handled in accordance with the requirements outlined in the	•

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	NamPower Procedures.	
Site Rehabilitation (progressive and post rehabilitation)	• Progressive rehabilitation shall be undertaken concurrently with project activities, and post-project rehabilitation shall be completed upon conclusion of all works. This includes the removal of all materials, equipment, and waste from the site to restore environmental integrity. • An inspection shall be conducted prior to the contractor's demobilization. Any identified non-conformances must be rectified before the contractor or project team vacates the site.	• Area superintendent • Project Manager • SHEW • Contractor
Emergency Procedures	• All potential emergency scenarios relevant to the operational activities shall be identified through a risk assessment process. • Emergency preparedness and response plans shall be developed for each identified scenario and effectively communicated to all relevant stakeholders, including NamPower personnel, contractors, and service providers. • District personnel and any individuals conducting work along the transmission lines shall be in position of a list of emergency contact numbers, including those for fire brigades, ambulance services, hospitals, police, and specialized responders such as snake and bee catchers.	• Area superintendent • All district personnel • Project Manager • Contractor

8 REPORTING, MONONITORING AND AUDITING

Environmental monitoring, inspections, and audits shall be conducted in accordance with the relevant procedures and requirements outlined in this plan. The Safety, Health, Environment, and Wellness (SHEW) Section shall be responsible for preparing reports detailing the outcomes of all monitoring and audit activities. These reports shall be communicated to the designated Area Manager, Superintendent, or Project Manager and other relevant stakeholders.

All records pertaining to monitoring, inspections, and audits shall be maintained and made readily available for review during internal or external inspections and audits. The following general monitoring indicators and guideline are recommended should herbicides be used to do vegetation management along the line.

The following general monitoring indicators and guideline are recommended should herbicides be used to do vegetation management along the line:

Table 5: General monitoring indicators and guideline recommended after herbicide application

Monitor trees adjacent the cleared area after herbicide application	A survey in year 1 (i.e. 6 months after application of herbicide) should be conducted along the affected route to determine the effect of the herbicide on non-target areas i.e. adjacent vegetation. Focus on protected tree species along the route
Monitor coppicing and regrowth after herbicide application	A survey in year 2 (i.e. 1 year after application of herbicide) should be conducted along the affected route to determine the effect of the herbicide on bush clearing. This would indicate the success of the herbicide used as well as indicate the necessity of follow-up treatment.
Sample any open surface water after herbicide application	Very few open water sources are located along the route and although it is recommended that herbicides not be used in “high” and “medium” sensitivity areas, monitoring this would be viewed as a good practice.

	Take water samples from any surface water encountered and have these analysed to determine if herbicide used has entered these sources.

9 NON-COMPLIANCE AND CONFLICT MANAGEMENT PROCEDURES

The Area Superintendent, project manager or the appointed Contractor shall be responsible for ensuring that all employees and external service providers strictly adhere to the requirements set forth in this Environmental Management Plan (EMP). Compliance with the EMP is essential to maintaining environmental integrity and operational accountability throughout the project lifecycle.

In instances where non-compliance is observed, the following procedure shall be implemented:

Identification and Reporting of Non-Compliance

Non-compliances shall be identified during routine inspections or audits conducted by the Safety, Health, Environment, and Wellness (SHEW) Section. Findings shall be formally documented and reported to the relevant Area Manager, Superintendent, or Project Manager for appropriate corrective action.

Notification to Responsible Stakeholders

Upon receipt of the non-compliance report, the Area Superintendent or Project Manager shall promptly notify all responsible stakeholders, including contractors and service providers, of the specific non-compliance issues.

Implementation of Corrective and Preventative Actions

Corrective and preventative measures shall be developed and implemented within an agreed timeframe. These actions must be appropriate to the nature and severity of the non-compliance and aim to prevent recurrence.

Follow-Up Verification

Follow-up inspections or audits shall be conducted by the SHEW Section to verify the effectiveness of the implemented corrective and preventative actions. The results of these follow-ups shall be documented and communicated to relevant parties.

In addition, the Contractor shall be obligated to notify NamPower immediately in the following circumstances:

Any disputes or conflicts arising with landowners or their representatives.

Any special conditions or requests made by landowners or their representatives that may affect project activities or environmental compliance.

NamPower reserves the right to suspend or halt all contractor activities in the event of a gross violation of the EMP. Such action may be taken to prevent further environmental harm, ensure regulatory compliance, and uphold the standards of responsible project execution.

10 RECORD KEEPING

Record keeping is important for the effective functioning and implementation of an EMP. EMP documentation must be kept in both the hard copy and electronic format for safe keeping. These must include but not limited to:

- Copy of the Environmental Clearance Certificate
- A copy of an EMP
- EMP implementation activities
- Induction records
- Audit and Inspection reports
- Other related documents

In case chemical vegetation management is conducted, the following records should be kept:

- Date of application
- Herbicide applied
- Persons responsible for application
- Supervisor
- Type of herbicide used
- Method of application
- Time of application

- Equipment used
- Concentration of herbicide used

11 CONCLUSION

All management measures and legal obligations stipulated in this Environmental Management Plan (EMP) shall be fully implemented to ensure environmental compliance by all parties involved in operational activities. This approach is essential to proactively identify, prevent, or mitigate potential adverse environmental impacts, while simultaneously enhancing positive outcomes.

Given the nature of the operational and maintenance activities associated with the powerline and its related infrastructure, it is anticipated that the environmental and social impacts will be minimal. Therefore, it is recommended that the Environmental Clearance Certificate (ECC) be issued.

12 REFERENCES

Cunningham, P. (2022). VEGETATION ASSESSMENTS WITHIN SERVITUDES OF HIGH VOLTAGE LINES [Rapid Vegetation Assessment] – 220kV HARDAP - KOKERBOOM 1 & 2.

Annexure 1: Areas of importance and protected species

Table 6. Areas of importance, with protected species potentially affected, along the 220kV Hardap - Kokerboom 1 & 2 transmission line.

Hotspot areas	Distance (km)	Area	Important species	Common names	Status	Aliens	Other important features	Importance ranking
	0 to 11.4	Kokerboom	*Vachellia erioloba*	Camel thorn	F			Low
1	11.4 to 11.7	Kokerboom	*Anisostigma schenckii* *Tamarix usneoides* *Ziziphus mucronata*	Kinkelbos Wild tamarisk Buffalo thorn	End F F	*Prosopis* spp.	Drainage line	High
	11.7 to 12.9	Kokerboom						Low
2	12.9 to 13.1	Kokerboom	*Anisostigma schenckii* *Tamarix usneoides*	Kinkelbos Wild tamarisk	End F		Drainage line	High
	13.1 to 29.6	Kokerboom						Low
3	29.6 to 29.7	Kokerboom	*Anisostigma schenckii* *Tamarix usneoides*	Kinkelbos Wild tamarisk	End F		Drainage line	High
	29.7 to 72.7	Asab area						Low
4	72.7 to 73.1	Asab area	*Aloe dichotoma*	Quiver tree	F; E-end; C2		Escarpment	High
	73.1 to 92.7	Asab area	*Aloe hereroensis* *Hoodia gordonii*		NC NC			Low
5	92.7 to 92.9	Asab area					Pan	High
	92.9 to 93.2	Asab area						Low
6	93.2 to 93.9	Asab area					Escarpment	Medium
	93.9 to 102.2	Asab area						Low
7	102.2 to 102.5	Asab area					Escarpment	Medium
	102.5 to 188.5	Hardap	*Boscia albitrunca*	Shepherd's tree	F			Low

Distance: Might not be precise as it was measured using car odometer
Importance ranking: Low
Status: F = Forest Act No. 12 of 2001;
NC = Nature Conservation Ordinance No. 4 of 1975
End & N-end = Endemic & Near endemic (Mannheimer and Curtis 2018)
C2: CITES Appendix 2 species

Annexure 2: Herbicide application guideline

Management requirement
Recommended herbicide for the control of woody plants: Access 240 SL or any similar product with picloram or tricoplyr as active ingredients should be used
The recommended herbicide for grass and weed at substations is: A product with active ingredient of Glyphosate.
Recommended Application method: Foliar application – spray or paint-on-stump –is recommended as this is target specific. Access mixed with water and Actipron (wetting agent).
Technique: The herbicide can be applied directly to the plant – stem or leaves – as a spray. Trees and shrubs with a stem diameter <10cm can be sprayed directly, but trees with a stem diameter >10cm should be felled before treatment of the cut surface for best results. Treatment should be done as soon as possible after felling and the entire cut surface and stump should be wetted. Coppice growth can also effectively be controlled.
Use: Active growing season – i.e. September to April (best in early growing season – September to November – before main rains) has best results.
Concentration Foliar application = 350ml/100l water + Actipron Super 500ml/100l spray mix. Cut stump application = 2l/100l water + Actipron Super 2l/100l spray mix.
Application repeatability ▪ Year 1: Apply herbicide (early growing season) ▪ Year 2: Follow-up to target any regrowth and coppicing (early growing season) ▪ Thereafter: As required – i.e. dependent on coppicing potential of various species. This could be determined during routine line inspections.

Annexure 3: Monitoring checklist for bush clearing and herbicide application

Activity: Bush clearing **Site:**	**Compliance**	
	Yes	No
Manual clearing conducted		
Mechanical clearing conducted		
Protected tree species on 12m boundary only trimmed		
Protected tree species not affecting line left *in situ*		
Raptor and vulture nesting sites left undisturbed		
Overall access improved		
Activity: Chemical application		
Active ingredient used = Triclopyr		
Application method used = spray		
Application technique used = spray leaves/cut stumps		
Application season = Sep to April (Sep to Nov = best)		
Application conditions = no wind		
Application procedures = protective equipment used as the MSDS		
Application knowledge = certified users only		
Storage = safe/secure		
Storage = chemical register maintained		
Storage = equipment clean/functional		
Concentration: Foliar application = 350ml/100l water + Actipron Super 500ml/100l spray mix		
Concentration: Cut stump application = 2l/100l water + Actipron Super 2l/100l spray mix		
Repeatability: Year 1		

Repeatability: Year 2		
Repeatability: Year 3		
Sensitive “hotspot” areas avoided		
Water – open surface water encountered		
Water – open surface water samples taken		
Collateral damage observed (i.e. non target areas/species affected)		
Any complaints from landowners		

Annexure 4: Protection of Ecology & Vegetation

Activity: Protection of Ecology & Vegetation	**Compliance**	
	Yes	**No**
Track discipline		
Evidence of new tracks		
Evidence of off-road driving		
Evidence of turnaround violations		
Evidence of oil spills		
Evidence of waste		
Evidence of litter		
Illegal collection/damage of flora		
Evidence of vehicle damage to plants		
Erosion		
Evidence of erosion along route		
Evidence of recovery at rehabilitated sites		
Invasive alien plants		
Evidence of invasive alien plants along route		
Bird mortalities		
Record all dead birds encountered below the line		

Annexure 5: Landowner permission form

Landowner Permission Form

Landowner name:	Contact number:
Representative name:	
Farm/village name:	
Contractor/NP Employee:	
Representative name:	Contact number:

General Notice

This form is to be used prior to a contractor entering a landowner's property to commenceany work related to the construction or maintenance of power-line structures and servitudes.

The form must be completed by either the landowner or his / her legal representative onthe property.

Section A: Before activities commence

Activities to be undertaken on the property (completed by the contractor):

Use of water resources
Powerline erection Powerline refurbishment Trimming of vegetation Use of other infrastructure(please specify)

Camping Bush clearing
Herbicide application
Access Road usage
Rehabilitation

Specific conditions to be met on the property (as stipulated by the landowner):

Dates when access is needed:

From: **To:**

Signatures (prior to entry)

Landowner/ Representative

Contractor/NamPower representative

Date

Date

Section B: Upon completion of work and prior to leaving the property

Remarks on compliance or misconduct (upon completion of activities):

Issues still to be resolved upon completion of activities:

Signatures (upon completion)

Landowner/Representative	Contractor/NamPower representative
Date	Date

Annexure 6: pre-application consent form for herbicide application

PRE-APPLICATION CONSENT FORM	
Name of Landowner / Representative:	
Contact Details:	
Name of Farm:	
Name of Contractor/NamPower Employee:	
Name and Details of Contact Person:	
Herbicide to be used:	
Period of Application:	
NamPower District Supervisor:	
Contact Details:	
NamPower site to be Treated:	
Comments from Landowner/Representative:	
Signed:	
Landowner/ Representative:	**NamPower Representative:**
Date:	**Date:**

Annexure 7: Post application review form for herbicide/pesticide applications

POST-APPLICATION REVIEW FORM	
Name of Landowner / Representative:	
Contact Details:	
Name of Farm/Village:	
Name of Contractor:	
Name and Details of Contact Person:	
Herbicide to be used:	
Period of Application:	
NamPower District Supervisor:	
Contact Details:	
NamPower site to be treated:	
Outstanding Issues:	
Signed:	
Landowner/ Representative:	NamPower Representative:
Date:	Date:

Annexure 8: Chance find procedure

Definition: The “chance finds” procedure covers the actions to be taken from the discovery of a heritage site or item to its investigation and assessment by a trained archaeologist or other appropriately qualified person.

Compliance: The “chance finds” procedure is intended to ensure compliance with relevant provisions of the National Heritage Act (27 of 2004), especially Section 55 (4): “a person who discovers any archaeological object must as soon as practicable report the discovery to the Council”. The procedure of reporting set out below must be observed so that heritage remains reported to the NHC are correctly identified in the field.

Procedure:

Action by person identifying archaeological or heritage material.

a) If operating machinery or equipment stop work

b) Identify the site with flag tape

c) Determine GPS position if possible

d) Report findings to foreman

Action by foreman

a) Report findings, site location and actions taken to superintendent

b) Cease any works in immediate vicinity

Action by superintendent

a) Visit site and determine whether work can proceed without damage to findings

b) Determine and mark exclusion boundary

c) Site location and details to be added to project GIS for field confirmation by archaeologist

Action by archaeologist

a) Inspect site and confirm addition to project GIS

b) Advise NHC and request written permission to remove findings from work area

c) Recovery, packaging, and labelling of findings for transfer to National Museum

In the event of discovering human remains

a) Actions as above

b) Field inspection by archaeologist to confirm that remains are human

c) Advise and consult with NHC and Police

d) Recovery of remains and removal to National Museum or National Forensic Laboratory, as directed