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ANNA

TRANSMISSION PROJECT

ANNA TRANSACTION ADVISORY SERVICES

Final Environmental and Social Management Plan

Namibia

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The contact details for the responsible parties associated with the execution of this ESMP are as follows:

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ABBREVIATIONS

Abbreviation	Meaning
ANNA	Angola-Namibia Interconnector Project
BFD	Bird flight diverters
CLO	Community Liaison Officer
DBSA	Development Bank of Southern Africa
EAP	Environmental Assessment Practitioner
ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EHS	Environmental, Health, and Safety
EHS	Environmental, Health and Safety
EMA	Environmental Management Act (No. 7 of 2007)
EO	Environmental Officer
ESIA	Environmental and Social Impact Assessment[1]
ESMF	Environmental and Social Management Framework
ESMF	Environmental and Social and Management Framework
ESMP	Environmental and Social Management Plan[2]
ESMS	Environmental and Social Management System
ESSS	Environmental and Social Safeguard Standards
FPIC	Free, Prior and Informed Consultation
GRI	Global Reporting Initiative
ha	Hectares
HIA	Heritage Impact Assessment
HIV / AIDS	Human Immunodeficiency Virus / Acquired Immune Deficiency Syndrome.
I&AP	Interested and Affected Party
ICP	Informed Consultation and Participation
IFC	International Finance Corporation

[1] The Namibian 2012 Environmental Impact Assessment (EIA) Regulations refer to the ESIA process simply as an "Assessment". In recognition of the international status of the project, due to the applicability of international financial institution environmental and social safeguards, the term "ESIA" has been used in this report, with the understanding that it is synonymous with the Namibian "Assessment".
[2] The Namibian 2012 EIA Regulations refer to the an ESMP simply as a "Management Plan". In recognition of the international status of the project, due to the applicability of international financial institution environmental and social safeguards, the term "ESMP" has been used in this report, with the understanding that it is synonymous with the Namibian "Management Plan".

Abbreviation	Meaning
km	kilometre
kV	Kilovolt
m	metres
MAWF	Ministry of Agriculture, Water and Forestry
MET: DEA	Ministry of Environment and Tourism: Department of Environmental Affairs
MME	Ministry of Mines and Energy
NCR	Non-conformance register
NoK	Next of Kin
OHS	Operational Health and Safety
OPGW	Conductor and Optical Ground Wire
PAC	Project Affected Community
PAC	Project Affected Community
PAP	Project Affected Persons
PAP	Project Affected Persons
PPE	Personal Protective Equipment
PS	Performance Standards
RAP	Resettlement Action Plan
RNT	Rede Nacional de Transporte de Electricidade
RPF	Resettlement Policy Framework
SADC	Southern African Development Community
SAPP	Southern African Power Pool
SEP	Stakeholder Engagement Plan
SHEW	Safety, Health, Environment and Wellness
SIA	Social Impact Assessment
VGP	Vulnerable Groups Plan

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1 Introduction

1.1 Purpose of this document

The Southern African Power Pool (SAPP) co-ordinates the planning, generation and transmission of electricity on behalf of member state utilities in the Southern African Development Community (SADC) region. As such, SAPP has initiated the Angola-Namibia (ANNA) Transmission Interconnector Project as an energy pool initiative. The aim of the project is to alleviate the current electricity supply constraints and contribute towards long-term security of energy supply by enhancing the transmission of electricity in the region. Given the transboundary nature of the project, the Namibian and Angolan national power utilities will be the beneficiaries of the project.

The proposed project involves the construction of a 400 kV overhead transmission line, with a total length of approximately 361 km from the proposed Kunene substation in Namibia to the proposed Lubango substation in Angola. Most of the proposed project (approximately 331 km) is located in southern Angola, and the remainder (31 km) in Namibia. The project is currently in the planning and conceptual design phase with detailed design to occur later. Associated with the planning phase, the Environmental and Social Impact Assessment (ESIA) application seeks to assess and obtain approval for a 2 km wide corridor for this transmission line (1 km on either side the proposed line), which is referred to as 'the study area'. The final transmission line alignment will have a 80 m wide servitude, which will be maintained by the utilities and used for the purposes of construction and maintenance of the transmission line. The servitude will be located within entirely within the 2 km wide corridor. The Namibian and Angolan sections of the line will be owned and operated by NamPower and RNT, respectively. A detailed project description is provided in Section 2 of the ESIA report.

This Environment and Social Management Plan (ESMP) is restricted to the Namibian portion of the Angola – Namibia Transmission Interconnector Project (ANNA) and forms part of the project's Environmental and Social Impact Assessment (ESIA) documentation. Further detail regarding the project context and impact assessment process can be found in the ESIA. Other key documents to be cross-referenced with this ESMP include the Stakeholder Engagement Plan (SEP), the Vulnerable Group Plan (VGP) and Resettlement Policy Framework (RPF). A separate ESIA and ESMP report, with all supporting documentation, has been compiled for the Angolan part of the line.

1.2 Objectives of the Environmental and Social Management Plan (ESMP)

This report is the Environmental and Social Management Plan (ESMP) for the Namibian portion of the proposed ANNA project. The report was compiled in accordance with Namibian environmental legislation (Environmental Management Act (No. 7 of 2007) and associated EIA Regulations.

An ESMP is a key output of the ESIA process and has been compiled in accordance with the requirements of the Ministry of Environment and Tourism: Department of Environmental Affairs (MET: DEA), the International Finance Corporation (IFC) Performance Standards, the Development Bank of Southern Africa (DBSA) and SAPP Guidelines as well as other national legislation pertaining to environmental management.

The purpose of this ESMP is to provide a framework within which the environmental and social risks and liabilities, identified during the ESIA, are to be managed during the project lifecycle and sets out how the project will mobilise resources to implement these measures. The ESMP has the following key objectives:

- Ensure compliance with relevant regulations, environmental good practice and commitments made in the ESIA Report;
- Communicate key environmental and social expectations and requirements to all role-players;

- Carry over and set out the measures identified in the ESIA to mitigate key environmental and social impacts during the construction and operational phases of the project;
- Establish systems to identify and prevent adverse environmental, social and economic impacts that might arise from project;
- Set out the roles and responsibilities for key role-players responsible for the implementation of the ESMP;
- Set out the monitoring requirements for the various phases of the project; and
- Ensure that there is sufficient allocation of resources on the project to implement the ESMP-related activities.

The ESMP is a living document and must remain relevant to the project as and when the scope evolves with subsequent phases of the project. Thus, the specifications or requirements in this ESMP may need to be taken under review and amended to ensure its continuing applicability to the project. It is recommended that the ESMP be reviewed on an annual basis and that this should include the identification of additional environmental and social risks that may have emerged since the commencement of the project, and development of appropriate mitigation measures to manage such risks.

This ESMP shall form part of the contract and be supplementary to tender documentation, as all contractors must comply with its commitments and requirements and they must price for compliance and implementation of these requirements where necessary. While NamPower holds the Environmental Clearance Certificate (ECC) and responsibility of the implementation of the ESMP, it is recognised that practical implementation of many of the measures may rest with contractors and subcontractors and consequently, NamPower will require the implementation of a robust review/audit programme to ensure that it is executed on its behalf.

1.3 Structure of the ESMP

The ESMP includes the following sections:

- Section 1: Introduction – sets out the purpose of the ESMP and the objectives of the document, as well as the structure of the document.
- Section 2: Project summary – describes the ANNA Transmission Interconnector Project, the components and proposed activities throughout the lifecycle.
- Section 3: Legislation and policy framework – lists the relevant national legislation, as well as the SAPP policies and the international framework for compliance, namely the IFC and DBSA requirements. It describes the relevance for the project and where in this document the provisions are included.
- Section 4: Roles and responsibilities - sets out the roles and responsibilities of the different parties involved in the execution of the project.
- Section 5: Environmental and social management – provides the approach the environmental and social management and provides detailed plans to address each of the aspects and impacts identified as requiring mitigation measures.
- Section 6: Training and environmental awareness – describes the proposed training for various parties to ensure that they are equipped to execute the ESMP based on their roles, as well as training for communities to raise awareness regarding project activities.
- Section 7: Emergency preparedness and response – includes a framework plan for identifying risks and procedures so that the relevant parties are prepared in their response.
- Section 8: Grievance mechanism – describes the proposed Grievance mechanism to be implemented for the project lifecycle.
- Section 9: Schedule and budget for ESMP implementation - includes the capital and recurrent costs to implement the ESMP.
- Section 10: ESMP reporting, monitoring and auditing – provides the process for regular monitoring, audit and review of the ESMP for performance improvements where relevant.

2 Project summary

2.1 Project objectives

SAPP has identified the Angola-Namibia (ANNA) Transmission Interconnector Project as one of the its key energy pool initiatives. The aim of the project is to alleviate the current electricity supply constraints and contribute to energy security of supply by reinforcing electrical distribution infrastructure in the region. The project is intended to link the Namibian and Angolan electricity networks in the north western part of Namibia and the southern part of Angola, initially supplying power to towns in the southern part of Angola, mainly Xangongo, Cahama and Ondjiva and also to make provision for the future integration of 400 kV line(s) from the planned Baynes Power Station 400 kV line(s). Anticipated economic benefits include unlocking cheaper energy generation sources across the region, improved access to renewable energy sources (with lower emissions), reduced cost of transmission (due to an increase in transmission route options) and a reduced risk of supply interruptions to both countries.

2.2 Project timeframes

The construction phase is expected to take 24 - 36 months (for the project in entirety that includes the Angolan component), but this would vary depending on the weather conditions at the time of construction and the construction method proposed by the contractor. Phasing may allow activities to happen in different locations concurrently. The operational lifespan of the project is 30 years.

2.3 Project location and components

The project is located in the north-western part of Namibia and spans the Omusati and Kunene Regions. The line extends from the proposed Kunene Substation (approved under an existing ECC) to the Angolan border approximately 4 km north-east of the Ruacana Power Station, within the Uukolonkadhi Conservancy. The proposed line runs parallel and approximately 60 m east of NamPower's existing 330 kV Ruacana-Omburu transmission line, and also crosses the existing Ruacana – Opuwo 66 kV transmission line (refer to Figure 2-1). The project is currently in the concept design phase and detailed design is not yet available. The project components are summarised in Table 2-1 below, more information can be found in the ESIA.

Table 2-1: Project components

Component	Description
Pylons	Type: 422A / Guyed Compact Cross-Rope Suspension Pylon, 422B, 422C, L312A Pylon, larger pylons used for > 800 m Kunene River crossing Spacing: 300 m to 500 m Height: Between 43.5 m and 26.9 m Footprint: 12 m x 10 m Foundation depth: 5 m Safety clearance (obstacles): 80 m x 40 m Additional features: Bird diverters and anti-climbing mechanisms
Conductors	Triple Tern ACSR conductor
Overhead line	31 km of 400 kV Single Circuit Transmission Line.
Servitude	Width: 80 m Safety clearance (obstacles): 12 m
Access roads	Local and existing tracks to be used where possible, with further new access roads required in the servitude where necessary for access and inspection purposes. Type: Dirt track with limited earthworks for erosion prevention where necessary, paved only if necessary e.g. steep sections.

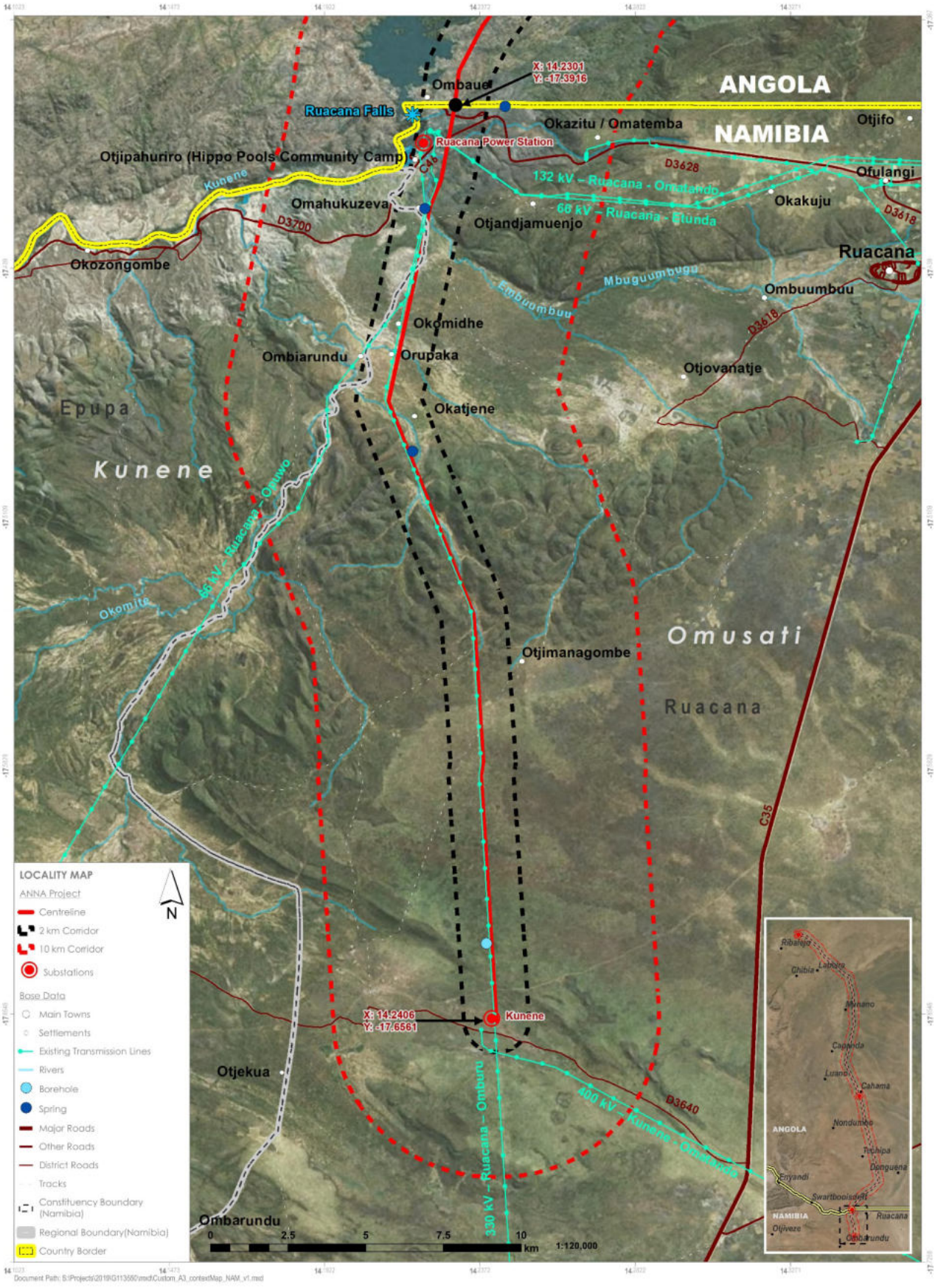


Figure 2-1: Locality map for the Namibian component

2.4 Project activities

The project involves the following project activities per phase as summarised in Table 2-2.

Table 2-2: Project activities per phase

Pre-construction	Construction
1. Resettlement planning: • Establish Resettlement Task Team (RTT) • Announce the project • Identify impacts • Census including socio-economic survey • Undertake inventory of assets • Develop compensation framework and identify livelihood restoration • Prepare detailed budget (valuation), implementation schedule and organisational responsibilities 2. RAP implementation: • Household consultation • Signing of contracts • Payment of compensations • Resettlement activities (e.g. relocations) 3. Demining activities; 4. Walkdown survey to inform preferred alignment; 5. Detailed survey to fix alignment (as informed by resettlement process with avoidance of assets as a priority) 6. Servitude application, where required 7. Land acquisition process; 8. Check survey for exact pylon locations 9. Soil investigation of selected pylon locations to inform foundation design 10. Final designs	1. Mobilisation of workers, machinery and construction equipment 2. Survey and development of access roads 3. Clearing of vegetation and stripping of the topsoil in the construction camp/s, construction site/s, right of way and at each pylon location 4. Setup of construction camp/s (approx. one camp of 0.5 ha) to include: • Site office, accommodation (if necessary), eating and ablution facilities • Laydown areas for infrastructure • Concrete batching plant • Storage facilities for materials, equipment or waste • Equipment parking area • Power supply (generator) • Fuel storage for generators and vehicles • Water supply (borehole or water treatment plant, or a water tank) • Security fencing • Mobile toilets and/or French drains for treated sewage disposal. 5. Transport required materials, equipment and components to the camp/s and each pylon location 6. Movement and operation of heavy machinery and equipment 7. Waste production and management 8. Surveying and pegging of pylon locations 9. Earthworks associated with the pylon 10. Placement of pylon foundations (including installation of earth connection and installation of support bases) 11. Assembly and erection of pylons using temporary laydown areas at each pylon 12. Laying of cables, conductor stringing, line signalling, aerial beacons and bird diverters, which entails unrolling, adjusting and securing of the cables, using the areas around the pylons or between the pylons. If crossing over or beneath obstacles (namely roads, rails and other aerial lines), set up of temporary protective structures 13. Conductor and Optical Ground Wire (OPGW) stringing 14. Installing of anti – climbing devices on the towers 15. Demobilisation of construction work sites. 16. Rehabilitation of the affected areas: • Removal / decommissioning of contractor's camp • Removal and disposal of all construction equipment and rubble

Pre-construction	Construction
	• Rehabilitation of the areas disturbed by construction works • Rehabilitation of all access roads not required in the operational phase 17. Resettlement follow up: • After project community support including grievance mechanism • Monitoring, evaluation and reporting.
Operation and Maintenance	**Decommissioning (if required)**
1. General operation of the transmission line (physical presence and functional characteristics) 2. Periodic inspections, monitoring, maintenance of the line, entailing the verification of the state of the conductors and structures (and replacement of components, if damaged), assessment of the compliance of the safety distances between the vegetation and the conductors 3. Vegetation management along the servitude e.g. cutting and pruning of trees, selective herbicide application, mechanical and manual bush clearing 4. Waste production and management, associated with the periodic maintenance actions (limited to pylon footprints) 5. Environmental and social monitoring (Section 9) 6. Resettlement follow up: • After project community support including grievance mechanism • Monitoring, evaluation and reporting.	1. Decommissioning plan to be compiled based on conditions at the time 2. Dismantling and removal of transmission cables and pylons 3. Rehabilitation of pylon foundations and other disturbed areas 4. Transport and disposal of the material off-site 5. Monitoring (site surveys) may be required after rehabilitation has been completed; this is to ensure that the rehabilitation objectives were met and that the rehabilitation process was successful

3 Legal and Policy Framework

This section provides an overview of the legal and policy framework underpinning this ESMP. As a donor-funded, transboundary project, the ESIA must comply with Namibian and Angolan legislation as well as financial institution environmental and social safeguards.

The overarching environmental legislation applicable in Namibia is the Environmental Management Act (No. 7 of 2007) and associated EIA Regulations, described in Section 3.1. The project is also governed by other national policies and legislation (refer to Section 3.1) and regional policies and guidelines (refer to Section 3.2). The ESIA process is undertaken in accordance with this national legislation as well as the IFC Performance Standards and the DBSA Environmental and Social Safeguards (ESSS) and are aimed at ensuring financed projects are carried out in an environmentally and socially responsible manner and. The applicability to the international guidance is provided in Section 3.3.

3.1 National legislation

An overview of the legislation that governs development in Namibia is provided in Table 3-1 based on the relevance to the project.

Table 3-1: Relevant legislation and applicability

Legal Requirements		
Legislation considered	**Relevant Organ of State / authority**	**Applicability**
The Constitution of the Republic of Namibia (1990)	Government of the Republic of Namibia	Overarching applicability in terms of sustainable development and civil rights.
Environmental Management Act (No. 7 of 2007)	MET: DEA	Overarching applicability in terms of sustainable development. The EIA Regulations (2012) list activities which could have a substantially detrimental effect on the environment and require environmental clearance from the MET: DEA. Several listed activities are triggered by the proposed project as indicated in the ESIA.
National Heritage Act (No. 27 of 2004)	Ministry of Education and Culture: National Heritage Council	Section 55 (4) states that “a person who discovers any A person who discovers any archaeological or palaeontological object or meteorite must as soon as practicable report the discovery to the Council”. Reg No. 106 of 2005 implement provisions of the National Heritage Act in respect of, among other things: (change in) status of protected places and registration of such places; application, under section 48(1) of the Act, for a permit to carry out works or activities; provisional protection orders; the form of permit referred to in section 52(1) of the Act; application for consent, in terms of section 53(7) of the Act (listed buildings). Refer to Section 5.3.9 where chance finds are included for.
Forestry Act (No. 12 of 2001)	MAWF: Forestry Council	Compensation for trees greater than 30cm in diameter to be paid to the Ministry of Water, Agriculture and Forestry. Several tree species are listed as being “plants or species of any plant declared to be protected plants” in terms of the 2015 Forest Regulations of the Forest Act (No. 12 of 2001). A licence is required for clearance of any living tree, bush or shrub growing within 100 metres of a river, stream or watercourse. In addition, trees with stem diameter of more

Legal Requirements		
Legislation considered	**Relevant Organ of State / authority**	**Applicability**
		than 18 cm at ground level may not be removed without a licence. Exclusions apply for the invasive alien plant species. Refer to Section 5.3.7 and 5.3.6.
Fertilizers Farm Feeds and Agricultural Remedies Act 36 of 1947	Ministry of Agriculture	Governs pest control/herbicide application for vegetation management. Refer to Section 5.3.6.
Nature Conservation Amendment Act (No. 3 of 2017)	MET	The Uukolonkadhi Ruacana Communal Conservancy as registered in terms of the Act is a key stakeholder and must be included in consultations, as indicated in the SEP (separate document).
Nature Conservation Ordinance (4 of 1975)	MET	GN 246/1977 (OG 3638) contains prohibitions on the export of processed or tanned leopard and cheetah skins. The collecting, harming and killing of all protected species is illegal, refer to Section 5.3.7. The Uukolonkadhi Ruacana Communal Conservancy as registered in terms of the Act is a key stakeholder and must be included in consultations, as indicated in the SEP (separate document).
The Communal Land Reform Act (No. 5 of 2002)	Republic of Namibia	General applicability in terms of communal land in Namibia and the prevention of land degradation and indirect contribution to the preservation of biological diversity.
Traditional Authorities Act (No. 25 of 2000)		The Uukolonkadhi Traditional Authority is a key stakeholder and must be included in consultations, as indicated in the SEP (separate document).
Water Act (No. 54 of 1956)	Ministry of Agriculture, Water and Forestry (MAWF)	General applicability to the management, protection, development, use and conservation of water resources, refer to Sections 5.3.2.
Water Resources Management Act (No. 11 of 2013)	Ministry of Agriculture, Water and Forestry (MAWF)	As above, however not yet in force.
Electricity Act (No. 4 of 2007)	Republic of Namibia: Ministry of Mines and Energy	NamPower must apply for necessary licenses/ approvals as required by the Act for the transmission of electricity.
Soil Conservation Act (No. 76 of 1969)	Ministry of Agriculture, Water and Forestry (MAWF)	General applicability in terms of the prevention and control of soil erosion and the protection, improvement and conservation of soil, vegetation and water supply sources and resources, refer to Section 5.3.3.
Public and Environmental Health Act (No. 1 of 2015)	Ministry of Health and Social Services	General applicability in terms of protection of the public from nuisance and other condition which is injurious or dangerous to health on land or premises owned or occupied by them. Refer to Sections 5.3.4, 5.3.5, 5.3.14 and 5.3.15.
Labour Act (No. 11 of 2007) and Regulations relating to the health and safety of employees at work	Ministry of Health and Social Services	This Act legislates the minimum wage and working conditions (S39-47). NamPower must ensure that all contractors comply with this Act. Prior to commencement of the construction activities, the Ministry of Labour is to be notified in relation to Regulation 20.

Legal Requirements		
Legislation considered	**Relevant Organ of State / authority**	**Applicability**
The Atomic Energy and Radiation Protection Act (No. 5 of 2005)	The Atomic Energy Board of Namibia	The proposed ANNA project is an electricity distribution project. Powerlines are considered to be a source of Low Frequency time-varying non-ionising electric and magnetic fields and monitoring thereof is a requirement set out in Section 5.3.15 and aimed at the protection of Vulnerable Groups.
Road Traffic and Transport Act (No. 22 of 1999) and Road Traffic and Transport Regulations (2001)	Namibian Roads Authority	The Regulations specify the equipment, loads, transportation of dangerous goods, traffic signage, speed and rules of the road. Permits may be required in respect of the above. Refer to Traffic Safety Management in Section 5.3.16.
Deeds Registries Act 47 of 1937	Deeds Office	A servitude requires registration in terms of the Act as it transverses a portion of the Ruacana townlands. (Note that the 330 kV line is also not yet registered).

Relevant policies and guidelines are included in Table 3-2 below.

Table 3-2: Relevant policies and guidelines and their applicability

Policy Requirements	
Policy considered	**Applicability**
Compensation Policy Guidelines for Communal Land (Approved in terms of Cabinet Decision of 15 September 2009	This Guideline has been considered in the Resettlement Policy Framework (RPF), a separate document.
Guidelines for Integrating HIV and Gender-Related Issues into Environmental Impact Assessment for Capital Projects in Namibia (2015)	This guideline has been considered in Section 5.3.11.
National Policy on Climate Change (2010)	Overarching applicability in terms of climate change mitigation and adaptation.
National Energy Policy (2017)	Overarching applicability in terms of energy supply, access and diversification.
Second National Biodiversity Strategy and Action Plan (2013-2022)	Overarching applicability in terms of protection of biodiversity.
Vision 2030	Overarching applicability in terms of sustainable development.

3.2 Regional Policies and Agreements

Relevant regional policies and guidelines are included in Table 3-2 below.

Table 3-3: Relevant policies and guidelines and their applicability

Policy Requirements	
Policy considered	**Applicability**
SAPP Environmental and Social Management Framework (2018)	General applicability in terms of guidance on, *inter alia*, stakeholder engagement, specialist terms of reference; identification of impacts, risks and mitigation measures.
SAPP ESIA Guidelines for Transmission Infrastructure (2010)	General applicability in terms of guidance on, *inter alia*, recommended format and components of an ESMP, approach to stakeholder engagement, identification of impacts, mitigation measures and monitoring.

3.3 International financial institution standards and policies

3.3.1 Standards

The International Finance Corporation (IFC) is an international financial institution that offers investment, advisory, and asset management services to encourage private sector development. The IFC's Performance Standards offer a framework for managing environmental and social risks of projects. They define clients' responsibilities for managing their environmental and social risks and are regarded as an international benchmark and have been adopted by many organisations as a key component of their environmental and social risk management (IFC, 2012). The Performance Standards (IFC PS) provide guidance on how to identify risks and impacts and are designed to help projects avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable manner.

The DBSA is a multilateral development finance institution that funds infrastructure development in the SADC region. It aims to promote sustainable development and improve the quality of life of people, supports economic growth and regional integration, and promotes the sustainable use of scarce resources. The DBSA has issued an update to the Environmental and Social Safeguards Standards (ESSS) (DBSA. 2018). These ESSS are used by the DBSA to manage social and environmental risks in its investment decision-making.

The IFC PS and the DBSA ESSS are included in the ESIA (Appendix E) along with their relevance and applicability to the project. The ESIA also includes a financial safeguard gap analysis of the project against these PS and ESSS.

The latest DBSA ESSS was issued in 2018 (DBSA. 2018) and are listed below:

- ESSS1: Assessment and Management of Environmental and Social Risks and Impacts
- ESSS2: Stakeholder Engagement and Information Disclosure
- ESSS3: Gender Mainstreaming
- ESSS4: Indigenous Peoples
- ESSS5: Land Acquisition, Land Use Restrictions and Involuntary Resettlement
- ESSS6: Labour and Working Conditions
- ESSS7: Community Health and Safety
- ESSS8: Cultural Heritage
- ESSS9: Biodiversity Conservation and Sustainable Living Natural Resources Management
- ESSS10: Resource Efficiency, Pollution Prevention and Management
- ESSS11: Safety of Dams (not applicable to this project).

The IFC PS (2012) are listed below

- PS1: Assessment and Management of Environmental and Social Risks and Impacts
- PS2: Labour and Working Conditions
- PS3: Resource Efficiency and Pollution Prevention
- PS4: Community Health, Safety and Security
- PS5: Land Acquisition and Involuntary Resettlement
- PS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- PS7: Indigenous Peoples
- PS8: Cultural Heritage

3.3.2 Environmental, Health, and Safety Guidelines

The IFC's Environmental, Health and Safety (EHS) Guidelines (IFC, 2007a) are technical reference documents with general and industry-specific examples of good international industry practices. When one or more members of the World Bank Group are involved in a project, the EHS Guidelines are applied as required by their respective policies and standards. The EHS Guidelines prescribe minimum performance

levels and measures that are generally considered achievable in new facilities using existing technology at reasonable cost.

These General EHS Guidelines are designed to be used together with the relevant industry sector EHS Guidelines. The EHS Guidelines for Electric Power Transmission and Distribution (IFC, 2007b) are relevant to the proposed project. Table 3-4 includes the IFC General and industry-specific EHS Guidelines and their applicability to the project.

Table 3-4: Applicability of IFC Environmental, Health, and Safety General Guidelines (2007)

Sub-section	Description of the guidance	Applicability to the ESMP
Environment		
1.1 Air Emissions and Ambient Air Quality	• Projects with significant sources of air emissions, and potential for significant impacts to ambient air quality, should prevent or minimise impacts by ensuring that: • Emissions do not result in pollutant concentrations that reach or exceed relevant ambient quality guidelines and standards by applying national legislated standards, or in their absence, the current World Health Organisation Air Quality Guidelines, or other internationally recognised sources; • Emissions do not contribute a significant portion to the attainment of relevant ambient air quality guidelines or standards. The Guideline suggests 25% of the applicable air quality standards to allow additional, future sustainable development in the same airshed.	• The project is an electricity transmission project that will transmit electricity from mainly renewable resources (hydro-electricity). Therefore, minimal emissions are expected to occur during the life-cycle of the project. • Exceedance of IFC or WHO thresholds is not expected due to the temporary nature of the works, the state of the airshed (being a rural area with no significant pollution sources) and the linear nature of the project (versus a point source). However, generic measures are included in Section 5.3.4 to minimise any impacts from dust and vehicle emissions.
1.2 Energy Conservation	• Applicable to projects that consume energy in process heating and cooling; process and auxiliary systems, such as motors, pumps, and fans; compressed air systems and heating, ventilation and air conditioning systems (HVAC); and lighting systems. The aim is to reduce energy consumption though adopting the guidance provided.	• Relevant design-related or behavioural measures applicable during construction are included in Section 5.3.17.
1.3 Wastewater and Ambient Water Quality	• Projects with the potential to generate process wastewater, sanitary (domestic) sewage, or stormwater should incorporate the necessary precautions to avoid, minimise, and control adverse impacts to human health, safety, or the environment. Guidance is proposed in this regard.	• Applicable to the proposed project only in so far as construction camps will have domestic wastewater discharges. • Measures to limit impacts of contaminated water generated during construction are included in Section 5.3.2.
1.4 Water Conservation	• Water conservation programmes should be implemented commensurate with the magnitude and cost of water use. Such measures may include water monitoring/management techniques; process and cooling/heating water recycling, reuse, and other techniques; and sanitary water conservation	• Not applicable to the proposed project, since it is an electricity transmission project, which does not consume water. The only water consumption will be during construction in the camps and for the concrete foundations. • Measures to limit water usage required during construction are included in Section 5.3.17.

Sub-section	Description of the guidance	Applicability to the ESMP
	techniques. Guidance is proposed in this regard.	
1.5 Hazardous Materials Management	• This guidance is applicable to projects that use, store, or handle any quantity of hazardous materials (Hazmats). The overall objective of hazardous materials management is to avoid or, when avoidance is not feasible, minimize uncontrolled releases of hazardous materials or accidents (including explosion and fire) during their production, handling, storage and use. It is twofold and relates to General Hazmat Management; as well as Management of Major Hazards: Additional guidance where hazardous materials are stored or handles above, threshold quantities.	• It is anticipated that no dangerous goods/ hazardous materials (such as fuels needed during the construction phase) will be temporarily stored on site. The Namibian section of the transmission line is approximately 32 km long. Fuelling and supplies would occur and be obtained in Ruacana. However, measures have been included in Section 5.3.7 should this need arise (i.e. fuelling small plant such as generators and compressors). • Use of herbicides during servitude maintenance is provided for in Section 5.3.7.
1.6 Waste Management	• This guidance is applicable to projects that generate, store, or handle any quantity of waste across a range of industry sectors. Guidance for general and hazardous waste management is provided.	• Engineers and contractors to incorporate this guidance into their project plans, as and where applicable. • Waste mitigation measures are included in Section 5.3.13.
1.7 Noise	• This guidance is applicable to projects that generate noise beyond the property boundaries. Noise prevention and mitigation measures should be applied where predicted or measured noise impacts from a project facility or operations exceed the applicable noise level guideline at the most sensitive point of reception. Noise reduction measures (from the source) are provided.	• Generation of noise would only occur at the construction phase. Construction noise is expected to be negligible as it will be temporary in nature and only occur at the construction camp and pylon locations, therefore having a limited area of influence. • Noise mitigation measures are included in Section 5.3.5.
1.8 Contaminated Land	• Land is considered contaminated when it contains hazardous materials or oil concentrations above background or naturally occurring levels. Contamination of land should be avoided by preventing or controlling the release of hazardous materials, hazardous wastes, or oil to the environment. When contamination of land is suspected or confirmed during any project phase, the cause of the uncontrolled release should be identified and corrected to avoid further releases and associated adverse impacts.	• The project infrastructure does not traverse any known areas of contaminated land. • A waste management plan has been developed and is included in Section 5.3.13.
2 - Occupational Health and Safety		
2.1 General Facility Design and Operation **2.2 Communication and Training** **2.3 Physical Hazards** **2.4 Chemical Hazards**	• Employers and supervisors are obliged to implement all reasonable precautions to protect the health and safety of workers. This section provides guidance and examples of reasonable precautions to implement in managing principal risks to occupational health and safety.	• Engineers and contractors to incorporate this guidance into their project plans, as and where applicable. • Guidance to be incorporated into an OHS Plan as part of the Health, Safety and Environment Management System. • Although a dedicated OHS Plan does not form part of the ESIA process, the OHS Plan in Section 5.3.15 incorporates this guidance

Sub-section	Description of the guidance	Applicability to the ESMP
2.5 Biological Hazards **2.6 Radiological Hazards** **2.7 Personal Protective Equipment (PPE)** **2.8 Special Hazard Environments** **2.9 Monitoring**		where relevant to the project and includes recommendations to protect workers and ensure their welfare. Section 6 refers to potential training requirements.
3 - Community Health and Safety		
3.1Water Availability and Quantity	• This guidance is applicable where water availability and quantity outside the project boundary may be affected. Drinking water should be protected in terms of water quality, and in terms of water availability, the potential effect of groundwater or surface water abstraction for project activities should be properly assessed through a combination of field testing and modelling techniques, accounting for seasonal variability and projected changes in demand in the project area.	• Any water required during the project life-cycle will be trucked in from Ruacana, as required. Alternatively, a borehole may be considered. • The contractor will have to ensure that the drinking water for the workers is of a potable quality. This is included in Section 5.3.2.
3.2 Structural Safety of Project Infrastructure	• The structural safety of the project should be ensured. Reduction of potential hazards is best accomplished during the design phase when the structural design, layout and site modifications can be adapted more easily.	• Engineers to incorporate this guidance into the project layout and design, where applicable.
3.3 Life and Fire Safety	• All new buildings accessible to the public should be designed, constructed, and operated in full compliance with local building codes, local fire department regulations, local legal/insurance requirements, and in accordance with an internationally accepted life and fire safety (L&FS) standard.	• The proposed development is for the 400 kV ANNA transmission line. Although there is risk of fire due to the electrical nature of the project, the development does not include any buildings that would be accessible to the public.
3.4 Traffic Safety	• The guidelines are aimed at the prevention and control of traffic-related injuries and fatalities relating to the project.	• Traffic related issues are not expected due to the remoteness of the area. • However, traffic safety measures are included in Section 5.3.16.
3.5 Transport of Hazardous Materials	• Projects should have procedures in place that ensure compliance with local laws and international requirements applicable to the transport of hazardous materials.	• Contractors should maintain and legal register and must apply guidelines where applicable. • Spills are included in a framework Emergency Preparedness and Response Plan included in Section 7 (refer to sub-section 3.7 in this table).
3.6 Disease Prevention	• Communicable diseases pose a threat to public health and typically are associated with large development projects. Examples include those relating to poor sanitation and living conditions, sexual transmission and vector-borne infections. Communicable diseases of most concern	• It is proposed to use local labour for construction as far as possible, as included in Section 5.3.11. • HIV / AIDS prevention and education strategies are included in Section 6.4.

Sub-section	Description of the guidance	Applicability to the ESMP
	during the construction phase due to labour mobility are sexually-transmitted diseases (STDs), such as HIV/AIDS. Projects should include interventions to mitigate for such risks.	
3.7 Emergency Preparedness and Response	• All projects should have an Emergency Preparedness and Response Plan that is commensurate with the risks of the facility.	• The compilation of a framework Emergency Preparedness and Response Plan applicable to the level of project design is included in Section 7.
4 - Construction and Decommissioning		
All sections	• Additional, specific guidance on prevention and control of community health and safety impacts that may occur during new project development, at the end of the project life-cycle, or due to expansion or modification of existing project facilities is provided. This cross-refers with other sections above as follows: • Environment (noise and vibration, soil erosion, air quality, solid waste, hazardous materials, wastewater discharge and contaminated land) • Occupational Health and Safety • Community Health and Safety	• The OHS Plan in Section 5.3.15 incorporates this guidance where relevant to the project. • The Community Health and Safety Plan in Section 5.3.14 incorporates this guidance where relevant to the project. • Environmental aspects are considered under the various plans found in Section 5.3.

Table 3-5 shows the EHS Guidelines for Electric Power Transmission and Distribution applicable to the project.

Table 3-5: IFC Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution (2007)

Section	Sub-section	Description of the guidance	Applicability to the ESMP
1 Industry-specific Impacts and Management	**1.1 Environmental**	• This guideline includes information relevant to power transmission between a generation facility and a substation located within an electricity grid, in addition to power distribution from a substation to consumers located in residential, commercial, and industrial areas. • Guidelines regarding environmental issues during the construction and operation phases of such projects specific to this industry sector are as follows: – Terrestrial habitat alteration – Aquatic habitat alteration – Electric and magnetic fields – Hazardous materials	• Engineers to incorporate this guidance, where applicable. • Biodiversity mitigation is included in Section 5.3.7. • Waste management is included in Section 5.3.13.
	1.2 Occupational Health and Safety	• Guidelines are provided with regards to occupational health and safety	• The OHS Plan in Section 5.3.15 incorporates this guidance where relevant to the project.

Section	Sub-section	Description of the guidance	Applicability to the ESMP
		hazards specific to such projects; these include: – Live power lines – Working at height – Electric and magnetic fields – Exposure to chemicals	
	1.3 Community Health and Safety	• Other than the general impacts provided for in the General EHS Guidance, the following impacts on community health and safety could occur as a result of such projects: – Electrocution – Electromagnetic interference – Visual amenity – Noise and Ozone – Aircraft Navigation Safety	• Engineers and Contractors to incorporate this guidance, where applicable, refer to Section 5.3.14. • Community health and safety is addressed in Section 5.3.14. It excludes electromagnetic interference, noise and ozone (corona) and aircraft safety which were scoped out of the impact assessment and/or addressed at the pre-feasibility phase. The necessary stakeholders have been engaged as included in the ESIA. • Landscape and Visual mitigation is included in Section 5.3.12
2 Performance Indicators and Monitoring	**All sections**	• This guideline provides limits and performance indicators for monitoring specifications for such projects including: • General public exposure to electric and magnetic fields • OHS (working distances, exposure of electric and magnetic fields, accident and fatality rates etc.)	• The OHS Plan in Section 5.3.15 incorporates this guidance where relevant to the project.

3.3.3 Environmental and social categorisation

DBSA and IFC use similar classification systems which categorises projects into one of four environmental assessment categories as follows:

According to the DBSA (2018), electrical transmission projects are typically listed as a Category 2 (Medium risk) projects as most negative impacts are expected to be reversible with the implementation of prescribed mitigation measures. This categorisation is considered to be an appropriate risk rating for this project, since no critical biodiversity areas, protected areas or areas of dense population, where significant resettlement would be required, are likely to be traversed. This implies that a full Environmental and Social Impact Assessment needs to, and has been, undertaken for the project. More detail on the justification for this categorisation is included in the ESIA Report.

4 Roles and responsibilities

The parties responsible in ensuring implementation of this ESMP at the various phases are shown in Table 4-1. They will be involved in different capacities e.g. implementation, management, supervision, monitoring and compliance auditing.

Table 4-1: Project staff and involvement per project phase

Company / Position	Pre-construction	Construction	Operation	Decommissioning
Environmental authority				
MET / MME	✗	✗	✗	✗
Sponsors				
SAPP	✗	✗	✗	✗
Fund administrators (DBSA)	✗	✗	✗	✗
Implementing Agent - NamPower				
NamPower – Project Manager	✗	✗	✗	✗
NamPower – Environmental Manager (SHEW)	✗	✗	✗	✗
NamPower – Stakeholder Manager	✗	✗	✗	✗
Owner's Engineer				
Project Manager	✗	✗		
Commercial and Control Manager	✗	✗		
Construction Manager	✗	✗		
Environmental Manager and ECOs	✗	✗		
Quality, Health and Safety Manager	✗	✗		
Community Manager	✗	✗		
EPC Contractor				
Environmental Officer (EO)	✗	✗		
Health and Safety Officer	✗	✗		
Community Liaison Officer/s	✗	✗		
Independent EO	✗	✗	✗	✗
Specialist inputs	✗	✗	✗	✗

4.1 Organisational structure

A provisional reporting and communications structure pertaining to environmental and social matters is indicated in Table 4-1 below for this project. Note that since this is provisional, it should be subject to review to reflect the contractual realities once established, as well as specific on-site requirements. Since this ESMP covers the full project lifecycle, the parties relevant to construction are shown in the dashed box.

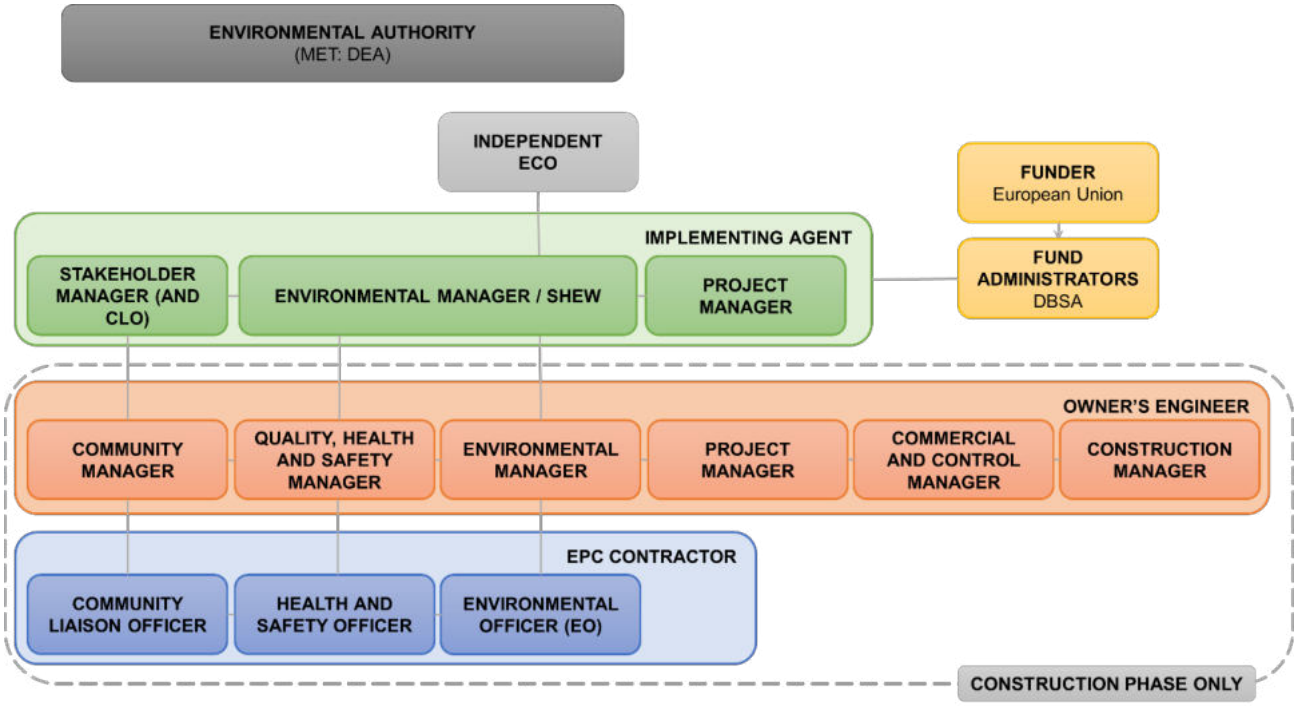


Figure 4-1: Proposed Organisational and Reporting Structure

4.2 Environmental authority

The Namibian Ministry of Environment and Tourism is the custodian of Namibia's natural environment and discharges this duty via the development, administration and enforcement of environmental legislation and policy. The MET is divided into three key departments. The Department of Environmental Affairs is the environmental authority with jurisdiction for the project. Their role is to monitor and enforce the implementation of the ESMP. They may require the submission of environmental audit reports at specific intervals and the ESMP must then be updated to fulfil such requirements.

4.3 Fund administrators and Funders

The fund administrators and funders are the DBSA and the EU respectively. The ESMP has been compiled to meet the requirements of these parties, through the application of IFC and DBSA standards or safeguards, as well as to satisfy internal reporting requirements for the DBSA. Should additional funders be identified, the ESMP must be reviewed to include any additional reporting requirements.

4.4 Implementing agent (NamPower)

The term 'Implementing Agent' in the context of this ESMP refers to the entity ultimately responsible for the transmission infrastructure. In Namibia this will be NamPower. The Implementing Agent will have a direct link with the Funder, the EPC Contractor and the Owner's Engineer, respectively, even though the project will be overseen by the Owner's Engineer during construction, on behalf of the Implementing Agent. The Implementing Agent must appoint and designate qualified personnel to execute, co-ordinate and oversee the implementation of the project as well as operation of the project and ensure compliance to the ESMP.

With regards to operation this includes managing of external sub-contractors appointed for maintenance activities and ensuring their compliance with the ESMP.

The Implementing Agent also has the responsibility of developing an Environmental and Social Management System (ESMS) which will include all of the recommendations within this ESMP.

4.4.1 Project Manager

The Project Manager will have overall responsibility for the management of the project. The Project Manager must ensure that all stipulations of the ESMP and conditions of the Environmental Clearance Certificate[3] (ECC), relevant permits and licenses are communicated and adhered to by the NamPower and its Contractor and external sub-contractors. The Project Manager must also ensure that periodic environmental audits are undertaken on the project implementation.

During construction, the Owner's Engineer will report to the Project Manager and will have the overall responsibility to oversee daily site works and to liaise with the Contractor from the Implementing Agent's perspective.

During operation, the Project Manager must ensure that NamPower and external sub-contractors remain in compliance with the requirements of the ESMP, through regular communication and monitoring.

4.4.2 Environmental Manager

The 'Environmental Manager' is the party responsible for sustainability and environmental management within the Implementing Agent. The Environmental Manager will be more active in the operational phase of the project as the Environmental Management of the Owner's Engineer's will fulfil many monitoring responsibilities during construction phase. It is possible that a representative from NamPower's Safety, Health, Environment and Wellness (SHEW) division can fulfil this role. The role of the Environmental Manager is as follows and extends beyond the scope of this ESMP as it involves ESMS activities as well:

- Develop and manage the implementation of a broad-based sustainability strategy and plan.
- Integrate the sustainability strategy throughout the responsible company.
- Ensure that the sustainability strategy and plan enhances business performance and supports the long-term interests of the company.
- Develop and implement the ESMS that adheres to local, national and international standards.
- Manage the support team of environmental, health and safety and community officers to implement the ESMS.
- Review the ESMP at various stages in the project lifecycle and ensure that it complies with the objectives, requirements, targets and indicators set in this document (refer to Section 10.4).
- Ensure compliance with relevant environmental legislation.
- Prepare monitoring reports for submission to the General Manager and to stakeholders and the relevant authority.
- Ensuring integration of environmental and social functions throughout the operation.
- Ensure implementation of the Grievance Mechanism and manage the environmental related components of the grievance mechanism.
- Implement environmental policies, procedures, and management plans.
- Review and analysis of monitoring results and preparation of reports to management and stakeholders.
- Planning of and carrying out environmental training programs and awareness for employees and contractors.
- Obtaining and maintaining all necessary environmental permits in liaison with the legal service.

[3] In terms of the EMA, assessments must be undertaken for activities which may have significant effects on the environment or the use of natural resources. The Minister has listed activities which may not be undertaken without an environmental clearance certificate (ECC). This project includes such activities and construction cannot commence in the absence of an ECC.

- Inspections/audits of environmental protection requirements by employees and sub-contractors.
- Sampling and data capture in accordance with the environmental monitoring program and analysis of results.
- Compile Global Reporting Initiative (GRI) data for inclusion in the annual report.
- Conduct environment risk assessment for the operation.
- Ensure that there is adequate capacity to implement sustainability and environmental management functions and responsibilities.
- Outsource functions as required to meet obligations and ensure compliance.

4.4.3 Stakeholder Manager

The Implementing Agent must appoint a 'Stakeholder Manager' to assist with developing and maintaining relationships with communities in and around the project area. It is possible that a representative from NamPower's Safety, Health, Environment and Wellness (SHEW) division can fulfil this role.

The Stakeholder Manager will be more active in the operational phase of the project as the Community Management team of the Owner's Engineer will fulfil many monitoring responsibilities during the construction phase, with appointed Social Specialists managing the implementation. They are able to provide insight and local knowledge which enhances the Implementing Agent's ability to manage a range of risks and uncertainties; and they are a familiar and accessible point of contact with whom community members can raise concerns, realise opportunities and resolve grievances. Their role includes the following:

- Act as the primary point of contact between affected communities and the Implementing Agent.
- Developing and maintaining relationships with local community stakeholders.
- Implementation of social policies, procedures and management plans, notably the Stakeholder Engagement Plan (SEP), the Vulnerable Groups Plan (VGP), the Resettlement Action Plan (RAP) and other social components of the ESMP.
- Establishment and overall management of the Grievance Mechanism in conjunction with the environmental, and health and safety coordinators, and in liaison with the Human Resources Manager, as well as the Owner's Engineer.
- Planning of and carrying out social and stakeholder engagement training programmes for employees.

Assistance with stakeholder engagement and building relationships with local community stakeholders. During operation specifically, the following should be undertaken ensuring continuity with previous phases:

- Appoint Community Liaison Officer/s (CLO/s) to follow on from the Contractor's CLOs responsibilities and provide training if required. See Section 4.6.3.
- Communicating with the communities through the CLOs in order to provide information on maintenance activities and scheduling thereof.
- Implementing of the grievance procedure in order to address grievances lodged by the project-affected communities.
- Monitoring the implementation of the Social Management Plans and Community Awareness Training.
- Identifying shortcomings or inappropriate actions taken as part of operation and proposed corrective measures or alternative actions.

4.5 Owner's Engineer

The project construction will be overseen by the Owner's Engineer on behalf of the Implementing Agent. The Owner's Engineer will be accountable for the management of the EPC Contractor on behalf of the Implementing Agent. The Owner's Engineer will have the following key functions:

- Environmental Management

- Community Management
- Project Management
- Commercial and Control Management
- Construction Management
- Quality, Health and Safety Management

The Owner's Engineer will interact with the EPC Contractor on behalf of the Implementing Agent. All formal communication between the EPC Contractor and the Owner's Engineer will be through the Implementing Agent. The Funder will interact directly with the Implementing Agent and will not have a direct link with the Owner's Engineer and the EPC Contractor.

The Owner's Engineer will have discipline specialists and resident engineers to provide the required technical capabilities required for the overall project. The resident engineers and technical specialists report to the Construction Manager, who will ensure that the expertise is located as and where required with minimal interruption of activities on alternative sites. This process also facilitates a platform for successful information transfer from the site office and the project office. The specialists and resident engineers also have inputs for the Project Management, Control and Commercial Management and the Quality, Health and Safety Management functions.

4.5.1 Environmental Management

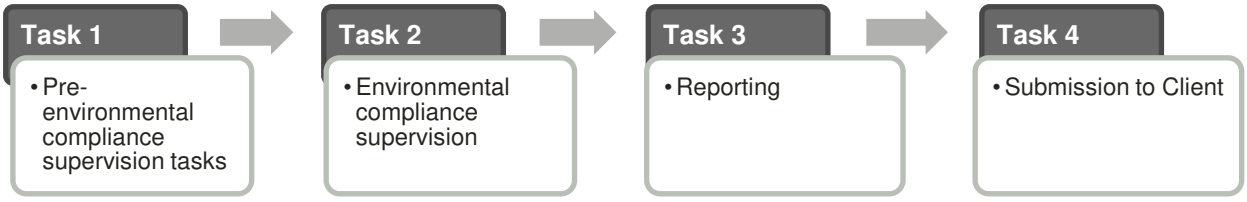
4.5.1.1 Environmental Manager

The function of the Owner's Engineer Environmental Manager is to supervise and monitor the compliance of the EPC Contractor during the construction period in accordance with the conditions of the environmental clearance certificate (ECC) and this ESMP.

The Environmental Manager will be supported by a team of Owner's Engineer Environmental Control Officers (ECO's) managed and distributed on the site according to the needs of the project and construction schedule.

4.5.1.2 Environmental Control Officer (ECO)

The Environmental Control Officer (ECO) is responsible for monitoring and supervising all activities and behaviours on a site to verify if the work undertaken by the EPC Contractor complies with the requirements of the conditions as stipulated in the environmental authorisation (ECC) as well as the requirements as outlined in the ESMP. The proposed methodology will be based on the following tasks:



The methodology is based on the Implementing Agent's procedures as well as established procedural requirements of the ISO 14000 standards for Environmental Management Systems and supervising and auditing of these systems.

This supervision will be undertaken on a permanent / ongoing basis. The team will be based on site permanently for the duration of the construction period and will ensure that the entire site is managed. The Environmental Supervision Team will be undertaking the following activities:

- Review of the ESMP and associated documentation (e.g. the Contractor's Code of Conduct) with regards to the construction phase as delegated by the Implementing Agent.

- Compiling a checklist that will be used during the construction period to determine whether all the ESMP requirements and ECC conditions have been implemented and are maintained for the duration of the project.
- Compiling material for environmental inductions for the all Contractor's staff to inform them of the ESMP and ECC requirements and basic legal requirements.
- Supervising and inspecting all work done by the Contractor against environmental specifications.
- Ensure that the Contractor adheres to the environmental requirements, standards and legislation.
- Identifying possible shortcomings in the environmental specifications and proposing corrective action.
- Monitoring the implementation of environmental mitigation measures and the effectiveness of the mitigation measures.
- Monitor the bush clearance team's compliance to applicable legislation and the Implementing Agent standards and procedures.
- Monitoring rehabilitation / reinstatement measure compliance to applicable legislation and Implementing Agent standards and procedures.
- Verifying all physical work done by the Contractor as per contract and environmental specifications;
- Determining and identifying environmental non-compliance.
- Keeping photographic record of progress on the site.
- Reviewing the Contractor's Method Statements, as required by the ESMP, from an environmental perspective, prior to the proposed activities taking place.
- Ensuring that the requisite remedial action following an environmental incident, event or finding of non-compliance is implemented in the event of non-compliance and capturing proof in the subsequent inspection audit.
- Address and ensure that an ethos of progressive rehabilitation takes place throughout the construction phase so as to ensure that the development site is rehabilitated to a high level of environmental integrity that is not only aesthetically pleasing but ecologically functional.
- Reviewing the Contractor's register of public complaints and confirming that all public comments or issues have been appropriately reported and addressed and verifying that corrective action has been undertaken.
- Reviewing and updating the ESMP based on recommendations of EM, where necessary.
- Participating in final inspections, take-overs and handovers to ensure that environmental requirements have been met and implemented.

The Environmental Team will report any environmental non-conformances on a purpose-designed Incident Report that allows for identification of the root causes of the incident and tracking of the corrective action and close-out of the incident. It will be ensured that any incident reported to Implementing Agent is correlated and, where possible, ways are identified to prevent it from reoccurring. All non-compliances with the ESMP / ECC will be reported in line with pre-determined procedures.

The Environmental Team will ensure that all site registers and log books recording environmental incidents and information are updated and available at all times. Furthermore, the ECOs will inspect measures that have been taken to address incidents to confirm whether these measures they have been implemented as planned and whether the corrective action is successful for the incident report to be closed.

For the purpose of this documents, the collective role of this team is referred to as the Owner's Engineer ECO.

4.5.2 Community Management

A community management team is required in order to ensure a sensitive approach to social impacts and to foster open communication between the construction team and the local inhabitants so that potential problems can be identified and addressed as they arise.

The supervision work will be carried out by a principal Community Manager / Social Specialist that will report to the Project Manager. The Community Manager will be supported by a team of local community and social facilitators[4]. The community and social facilitators will be allocated to each section of work according to the needs of the project and construction schedule. The team will be based on site permanently for the duration of the construction period and will ensure that the entire site is managed. The community facilitators will be employed from the local community as they are familiar with local customs and languages. They will be provided with training at the start of their engagement to enable them to understand the project, ensure that they convey appropriate messages to affected parties and to assist them with obtaining the necessary information from the affected parties regarding project-related issues in a culturally-appropriate manner.

The purpose of the Community Supervision Team will be as follows:

- To ensure that construction takes place in a socially just manner.
- To manage the relationship between the local authorities and population with the client, Contractor and sub-contractors.
- To address grievances lodged by the local population, including GBV specific grievances.
- To ensure that project-affected communities are informed about the relevant aspects of the project.
- To keep the project-affected communities updated on the progress of construction activities.
- To ensure that the Social Management Plan, Stakeholder Engagement Plan, Vulnerable Groups Plan, Resettlement Action Plan and Community Awareness Training is satisfactorily implemented.

This will be achieved by conducting the following activities:

- Training local facilitators to ensure an adequate understanding of their roles and responsibilities, and how these should be carried out.
- Developing procedures and protocols to be implemented by the local social facilitators, the Contractor and subcontractors when performing their duties in the social environment, including procedures for adequate and accurate record keeping of activities.
- Developing and implementing a feasible grievance procedure (in agreement with the Implementing Agent) in order to address grievances lodged by the project-affected communities. Establish a process within the Grievance Mechanism specifically for the handling of gender-based violence (GBV) incidents / complaints that provide protection and support for the victim, so that no identifiable information on the victims is stored in the GRM and referral of the victim to service providers for support.
- Monitoring the implementation of the Social Management Plans and Community Awareness Training.
- Identifying shortcomings or inappropriate actions taken as part of construction and proposed corrective measures or alternative actions.
- Communicating with the Contractor and sub-contractors in order to stay abreast the construction progress and problems experienced by construction teams.
- Establishing, maintaining and managing a channel of communication with the project-affected communities and local authorities.

The entire Community Management Team will provide environmental advice, in conjunction with the Implementing Agent, to the Contractor and affected parties as and when required.

The Community Manager will compile a monthly Community Supervision Report which will be provided to Implementing Agent for review and consideration.

The Community Management Team will report any non-conformances on a purpose-designed Incident Report that allows for identification of the root causes of the incident and tracking of the corrective action and close-out of the incident. It will be ensured that any incident reported to the Implementing Agent is

[4] For continuity, these local facilitators should be employed across multiple project phases, for example, could be employed to assist with the RAP during pre-construction and remain for the construction and operational phases.

correlated and, where possible, ways are identified to prevent it from reoccurring. However, it must be emphasized that the onus for identifying corrective actions will be on the EPC Contractor. All non-compliances with the ESMP/ECC will be reported in line with pre-determined procedures.

The Community Management Team will ensure that all site registers and log books recording environmental incidents and information are updated and available at all times.

4.5.3 Quality, Health and Safety Management

The Quality, Health and Safety Management function will include the following tasks:

- Carry out construction supervision.
- Conduct internal site audits and report to the Implementing Agent regularly.
- Adapt the ISO 9001 system to the specific needs of the site and a full organisational structure including the Project Management Team Staff, Contractor's representatives and the Implementing Agent's representatives will be drawn up and included in the contract quality assurance plan.
- Ensure that site inductions are done and valid.
- Report all health and safety issues and incidents that take place on site.
- Carry out a final inspection of the works together with representatives from the Client and the EPC Contractor.

4.6 EPC Contractor

The term 'Contractor' in the context of the ESMP refers to the appointed Lead Engineering, Procurement and Construction (EPC) Contractor responsible for any site activities, or portion of the site activities required for the construction phase of the project. The Contractor shall be responsible for ensuring the day-to-day implementation of the ESMP during the construction activities and, therefore, must be well-versed in the requirements of this document. The Contractor shall conduct activities in a manner that will cause the least possible disturbance to the existing amenities, whether natural or man-made, in accordance with all applicable legal requirements. Disturbance or disruption of the daily lives of local communities shall be avoided, wherever possible.

The role of the Contractor (pertaining to environmental matters) will include:

- Liaison with the Owner's Engineer and Independent ECO as required.
- Assuming the responsibility for the administration and implementation of sections of the ESMP relevant to the Contract to ensure adherence to the local legal requirements, and relevant international standards.
- Nominating a suitable member of staff to fulfil the role of Environmental Officer (EO) and providing the details of this person to the Owner's Engineer for approval (see Section 4.6.1 below).
- Ensuring all work areas and site activities pertaining to the Contract are conducted in an environmentally sensitive manner and in accordance with the relevant sections of the ESMP.
- Providing environmental awareness training, staff induction training and emergency response procedures to all relevant staff, ensuring that they awareness is built with regards to environmental and social management and that they are adequately informed of the requirements of the ESMP pertaining to their role on site.
- Developing a Code of Conduct to be signed by all employees (and sub-contractors) which must ensure compliance with the management plans in Section 5 below, which includes behaviours, and associated consequences, relating to, *inter alia*:
    - Protection of natural resources;
    - Resource efficiency;
    - Interactions with local communities including gender-based violence (GBV);
    - Behavioural issues and criminal activities;
    - Health and safety, etc.

- The Contractor is also responsible for all sub-contractors, suppliers and service providers and must ensure that all persons on site (temporary or permanently) have undergone induction training and are conversant with the ESMP or relevant sections of the ESMP pertaining to their role on site. The Contractor must task the EO to monitor the activities of sub-contractors and service providers to ensure they comply with the ESMP requirements.
- Compilation and submission of workplans or method statements required in terms of this ESMP (either specified, or for any activities that are proposed as variations to the standard construction practices detailed or referred to in the Contract Documents, or for any activities requiring special attention as specified in this ESMP and/or requested by the Owner's Engineer, or Competent Authority). Method statements should include at the least the following:
    - Site establishment, location and contractor camps
    - Workshop and equipment storage areas
    - Hazardous substances (including fuel)
    - Herbicide use (see Appendix B)
    - No-go areas
    - Ablution facilities
    - Watercourse crossings
    - Water use and abstraction
    - Discharge of water to the environment
    - Bush clearing
    - Waste management
    - Soil protection
    - Concrete batching
    - Stockpiling (if outside the camp) and rehabilitation of stockpiled areas
    - Closure and reinstatement or rehabilitation
- Liaise closely with the Owner's Engineer ECO on any environmental management issues, environmental incidents or events, or emergencies affecting the environment.
- Provide regular feedback to the Owner's Engineer's ECO regarding the project and notify if there are any issues.
- Addressing the findings of the inspections / audits; reacting to any instructions issued by the Owner's Engineer with respect to non-compliance with the ESMP, dealing with emergency or unforeseen situations; reacting to complaints/issues raised by the public.
- Providing and managing an Environmental Incident Report File which documents time, date, location and nature of any incidents; corrective actions taken and by whom, as well as date; comments on the cause of the incident; and signature. The Owner's Engineer ECO must be kept informed.
- Providing managing a Complaints Register which includes time and date of the complaint, name and contact details of the complainant, location and nature of the complaint, corrective actions undertaken and by whom as well as the date, and signature. Following the complaint, an investigation must take place and a response by the EO to the complainant must be provided within seven working days. The Owner's Engineer ECO should be kept informed.

4.6.1 Environmental Officer (EO)

The term 'EO' in the context of the ESMP refers to the nominated staff member of the Contractor who will fulfil the role of the Contractor's environmental representative to ensure compliance with the ESMP and relevant environmental legislation. The EO shall ensure that the works on site are conducted in an environmentally responsible manner that is consistent with the requirements of this ESMP. Therefore, the EO must be fully conversant with all the requirements of the ESMP, conditions of the ECC, and relevant permits and licenses. The EO will liaise closely with the Owner's Engineer and their ECO in all matters relating to the implementation of the ESMP.

NOTE: It is possible that the Health and Safety representative of the Contractor can also fulfil this role.

The duties and requirements of the EO must include:

- Liaison with the Contractor and Owner's Engineer ECO on matters relating to the environmental considerations on site.
- Assisting with the compilation of environmental components of Method Statements on behalf of the Contractor for the approval by the Owner's Engineer.
- Being a dedicated project resource on site throughout the duration of construction phase.
- Undertaking daily inspections of all work areas to ensure all activities and behaviours of persons on the site are being undertaken in accordance with the ESMP.
- Maintaining site documentation and records pertaining to the ESMP and environmental matters and approvals and submitting / reporting on these as needed.
- Providing a regular and routine account of environmental matters for the Owner's Engineer, including any environmental incidents, events or accidents, and reporting on any entries in the Environmental Incident Report File or Complaints Register. This account may take the form of a written report or checklist or similar, or meeting with the Owner's Engineer and their ECO.
- Overseeing the implementation of corrective action for non-conformances within the stipulated timeframes.
- Responding to and reporting on environmental accidents, incidents and events within appropriate time frames, and ensuring that all works requiring remediation are undertaken in accordance with the Owner's Engineer's instructions.

4.6.2 Health and Safety Officer

The Contractor must appoint a 'Health and Safety Officer'. Their duties include, *inter alia*:

- Implementation of health and safety policies, procedures and management plans, notably the Occupational Health and Safety Plan.
- Review and analysis of monitoring results and preparation of reports to management and stakeholders.
- Ensure compliance with relevant health and safety legislation.
- Planning of and carrying out safety training programs for employees and contractors.
- Obtaining and maintaining all necessary safety permits.
- Management of the safety related components of the grievance mechanism.
- Inspections/audits of safety requirements by all employees and sub-contractors within the designated site.
- Sampling and data capture in accordance with safety monitoring program and analysis of results
- Assistance with the preparation of reporting and permit applications.

4.6.3 Community Liaison Officer/s

The Contractor must appoint at least one male and one female 'Community Liaison Officer/s' (CLO/s), who are familiar with the local languages and customs. It is preferable that this role is fulfilled by an Indigenous Person. It is possible that the Environmental Officer could also fulfil this role. Their duties include, *inter alia*:

- Communicate information regarding construction activities and scheduling to project affected communities.
- Address any required day to day interactions between the construction staff and communities with prior coordination with the Owner's Engineer Community Management Team.
- Attend all coordination meetings requested by Owner's Engineer Community Management Team on a regular and *ad hoc* basis as required.
- Report to Owner's Engineer Community Management Team on a regular and *ad hoc* basis – with regards to social incidents and community relations issues.

- Involvement and assisting in the implementation of the Resettlement Action Plan, Stakeholder Engagement Plan, Vulnerable Groups Plan, Social Management Plan and Community Awareness Training where required.
- Serve as a channel for reporting grievances to the Owner's Engineer Community Management Team.

4.7 Independent ECO

The Implementing Agent must appoint a suitably qualified 'Independent Environmental Control Officer' Their duties during construction include:

- Responsible for auditing all activities and behaviours on a site to verify if the work undertaken by the EPC Contractor complies with the requirements of the conditions as stipulated in the ECC as well as the requirements as outlined in the ESMP. This includes the following:
    - Undertaking compliance inspections and audits at defined intervals, as per the ECO Schedule, as well as the requirements of the conditions of the ECC and any other relevant environmental permits and licenses.
    - Preparing reports on the findings of the inspections and audits, and on any emergency or unforeseen situations in which the expertise of the ECO has been consulted.
    - Making reports available to the Contract Manager, the Contractor and the environmental authority according to the ECO Schedule.
- Visiting the site on a regular basis to assess the project, its aspects and impacts and advise as to the required actions in order to ensure that all legal requirements, best practice protocols, adherence to by-laws, etc. are observed and to participate in project management site meetings.

During the operation phase, the Independent ECO is responsible for the following:

- Responsible for monitoring the environmental performance of the project to ensure that the Implementations Agent and any sub-contractors (for example in relation to specialised activities such as pesticide application and alien plant clearing etc.) comply with the requirements of the conditions as stipulated in any environmental authorisation (ECC) as well as the requirements as outlined in the ESMP.
- Inspection of the project site and surrounding areas at identified intervals and provision of recommendations for any issues that may have an impact on the environment.
- Ensuring that the requisite remedial action following an environmental incident, event or finding of non-compliance is implemented in the event of non-compliance and capturing proof in the subsequent inspection audit.
- Liaison with the Implementing Agent's Environmental Manager, Community Liaison Officer/s and the relevant authority as required.
- Reviewing any environmental related Grievances and confirming that all public comments or issues have been appropriately reported and addressed, including that proof of such action has been retained.

5 Environmental and social management

5.1 Approach to the ESMP

The approach to environmental and social management of the project is based on the Plan-Do-Check-Act cycle which aims to ensure continual improvement, refer to Figure 5-1. This is also known as the 'Deming Cycle Rationale'[5], and relevant definitions are as follows:

Plan: During the **planning** phase, the ESIA and ESMP establish the following:

- **Environmental and social management requirement**s are identified based on the identified impacts, proposed mitigation, the lender and legal requirements. The application of mitigation has been based on the mitigation hierarchy (Section 5.2).
- For each environmental or social impact, an **objective** is specified. The aim of the objective is to translate the requirement into a statement of achievement so that if the objective is met then the requirement will have been met (note that several different requirements could be satisfied by a single objective and vice versa); and
- For each objective specified an **indicator** is defined that will provide an indication of whether the objective is being met or not. To provide a metric for the indicator, targets are set which serve to reflect the performance aspirations of each objective. Some indicators are qualitative where no metric is available.
  The Management Plans showing impacts, objectives and the specifications and mitigation measures are set out in Section 5.3 of the ESMP. It includes responsibilities and estimated costs of implementation – where above the normal scope of the contractor or the standard operating procedures of the utilities or sponsors.

  Section 5.3 presents the measures proposed to prevent, mitigate, compensate or enhance the impacts identified for the preconstruction, construction and operation phases of the ANNA project.

  Section 5.4 sets the monitoring plan divided in two stages, related to the group of activities expected to be done: construction and decommissioning phases and operational phase.
- The monitoring plan including the indicators are set out in Section 5.4.

Do: During the **implementation** phase, the project is executed in accordance with the ESMP. Responsibilities for this are set out in Section 4, and recommended training is provided in Section 6.

Note that as part of implementation, the Owner's Engineer ECO and/or Implementing Agent's Environmental Manager must review and adjust this ESMP in consultation with all other parties in light of the detailed design, planned construction activities and site-specific constraints. Method statements to address the requirements and show the compliance can be addressed at this stage and reviewed by the responsible parties.

Check: Performance is measured through monitoring. Each performance indicator is therefore monitored to ensure environmental and social objectives are being achieved, refer to Section 5.3.18 for the detailed monitoring plan. Similarly, the ESMP will be monitored and audited to ensure that it is being implemented effectively. Results are reported and audits are required.

Act: Actions are required to continually improve environmental performance by taking into account recommendations of the Owner's Engineer ECO, the Implementing Agent's Environmental Manager, or environmental authorities.

[5] Gorenflo, G and Moran J.W. Undated. The ABCs of PDCA. http://www.naccho.org/uploads/downloadable-resources/ABCs-of-PDCA.pdf. Accessed on 2 October 2017.

Figure 5-1: Approach to environmental and social management

5.2 Mitigation hierarchy

The overarching approach to environmental and social management is to address risks through the application of the mitigation hierarchy whereby one should "*Anticipate and avoid risks and impacts. Where this is not possible, minimise or reduce risks and impacts to acceptable levels. Mitigate risks and impacts which have been minimised or reduced. Where significant residual impacts remain, compensate for or offset them, where technically and financially feasible*" (DBSA, 2018[6]). This aims for no residual impacts and no net loss of environmental resources. Furthermore, in biodiversity terms, 'no net loss' is defined as the "*The point at which project - related biodiversity losses are balanced by gains resulting from measures taken to avoid and minimise impacts, to undertake on - site restoration and to offset any significant residual impacts*", therefore 'net gains' are measures that result in additional positive outcomes for conservation. This is demonstrated in Figure 5-2 below and the approach has been applied in the management plans in Section 5.3:

[6] DBSA. 2018. Environmental and Social Safeguard Standards, Johannesburg, DBSA.

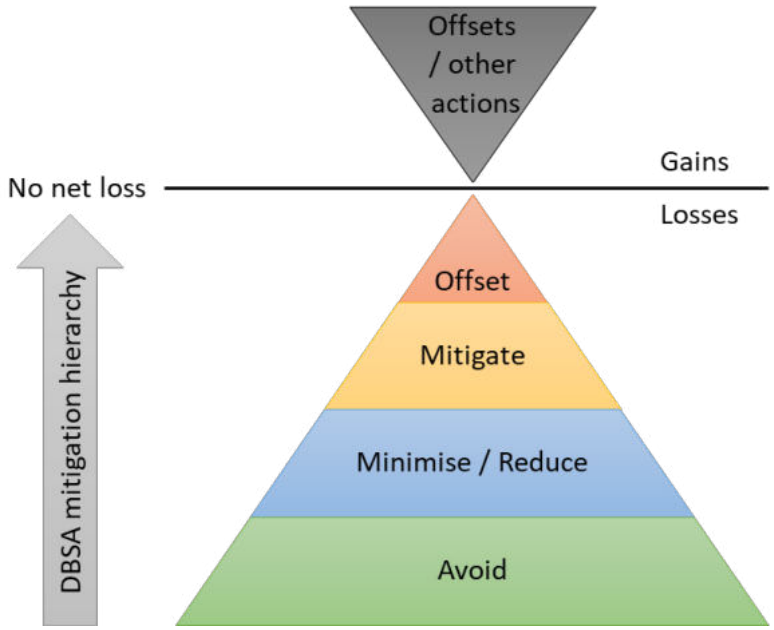


Figure 5-2: Mitigation hierarchy

5.3 Environmental and social management plans

5.3.1 Climate Adaptation and Resilience Assessment and Management Plan

Identified impacts/risks:	1. Impact of the project on climate change: increased GHG emissions 2. Impact of climate change on the project: effects of increased temperatures on personnel; effects of increased temperatures and high rainfall intensity on infrastructure
Objectives of improved management	1. Ensure that all GHG emissions kept to a minimal, if they cannot be avoided 2. Mitigate effects of climate change on project workers and infrastructure
Applicable Standards and legislation	PS 1: Assessment and management of environmental and social risks and impacts ESSS1: Project screening: environmental and social risks, impacts and opportunities
	PS 3: Resource efficiency and pollution prevention ESSS10: Resource efficiency, pollution prevention and management
	EHS Guidelines: General EHS Guidelines – Section 1 Environmental: 1.1 Air emissions and ambient air quality
	National Policy on Climate Change (2010)

5.3.1.1 Pre-Construction Measures

Management measure	Detailed Description	Responsibility
Specifications	– NamPower shall develop a dedicated GHG management plan. Key elements of this management plan include: • Developing a policy statement indicating the infrastructure commitments with regards to reducing GHG emissions and implementing the required mitigation measures. • Development of annual carbon footprint assessments, which require appropriate data capturing and management system to support monitoring and evaluation. • The establishment of short, medium and long term GHG emission targets, which should be in line with national mitigation objectives and will allow performance to be monitored. • Identify maintenance practice and process that help reduce lifetime GHG emissions.	NamPower
Avoidance	– Choose technology, equipment and materials and respective sources, as this has the potential make significant contributions to reducing project emissions across the entire life cycle. This entails: • Exploring alternative construction technologies and equipment with lower carbon footprints and reduced risk of fugitive emissions, • Alternative construction materials with lower embodied emissions, • Fuel efficient construction equipment and vehicles	Project designer Contractor

	• Making use of locally sourced materials reducing the need to transport materials over long distances. • Eliminate the need for certain materials or make use of recycled materials. • Adequate planning and efficient use of materials can also help further reduce the projects carbon footprint. – The specialist report (Appendix D2 of the ESIA) provides a summary of the most significant contributors to GHG emissions during construction which can be referenced to ensure areas of high impact are being prioritised for intervention	
Mitigation/ Reduce	– Improve flood protection for ground level equipment and infrastructure, mainly substations and pylons located in steep areas.	
Stop work	N/A	

5.3.1.2 Construction and Decommissioning Measures

Management measure	Detailed Description	Responsibility
Specifications	N/A	Contractor
Avoidance	– Establish a heat stress prevention program that includes: • The provision of enough water to staff. • Training on heat stress. • Inclusion frequent breaks in construction schedules. • Ensure protective clothing. • Minimisation of work undertaken in midday heat, rather in cooler morning or late afternoon hours.	
Mitigation/ Reduce	– Waste Minimisation and Management measures, based on the efficient use of new materials and minimisation of waste sent to landfill through the following steps: • Reducing complexity within the design. • Careful specification of materials to avoid wastage. • Avoid changes to the design resulting in wastage by setting clear objectives and requirements from the outset. • Avoid damage to materials during transport, storage and fitting. • Effective communication between design team, procurement and contractors. • Use materials with recycled content where possible. – Management of land use change emissions such as (also included in Section 5.3.7): • Actively minimise land clearing during construction as identified. • Rehabilitate land and vegetation temporarily disturbed during construction. – Consider the use of alternative fuels: biodiesel can be considered for mobile combustion such as onsite power generation and transport of materials and workers.	
Stop work	N/A	

5.3.1.3 Operational Measures

Management measure	Detailed Description	Responsibility
Specifications		NamPower
Avoidance	– Establish a heat stress prevention program that includes: • The provision of enough water to staff. • Training on heat stress. • Inclusion frequent breaks in maintenance schedules • Ensure protective clothing.	
Mitigation/ Reduce	– Should the infrastructure be affected by the increase of temperature (although unlikely), implement demand management to help to effectively address the efficiency reduction. – Undertake regular forecasting to prepare in advance for extreme weather events that might affect the infrastructure. – Set up rapid emergency repair teams to repair damaged infrastructure to limit impact on operations and ensure continuity	
Stop work	N/A	

5.3.2 Integrated Water Resource Management Plan

Identified impacts/risks:	1. Potential disturbance or interference with watercourses 2. Potential water resource (superficial and subterranean) contamination 3. Potential localised dewatering of the aquifer 4. Potential sedimentation of watercourses due to erosion
Objectives of improved management	1. Ensure that any disturbance or interference to the natural drainage lines are kept to a minimal, if they cannot be avoided 2. Prevent and remediate the occurrence of any accidental spills, water or soil contamination in order to ensure that water resource (superficial and subterranean) quality and use is not compromised 3. Ensure that, if any groundwater abstraction is needed, it is made within admissible aquifer capacity and natural recharge volume range 4. Prevent the sedimentation of any natural drainage line due to sediment mobilization and transport associated to construction activities and soil erosion
Applicable Standards and legislation	PS 1: Assessment and management of environmental and social risks and impacts ESSS1: Project screening: environmental and social risks, impacts and opportunities PS 3: Resource efficiency and pollution prevention ESSS10: Resource efficiency, pollution prevention and management

	EHS Guidelines: General EHS Guidelines – Section 1 Environmental: 1.3 Wastewater and ambient water quality; 1.4 Water conservation EHS Guidelines: General EHS Guidelines – Section 3 Community Health and Safety: 3.1 Water quality and availability EHS Guidelines: General EHS Guidelines – Section 4 Construction and Decommissioning: 4.1– Environment; Wastewater discharges EHS Guidelines: EHS Guidelines for Electric Power Transmission and Distribution – Section 1.0 Industry Specific Impacts and Management: 1.1– Environmental: Aquatic habitat alteration
	Water Resources Management Act (11 of 2013) Water Act (54 of 1956)

5.3.2.1 Pre-construction

Management measure	Detailed Description	Responsibility
Specifications	– The contractor shall review and adjust this Integrated Water Resource Management Plan considering the planned construction activities and site-specific constraints. – Obtain the necessary approvals for abstracting water from the Kunene River, or utilising municipal supply in Ruacana Town, where necessary for the construction activities. – Obtain any necessary approvals for drilling a borehole from the Ministry of Agriculture, Water and Forestry, in consultation with the Traditional Authority, should it be required to source groundwater for the construction activities, or to implement or repair a borehole for the community as part of the livelihood restoration plan. – If boreholes are required for the reasons above, the applicable geohydrological studies should be undertaken to inform the location and sustainability of groundwater sources.	Contractor
Avoidance	– The final location of the pylons must avoid disturbing any natural watercourse (perennial or ephemeral) or any aquatic sensitive area identified by the ecologist during his walkdown. Refer to Appendix A1 for the watercourses mapped to date which includes Mbuguumbugu/Embuumbuu and Okomite Rivers, as well as other unnamed watercourses. – The designing of the construction access route should contemplate the use of the existing 330 kV Ruacana-Opuwo line access/right-of-way, as much as possible. – The design of this access road must include drainage and control of runoff flow, to ensure erosion control.	
Mitigation/ Reduce	N/A	
Stop work	N/A	

5.3.2.2 Construction and Decommissioning Measures

5.3.2.2.1 Disturbance or interference with watercourses

Management measure	Detailed Description	Responsibility
Specifications	– If the disturbance or interference to the natural drainage lines cannot be avoided, its kept to a minimal and rehabilitated as soon as possible.	Contractor
Avoidance	– Natural storm water runoff not contaminated during the development and clean water can be discharged directly to the local drainage lines, subject to approval by the Owner's Engineer and supported by their ECO. There must be no impact on the long-term morphological dynamics of local drainage lines and watercourses. – When working near a watercourse, the following must be taken into consideration: • The water levels during the period of construction must be respected; • No alteration can be made on the bed, banks, course or characteristics of the watercourse. – Where earthworks are being undertaken in close proximity to a watercourse, slopes must be stabilised using suitable materials e.g. sandbags or geotextile fabric, to prevent sand and rock from entering the channel. – Appropriate rehabilitation and re-vegetation measures for the watercourse banks must be implemented timeously; in this regard, banks should be appropriately and incrementally stabilised as soon as development allows.	
Mitigation/ Reduce	– Water that has been contaminated with suspended solids, such as soils and silt, may be released into watercourses or water bodies only once all suspended solids have been removed from the water by settling out these solids in sedimentation ponds. The release of settled water back into the environment must be subject to approval by the Owner's Engineer and supported by their ECO.	
Stop work	– Unauthorised/unpredicted interruption of the normal flow of the watercourse or release of suspended solid contaminated water into the natural drainage lines	

5.3.2.2.2 Water resource (superficial and subterranean) contamination

Management measure	Detailed Description	Responsibility
Specifications	– Prevent and remediate the occurrence of any accidental spills, water or soil contamination.	Contractor
Avoidance	– Ensure that substances that pose a risk of water/soil contamination are appropriately stored and disposed of (also refer to Section 5.3.3). – Sewage must be collected and removed from the site for appropriate disposal at a duly licenced facility. – The quality and quantity of effluent streams discharged to the environment including stormwater must be managed and treated to meet the applicable effluent discharge guidelines (refer to Section 5.4.1).	

Management measure	Detailed Description	Responsibility
	Cement / concrete batching: – All measures set out in Section 5.3.13.2, referring to the construction waste management plan, must be put in practice. Runoff from the cement/concrete batching areas must be strictly controlled, and contaminated water must be collected, stored and either treated or disposed of off-site, at a location approved by the Owner's Engineer ECO. Hazardous substances and chemicals: – All measures set out in Section 5.3.7 and in Section 5.3.13, referring to the Hazardous material and Waste Management Plans, must be put into practice. With particular relevance for the water resources management are the measures that control and prevent the accidental contamination of soils and watercourses. Ablutions – Ablution facilities must be located at least 100 m away from any watercourse. – Ablutions shall be placed on level surfaces and secured to the ground if onsite areas are susceptible to potential flooding. – The Contractor shall be responsible for the cleaning, maintenance and servicing of all toilets and ablutions. No spillage may occur when toilets are emptied. – Toilets shall have an external closing mechanism to prevent paper blowing out when not in use and no litter or general waste shall be placed in these toilets. – Workers should not be allowed to urinate or defecate anywhere but in the toilets provided. – Mobile chemical toilets are to be installed onsite, if no other ablution facilities are available, and must be protected from vandals.	
Mitigation/ Reduce	– All measures set out in Section 5.3.13.2, must be put in practice. – Ensure oily wastewater from wash bays undergo treatment in an oil separator before being discharged to a lined detention pond and eventually discharged to the environment. – Ensure that emergency spill kits are present at strategic locations with trained people available to use it in the case of accidental spillages. – The Contractor must report all major incidents to the Owner's Engineer ECO immediately. Any spill incidents must be cleaned up immediately and in according with the emergency procedure. – Use designated washing areas for all equipment used for concrete work with the necessary mechanisms in place to retain contaminated runoff and allow for the necessary treatment/filtering of polluted water. Tools wash water and drum wash are to be disposed of in a settling pond before discharge. – Concrete spills will be allowed to harden and removed within 2 days for reuse as fill or disposal at an appropriate site designated by the Owner's Engineer ECO.	

Management measure	Detailed Description	Responsibility
Stop work	– Unauthorised/unpredicted interruption of the normal flow of a watercourse or release of contaminated water into the natural drainage lines – Mismanagement of waste concrete and/or cement laden runoff can result in the suspension of bulk concrete batching activities via instruction from the Owner's Engineer ECO until non-conformances have been rectified to the Owner's Engineer ECO's satisfaction. – Should a major spill occur, the Owner's Engineer ECO may request the Owner's Engineer to suspend or partially suspend construction in order to allow for the assessment, reporting and rectification of the impact. – Depending on the severity of the non-conformance and degree of negligence on the Contractor's part, the Owner's Engineer ECO must also inform the relevant authorities to confirm the Contractor's liability to be prosecuted and/or fined.	

5.3.2.2.3 Localised dewatering of the aquifer

Management measure	Detailed Description	Responsibility
Specifications	– If any groundwater abstraction is needed it can only be made within admissible aquifer capacity and natural recharge volume range	Contractor
Avoidance	– Monitor abstracted volumes. – Monitor water levels of construction borehole/s as well as other nearby boreholes as set out in Section 5.4.1	
Mitigation/ Reduce	– Ensure water conservation is being practiced by: • Including water use and conservation in the environmental awareness training. • Reusing, recycle or treat water where possible (use of grey water should be encouraged, for example water can be reused for dust suppression). • Minimising water use for cleaning of equipment. • Undertaking regular audits of water systems.	
Stop work	– Stop pumping immediately if dewatering is detected and revise pumping rates and equipment to obtain sustainable abstraction rates.	

5.3.2.2.4 Sedimentation of watercourses due to erosion

Management measure	Detailed Description	Responsibility
Specifications	– Prevent the sedimentation of any natural drainage line or watercourse	Contractor

Management measure	Detailed Description	Responsibility
Avoidance	– Vegetation and topsoil clearance can only occur at increments and done up to two weeks ahead of actual construction (i.e. excavation) commencing in an area. – The stockpiles (construction materials, topsoil, subsoil, imported materials such as sand and fill material etc.) cannot be located in or near natural drainage areas and must be located on flat surfaces, away from areas susceptible to concentrated storm water runoff or flow. – All construction camps and stockpiles or storage areas are located outside any watercourse. – Storm water runoff must be diverted around the construction site camp and stockpile areas by means of cut-off berms or trenches to avoid contamination of clean overland runoff.	
Mitigation/ Reduce	– Implement specific stormwater management and erosion prevention measures in all areas with high erosion potential (e.g. river banks, steep slopes) – Clean storm water, generated on construction footprint, can be discharged into surrounding the drainage lines and vegetation and cannot be allowed to collect and concentrate in large volumes or discharge at high velocities. – Water contaminated with suspended solids, may be released only once all suspended solids have been removed in sedimentation ponds. The release of settled water into the environment must be subject to approval by the Owner's Engineer and supported by their ECO. – All disturbed areas must be rehabilitated as soon as possible after construction has been completed in order to stabilise exposed surfaces, susceptible to erosion.	
Stop work	– Unauthorised/unpredicted interruption of the normal flow of the watercourse or release of water highly contaminated with suspended solids into the natural drainage lines	

5.3.2.3 Operational Measures

5.3.2.3.1 Disturbance or interference with watercourses

Management measure	Detailed Description	Responsibility
Specifications	– The disturbance to the natural drainage lines is kept to a minimal and rehabilitated as soon as possible	NamPower
Avoidance	– All access roads shall be monitored for the development of erosion features during maintenance inspections of the transmission line. – Complete an incident report after inspection/maintenance activities with the location of disturbed or eroded drainage areas. This should initiate an immediate response to control the phenomena before it gets any further.	
Mitigation/ Reduce	– Make sure that the access roads along the powerline are stabilised with packed stones when crossing watercourses or, if its detected that this measure is not enough, implement concrete tracks, in the areas with excessive erosion / scour. – Implement road berms ("speed bumps") at regular intervals across the access road to divert surface water runoff away from the road into the adjacent natural area.	

Management measure	Detailed Description	Responsibility
	– Maintain the integrity of the banks of watercourses by only trimming parts of trees directly affecting the safe operation of the line.	
Stop work	N/A	

5.3.3 Soil and Erosion Management Plan

Identified impacts/risks:	1. Potential loss of topsoil 2. Soil erosion 3. Accidental soil contamination
Objectives of improved management	1. Ensure that topsoil is properly removed and managed during construction in order to enable successful rehabilitation at the completion of construction 2. Reduce soil exposure to stormwater and wind to prevent soil degradation and potential loss of its capacity to ensure the settling, subsistence and survival of vegetation 3. Prevent and remediate the occurrence of any accidental spills or soil contamination in order to maintain its capacity and integrity
Applicable Standards and legislation	PS 1: Assessment and management of environmental and social risks and impacts ESSS1: Project screening: environmental and social risks, impacts and opportunities
	PS 3: Resource efficiency and pollution prevention ESSS10: Resource efficiency, pollution prevention and management
	PS6: Biodiversity conservation and sustainable management of living natural resources ESSS9: Biodiversity conservation and sustainable management of living natural resources and resilience
	EHS Guidelines: General EHS Guidelines – Section 1 Environmental: 1.8 Contaminated land EHS Guidelines: General EHS Guidelines – Section 4 Construction and Decommissioning: 4.1– Environment; Soil erosion and Contaminated land
	Soil Conservation Act (76 of 1969)

5.3.3.1 Pre-Construction Measures

Management measure	Detailed Description	Responsibility
Specifications	– The contractor shall review and adjust this Soil and Erosion Management Plan considering the planned construction activities and site-specific constraints	Contractor

Management measure	Detailed Description	Responsibility
Avoidance	– The design of the construction access route should use of the existing 330 kV Ruacana-Opuwo line access/right-of-way, as much as possible – The access road must include drainage and control of runoff flow, to ensure erosion control.	
Mitigation/ Reduce	N/A	
Stop work	N/A	

5.3.3.2 Construction and Decommissioning Measures

5.3.3.2.1 Potential loss of topsoil and soil erosion

Management measure	Detailed Description	Responsibility
Specifications	– Topsoil is properly removed and managed during construction to enable successful rehabilitation at the completion of construction	Contractor
Avoidance	– Topsoil must be removed from construction areas to a maximum depth of 30cm – depending on the depth of the soil horizons. Where the topsoil layer is shallow or alternating in depth, it must be removed to the maximum depth possible. Cleared vegetative materials should be considered to form part of the topsoil. – Store topsoil in protected stockpiles (maximum height 2m), in specifically designated areas, protected from for compaction and contamination due to other construction activities, for posterior use in the rehabilitation. If the topsoil stockpiles have to remain in site for periods longer than1.5 years, then they should be seeded with a mixture of local herbaceous vegetation (preferably a mix with cereal and legume) to ensure that maintenance of soil quality and avoid the contamination of invasive species. – Avoid moving/handling the topsoil more than twice (i.e. restricted to initial stripping and final reapplication). Do not move topsoil between different areas on site i.e. it should be reapplied in the same area that it was removed from. – Construction activities must be phased to minimise the area of disturbance at one time. Areas having to be stripped of topsoil for construction purposes must be kept to a minimum and only stripped when work is about to take place. Vegetation and topsoil clearance can only occur at increments and done up to two weeks ahead of actual construction (i.e. excavation) commencing in an area. – Existing vegetation must be preserved as much as possible and vegetation clearing at pylon sites must be kept to a minimum. Big trees with large root systems shall be cut manually and removed, as the use of a bulldozer will cause major damage to the soil when the root systems are detached.	
Mitigation/ Reduce	– Limit the height and slope of material stockpiles to reduce wind entrainment. Stockpiles exceeding 2 m in height are more likely cause dust during windy conditions. – All stockpiles must be stored in a demarcated area protected from wind and rain erosion (either through covering and/or orientation or barriers) and in a location where watercourses cannot be impacted.	

Management measure	Detailed Description	Responsibility
	– Ensure that all weeds and alien invasive species are removed from the stockpiles prior to reaching seed formation stage. – Disturbed areas no longer used for construction purposes must be stabilised and re-vegetated immediately. – Apply mulch to the topsoil if its quality has been impacted significantly (e.g., compaction or storage from a period longer than 1,5 year) and can compromise the success of revegetation (based on the reasoned opinion of the Owner's Engineer ECO). – Implement all mitigation measures referring to the protection of water resources (Section 5.3.2).	
Stop work	– Interruption of the normal flow of the watercourse or release of water with high concentration suspended solids into the natural drainage lines (refer to Section 5.3.2).	

5.3.3.2.2 Accidental soil contamination

Management measure	Detailed Description	Responsibility
Specifications	– Prevent and remediate the occurrence of any accidental spills or soil contamination	Contractor
Avoidance	– Ensure that all equipment, machinery and vehicles are in good working order, and that there is no leakage. No maintenance will take place on site and broken equipment, machinery and vehicles must be removed off-site within 24 hours of the breakdown. Where possible and practical all maintenance of vehicles and equipment must take place in the workshop area. – Ensure that all substances that pose a risk of water/soil contamination are appropriately stored, handled and disposed of (also refer to Section 5.3.8). – Implement all mitigation measures referring to the protection of water resources (Section 5.3.2).	
Mitigation/ Reduce	– All accidental spills must be immediately contained and adequately cleaned-up, or treated *in situ,* as set out in Section 5.3.8.	
Stop work	– It there is any release of contaminated water into the soil – Should a major spill occur, the Owner's Engineer and their ECO reserves the right to suspend or partially suspend construction in order to allow for the assessment, reporting and rectification of the impact. – Depending on the severity of the non-conformance and degree of negligence on the Contractor's part, the Owner's Engineer ECO will also inform the relevant competent authority to confirm the Contractor's liability to be prosecuted and/or fined.	

5.3.3.3 Operational Measures

5.3.3.3.1 Potential loss of topsoil and soil erosion

Management measure	Detailed Description	Responsibility
Specifications	– During maintenance activities, keep to existing roads within the servitude and do not deviate from them.	NamPower
Avoidance	– Complete an incident report after inspection/maintenance activities along the transmission line which includes the location of any eroded areas. This should innitiate an immediate response to control erosion before it gets any worse. – Refer to Section 5.3.7.3 for specific vegetation clearing mitigation measures. – Implement all mitigation measures referring to the protection of water resources (Section 5.3.2).	
Mitigation/ Reduce	– Implement all mitigation measures referring to the protection of water resources (Section 5.3.2).	
Stop work	N/A	

5.3.3.3.2 Accidental soil contamination

Management measure	Detailed Description	Responsibility
Specifications	– Prevent and remediate the occurrence of any accidental spills or soil contamination	NamPower
Avoidance	– Ensure that all equipment and vehicles are in good working order. – Ensure that substances that pose a risk of water/soil contamination are appropriately stored, handled and disposed of (also refer to Section 5.3.7). – Implement all mitigation measures referring to the protection of water resources (Section 5.3.2).	
Mitigation/ Reduce	– All accidental spills must be immediately contained and adequately cleaned-up, or treated *in situ,* as set out in Section 5.3.8.	
Stop work	N/A	

5.3.4 Air Quality Management Plan

Identified impacts/risks:	1. Dust emissions due to earthworks, movement of materials and circulation of vehicles and heavy machinery 2. Emissions of exhaust gases and other pernicious substances from the vehicles and machinery 3. Production of ozone and NOx due to the Corona effect *(this impact was considered negligible in terms of the EHS Guidelines and no additional mitigation measures were thus provided.)*
Objectives of improved management	1. Ensure that dust emissions are minimised to a level that do not lead to any significant affection or disruption in the natural resources or in the quality of life of the local communities 2. Ensure that the emissions from the vehicles and machinery are minimised to a level that do not lead to any significant affection or disruption in the natural resources or in the quality of life of the local communities
Applicable Standards and legislation	PS 1: Assessment and management of environmental and social risks and impacts ESSS1: Project screening: environmental and social risks, impacts and opportunities
	PS 3: Resource efficiency and pollution prevention ESSS10: Resource efficiency, pollution prevention and management
	EHS Guidelines: General EHS Guidelines – Section 1 Environmental: 1.1 Air emissions and ambient air quality EHS Guidelines: General EHS Guidelines – Section 2 Occupational health and safety: 2.4 - Chemical hazards: Air quality EHS Guidelines; General EHS Guidelines – Section 4 Construction and Decommissioning: 4.1– Environment: Air quality EHS Guidelines; EHS Guidelines for Electric Power Transmission and Distribution – Section 1.0 Industry Specific Impacts and Management: 1.3– Community health and safety: Noise and Ozone
	Public and Environmental Health Act (01 of 2015) Atmospheric Pollution Prevention Ordinance (11 of 1976)

5.3.4.1 Construction and Decommissioning Measures

5.3.4.1.1 Dust emissions due to earthworks, movement of materials and circulation of vehicles and heavy machinery

Management measure	Detailed Description	Responsibility
Specifications	– Dust emissions must be minimised.	Contractor
Avoidance	– Limit the amount of disturbed area at any one time as far as possible. Dust suppression is only required near sensitive receptors and/or if complaints are received. Measures can include water or non-toxic chemical dust suppression. If water is used it must be reused / recycled water (i.e. from settlement ponds). Any chemicals utilised must be of a biodegradable nature and approved by the Owner's Engineer ECO. – Site activities must be planned so that machinery and dust generating activities are located away from sensitive receptors (i.e. homesteads or villages), as far as possible. – Establish and enforce vehicle speed limits on haul roads and construction camps to reduce the dust emissions. – All access roads must be maintained.	

Management measure	Detailed Description	Responsibility
	– No overloading of fine material must be permitted and, where necessary, truck loads transporting fine material must be covered with a tarpaulin to prevent dust emissions. – Limit the height of stockpiles which could cause a dust nuisance to 1m. Where it cannot be achieved, cover fine material stockpiles with shade cloth, hessian or a similar acceptable cover. – Limit earthworks during windy conditions (i.e. winds above 40 km/h). – Limit vehicle travelling speeds on unsurfaced roads to 40 km/h. – Revegetate all disturbed areas as early as possible.	
Mitigation/ Reduce	– All dust complaints received from the community will be recorded in a complaints' register (as set out in Section 4.6) promptly investigated and addressed. Communities may report a grievance if they feel that it has not been addressed as set out in Section 8 (Grievance Mechanism). – Should there be a high incidence of complaints additional measures will need to be developed and implemented to the satisfaction of the Owner's Engineer ECO.	
Stop work	– Work causing dust emissions must be halted at wind speeds exceeding 40km/h. – Where dust generation leads to/results in a complaint by the communities, the Owner's Engineer ECO should consider the suspension of the work or activity on site until the source of dust emissions is identified and adequate mitigation measures are implemented.	

5.3.4.1.2 Emissions of exhaust gases from the vehicles and machinery

Management measure	Detailed Description	Responsibility
Specifications	– Emissions of exhaust gases and other air quality pernicious substances are minimised	Contractor
Avoidance	– Select 'low-emission' construction vehicles and machinery wherever possible. Where possible, use low sulphur containing diesel. – All vehicles and equipment must be well maintained and serviced according to manufacturer's specifications. All equipment shall include a service exhaust system and silencers – Ensure all new vehicles/equipment delivered to site has undergone inspection. – Enforce strict compliance with speed limits for all construction vehicles. – Minimise idling times by enforcing shut down of vehicles and equipment when not in use and / or reducing the maximum idling time to five minutes for all equipment. – Appropriate PPE must be worn at all times when working in areas exposed to hazardous emissions. Small plant must be located away from the work area and kept out of the trenches where people are working. – Prohibit the indiscriminate burning of materials resulting from clearance of trees, bushes, combustible materials and waste.	
Mitigation/ Reduce	– All complaints received from the community will be recorded in a complaints' register (included in the proposed Grievance mechanism – Section 8), promptly investigated and addressed.	

Management measure	Detailed Description	Responsibility
Stop work	– Where emissions lead to/results in a high rate of complaints by the communities, the ECO should consider the suspension of the work or activity on site until the source of the air quality nuisance is identified and adequate mitigation measures are implemented.	

5.3.5 Noise Management Plan

Identified impacts/risks:	1. Noise vibration and emissions dust due to the circulation of vehicles and heavy machinery 2. Noise emissions due to the Corona effect *(this impact was considered negligible in terms of the EHS Guidelines and no additional mitigation measures were thus provided.)*
Objectives of improved management	1. Ensure that noise emissions are minimised to a level that do not lead to any significant affection or disruption in the natural resources or in the quality of life of the local communities
Applicable Standards and legislation	PS 1: Assessment and management of environmental and social risks and impacts ESSS1: Project screening: environmental and social risks, impacts and opportunities
	PS 3: Resource efficiency and pollution prevention ESSS10: Resource efficiency, pollution prevention and management
	EHS Guidelines: General EHS Guidelines – Section 1 Environmental: 1.7 Noise EHS Guidelines: General EHS Guidelines – Section 2 Occupational Health and safety: 2.3 - Physical hazards: Noise; Vibration EHS Guidelines: General EHS Guidelines – Section 4 Construction and Decommissioning: 4.1– Environment: Noise and vibration EHS Guidelines: EHS Guidelines for Electric Power Transmission and Distribution – Section 1.0 Industry Specific Impacts and Management: 1.3– Community health and safety: Noise and Ozone
	Public and Environmental Health Act (01 of 2015)

5.3.5.1 Construction and Decommissioning Measures

5.3.5.1.1 Noise vibration and emissions dust due to the circulation of vehicles and heavy machinery

Management measure	Detailed Description	Responsibility
Specifications	– Ensure that noise emissions are minimised to an acceptable level.	Contractor
Avoidance	– Construction camps / yards or other activities should not be established near residences (or other noise sensitive receptors) where possible. Construction activities can only occur during the daylight hours. – Fit silencers to all equipment and service as needed. – Site inductions should cover the importance of noise control and available noise reduction measures.	

Management measure	Detailed Description	Responsibility
	– All machinery and equipment must be maintained in good working order and must meet current good practice noise emission levels. This should be achieved by making it a component of contractual agreements with the construction contractors. – All equipment must be turned off when not in use.	
Mitigation/ Reduce	– Should construction have to continue after hours, all communities affected must be notified at least 48 hours in advance. – Prior to any particularly noisy processes identified, the nearest affected communities must be informed at least 48 hours in advance of the proposed timing of the specific works in their properties. – Appoint one or more CLO/s as a critical element in the management of the impacts - if provided with adequate warning, affected sensitive receptors are sometimes willing to accept excessive noise for a short period of time. – Where reasonable and feasible, good practice noise mitigation measures should be applied including: • Maximising the offset distance between noisy equipment items and sensitive receptors. • Avoiding the coincidence of noisy equipment working simultaneously close together when adjacent to sensitive receptors. • Minimising consecutive works in the same locality. • Orienting equipment away from noise sensitive receptors. • Carrying out loading and unloading away from noise sensitive areas. – Ensure good driving practices by minimising reversing of equipment to prevent nuisance caused by reversing alarms; reducing unnecessary acceleration and braking when approaching and leaving the site; complying with speed limits – All noise complaints received from the community will be recorded in a complaints' register (included in the proposed Grievance Mechanism – Section 8), promptly investigated and addressed.	
Stop work	– Where noise emissions lead to/results in a high rate of complaints by the communities, the Owner's Engineer ECO should consider the suspension of the work or activity on site until the source of noise is identified and adequate mitigation measures are implemented	

5.3.6 Alien Invasive Species Management Plan

Identified impacts/risks:	1. Potential spread of alien invasive flora species 2. Accidental contamination of line corridor/servitudes by alien invasive species
Objectives of improved management	1. Ensure that all alien invasive flora is under control and that rehabilitation is put in place in a way that avoids potential infestation and/or re-infestation 2. Prevent and remediate the occurrence of any accidental spreading of alien invasive species

Applicable Standards and legislation	PS 1: Assessment and management of environmental and social risks and impacts ESSS1: Project screening: environmental and social risks, impacts and opportunities
	PS6: Biodiversity conservation and sustainable management of living natural resources ESSS9: Biodiversity conservation and sustainable management of living natural resources and resilience
	EHS Guidelines; EHS Guidelines for Electric Power Transmission and Distribution – Section 1.0 Industry Specific Impacts and Management: 1.1– Environmental: Terrestrial habitat alteration; Aquatic habitat alteration
	Nature Conservation Ordinance (4 of 1975) Forestry Act (12 of 2001) Nature Conservation Amendment Act (3 of 2017) Plant Quarantine Act (7 of 2008) Agricultural Pests Act (3 of 1973) Weeds Ordinance (19 of 1957)

5.3.6.1 Construction and Decommissioning Measures

Management measure	Detailed Description	Responsibility
Specifications	– All alien invasive flora must be kept under control and rehabilitation undertake in a way that avoids potential infestation and/or re-infestation, i.e. retain the *status quo* along the line route and prevent and remediate the occurrence of any accidental spreading of alien invasive species, as currently no such species were identified.	Contractor
Avoidance	– All areas disturbed and affected by the construction works and no longer in use (temporary footprints) must be immediately rehabilitated, as set out in Section 5.3.7.2.1. In no circumstances should these areas can be rehabilitated with invasive alien vegetation, only native vegetation can be used for this purpose. If there is a need to import material from outside of the construction area (fill materials, topsoil, etc.) they must be free of weeds. – All topsoil and subsoil stockpiles must be checked for emerging weeds on a regular basis (see Section 5.3.3.2).	
Mitigation/ Reduce	– Implement a policy of "no tolerance" towards any invasive alien plant species encountered in the area (e.g. *Prosopis* spp., etc.). This includes the removal and destruction of these species throughout the proposed line servitude, access roads and construction camp sites. – If there is a need to remove invasive alien species the EO and the Owner's Engineer ECO should advise on the rehabilitation required at the site in order to avoid potential re-infestations and/or erosion phenomena. – The planting of any potentially alien invasive plant species (e.g. *Tecoma stans, Pennisetum setaceum*, etc.) is prohibited and if there is any requirement for the use of ornamental plants (e.g. localized areas within the substation) the vegetation to be used should be selected from the range of local natural species. – If during construction the presence of alien invasive species is observed, they should be documented – i.e. species and location – and the information must be forwarded to the NamPower Environmental Department. The Ministry of Environment and Tourism (MET) and the Uukolonkadhi Communal Conservancy should also be informed of any major infestations so that clearing programmes can be initiated.	

Management measure	Detailed Description	Responsibility
Stop work	– If its detected that the import materials (filling materials, topsoil, subsoil, etc.) are infested with weeds the Owner's Engineer ECO reserves the right to suspend or partially suspend construction via instruction from the Utility in order to allow for the assessment, reporting and rectification of the problem.	

5.3.6.2 Operational Measures

Management measure	Detailed Description	Responsibility
Specifications	– Prevent and remediate the occurrence or accidental spreading of alien invasive species	NamPower
Avoidance	– Complete an incident report after inspection/maintenance activities along the transmission line which includes the presence and location of any identified invasive alien plant species. This should then innitiate an immediate response to eradicate the plants observed.	
Mitigation/ Reduce	– If during maintenance operations and or monitoring of the line servitude the presence of alien invasive species is observed, they must be documented (species and location) and the information must be forwarded to NamPower Environmental Department. The Ministry of Environment and Tourism (MET) and the Uukolonkadhi Communal Conservancy should also be informed of any major infestations so that clearing programmes can be initiated as early as possible. – All areas affected by erosion must be immediately rehabilitated, as set out in Section 5.3.7.2.1. In no circumstances these areas can be rehabilitated with invasive alien vegetation.	
Stop work	N/A	

5.3.7 Biodiversity Management Plan

Identified impacts/risks:	1. Loss of or disturbance to flora and habitats (terrestrial and aquatic) 2. Loss of or disturbance to fauna (terrestrial and aquatic) 3. Increased risk of avifauna mortalities due to collisions and electrocution 4. Impacts on sensitive habitats (*Mitigation measures combined with impact 1).* 5. Loss of or disturbance of natural capital and associated ecosystem services (*Mitigation measures addressed in terms of impacts 1, 2 and 3).*
Objectives of improved management	1. Ensure that the potential loss and disturbance of flora and habitats is kept to a minimum and that all affected areas are rehabilitated as soon as possible 2. Ensure that the potential loss and disturbance of fauna is kept to a minimum, all disturbed areas are rehabilitated and cleared of all movement as soon as possible

	3. Ensure that the avifauna mortality risks are kept to a minimum 4. Ensure that the potential loss and disturbance to natural capital and associated ecosystem services is kept to a minimum, all affected areas are rehabilitated as soon as possible and enable previous uses of local natural resources
Applicable Standards and legislation	PS 1: Assessment and management of environmental and social risks and impacts ESSS1: Project screening: environmental and social risks, impacts and opportunities
	PS6: Biodiversity conservation and sustainable management of living natural resources ESSS9: Biodiversity conservation and sustainable management of living natural resources and resilience
	EHS Guidelines; EHS Guidelines for Electric Power Transmission and Distribution – Section 1.0 Industry Specific Impacts and Management: 1.1– Environmental: Terrestrial habitat alteration; Aquatic habitat alteration
	Forestry Act (12 of 2001) Nature Conservation Amendment Act (3 of 2017) Nature Conservation Ordinance (4 of 1975)

5.3.7.1 Pre-Construction Measures

Management measure	Detailed Description	Responsibility
Specifications	– Ensure that all impacts on the local ecosystems and natural capital are kept to a minimum. – An ecological specialist must undertake a walkdown of the full length of the transmission line to identify all sensitive areas and species that must be avoided during construction. This information shall inform the final site layout plan and no go-areas (to be avoided and clearly marked before the start of construction activities in a certain area). Currently sensitive areas include the Kunene River, ephemeral drainage lines and fountains and associated riparian vegetation, rocky ridges (broken terrain), etc. – A representative from the local community should accompany the specialist on the walkdown to assist with identification of flora of importance. – This report should also detail the training requirements to ensure the protection of the natural resources, including the identification and proper management of relevant local flora and fauna, including dangerous species and alien invasive species. – An ecologist must compile a booklet to assist in the identification of protected tree species which can support the training of Contractor's personnel during construction, as well as the NamPower operational staff during maintenance activities. – The specialist report must include the location and specifications of all required bird flight diverters (BFDs) (e.g. coils, flappers) to be applied to the proposed 400kV transmission line where (indicatively shown on Appendix A2): – It crosses and runs adjacent to the Kunene River (high risk) to prevent and/or minimise bird collisions in this area. – It passes through/over mountainous terrain (high risk) to prevent and/or minimise bird collisions in this area. – It crosses well vegetated ephemeral drainage lines, especially areas with pools and/or fountains, known to occur in the area (medium risk) to prevent and/or minimise bird collisions.	Contractor Ecological specialist

Management measure	Detailed Description	Responsibility
	– Bird flight diverters must be installed in accordance with any NamPower policies available at the time, or in the absence of this, other best practice guidelines such as the 'Utilisation of bird flight diverters on Eskom overhead lines' (Eskom, 2015) and must be installed as soon as the conductors are strung. Refer to Appendix A2 for proposed locations of the bird flight diverters. – All areas that may need additional management measures (sensitive areas) or areas that might pose a threat if mishandled (such as areas infested with aliens), must be identified and georeferenced, and appropriate mitigation/management measures need to be included in the construction conditions and constraints. This includes the identification of buffer areas to inform the maintenance activities within the servitude. – This report also needs to include other measures considered necessary to protect the ecosystems and/or prevent damage to infrastructure such as install protection against fauna collision/electrocution (giraffes, baboons, etc.), place skirtings of loose rocks (diameter of 2-3m) around pylon infrastructures in known elephant routes (to prevent them from using the pylons as rubbing posts as it poses risks of electrocution and potential damages to the pylon structure), etc. – Locate the construction camp at the already disturbed area – e.g. area previously used for the Kunene-Omatando line (near the proposed Kunene substation) – instead of disturbing new areas.	
Avoidance	– Identify and avoid sensitive habitats (e.g. wetlands) when locating pylons and access roads in the detailed design stage of the project. – Identify and avoid sensitive habitats (informed by walkdown) when locating construction sites - e.g. Kunene River, ephemeral drainage lines and fountains and associated riparian vegetation, rocky ridges (broken terrain), etc. – Identify existing tracks/roads that can be used for construction activities, thus avoiding affecting undisturbed areas.	
Mitigation/ Reduce	N/A	
Stop work	N/A	

5.3.7.2 Construction and Decommissioning Measures

5.3.7.2.1 Loss of or disturbance to flora and habitats (terrestrial and aquatic)

Management measure	Detailed Description	Responsibility
Specifications	– Ensure that all impacts on the terrestrial and aquatic flora and habitats are kept to a minimum.	Contractor
Avoidance	– Clearly mark all identified no-go areas before the start of any construction activities in a certain area of the corridor. – Removal of vegetation and topsoil can only occur at increments and be done up to two weeks ahead of actual construction commencing in an area. – No burning of vegetation will be allowed. – Remove/relocate species of conservation value (identified in the walkdown report) where possible and practical.	

Management measure	Detailed Description	Responsibility
	– Where vegetation consists of grasses, bulbs and shrubs, it should be cleared (i.e. complete removal of the vegetation with its root system) as part of the removal of topsoil (i.e. to a maximum depth of 30cm) in order to maximise organic content and the available seedbank in the rehabilitation soil. – Only the bigger tree species and/or individuals potentially causing problems to the transmission line servitude should be removed, all vegetation that will not interfere with the line should not be cleared. – Damage to protected tree species must be avoided at all costs, where unavoidable, a permit is required. A booklet to assist in the identification of protected tree species must be generated during the pre-construction phase to support this. – The CLO/s should consult the adjacent communities to establish if they wish to use any cut vegetation from bush clearing activities. If not, it should be disposed of in a manner that it does not pose a fire risk to the infrastructure and in accordance with any NamPower policies on bush clearing that become available. – Implement erosion control measures provided in Sections 5.3.2 and 5.3.3, referring to Water Resources and Soil Management Plans, respectively, especially in sensitive habitats, on steep slopes, in areas with fields/crops or through/adjacent to water sources and with important flora species and habitats (identified in the walkdown report). – All measures referring to water and soil protection against pollution and contamination set out in Sections 5.3.2.2 and 5.3.3.2 must be adhered. – Make sure that existing tracks/roads are used as much as possible throughout the construction phase. – Include in the worker's training a module on environmental awareness some information on protected and dangerous species (fauna and flora), how to identify them, preserve and avoid the perilous ones, as set out in Section 6. – All chemicals used need to be duly handled, stored and disposed of, as set in Section 5.3.7 and 5.3.8 referring to the Pesticide and Waste Management Plans, respectively.	
Mitigation/ Reduce	– Ensure that topsoil is removed and conserved in order to ensure the success of the rehabilitation (also see Section 5.3.3.2). – All areas disturbed and affected by the construction works no longer in use (temporary footprints) must be rehabilitated as soon as possible. The sequence for rehabilitation should be as follows decompaction and reshaping of the affected areas, laying of the previously removed and stored topsoil (layer between 15 cm to 30 cm), raking and smoothing of the soil to ensure adherence to subsoil and reseed followed by watering regime as agreed with the Owner's Engineer ECO. – Any area disturbed outside the approved construction footprint must be reinstated at the Contractor's cost to the satisfaction of the ECO. – Implement a policy of "no tolerance" towards any invasive alien plant species encountered in the area (e.g. *Prosopis* spp., etc.). This should include the removal and destruction of these species throughout the proposed development areas. Such activity would be beneficial to the overall ecology of the areas as set out in Section 5.3.6 (with reference to the Alien Invasive Management Plan).	

Management measure	Detailed Description	Responsibility
	– The planting of any potentially alien invasive plant species (e.g. *Tecoma stans, Pennisetum setaceum*, etc.) is prohibited. If there is any requirement for the use of ornamental plants (e.g. localized areas within the substation) then the vegetation to be used should be selected from the range of local natural species.	
Stop work	– Should the Contractor fail to remain within the approved construction footprint or intentionally/negligently cause damage to a natural feature/vegetation in a sensitive area, the Owner's Engineer ECO reserves the right to request punitive measures or the suspension or partial suspension of construction via instruction from the Owner's Engineer in order to allow for the assessment, reporting and rectification of the impact. – The aforementioned will be determined by the type and significance of the non-conformance and the risk of it reoccurring should construction proceed.	

5.3.7.2.2 Loss of or disturbance to fauna (terrestrial and aquatic)

Management measure	Detailed Description	Responsibility
Specifications	– Ensure that all impacts on terrestrial and aquatic fauna are kept to a minimum	Contractor
Avoidance	– Clearly mark all identified no-go areas before the start of any construction activities in a certain area of the corridor and ensure staff respect these. – The collection of firewood by site staff is not permitted. – Do a site walkdown prior to construction commencing in a certain area to remove any slow-moving animals, identify and protect nesting sites, burrows etc., and prevent the destruction of habitat trees – e.g. dead trees and old specimens (i.e. cavity and bark dwellers such as geckos, snakes, bats, genets, galagos, etc utilise them). These areas must be demarcated as no-go areas, wherever possible, and any disturbance to these places should be avoided (especially raptor breeding sites). – Make sure that existing tracks/roads are used where possible throughout the construction phase. Avoid off-road driving and nocturnal driving as this may result in the destruction of slow-moving reptiles and mammals, especially nocturnal species. – Implement and maintain track discipline with maximum speed limits (e.g. 40km/h) as this results in fewer reptile road mortalities and associated dust pollution emissions. – Include in the worker's training a module on environmental awareness that also a contemplates information on protected and dangerous species (fauna and flora), how to identify them, preserve and avoid the perilous ones, as set out in Section 6. – Prevent the illegal collection for food and trade (e.g. birds, chameleon, tortoises, giant bullfrog, egg collection), poaching, and killing of perceived dangerous species (e.g. all snakes and mammalian predators / carnivores), with appropriate training and monitoring. – No domestic animals can be allowed in the construction sites and the feeding of wildlife must be prohibited.	

Management measure	Detailed Description	Responsibility
	– Ensure that the Waste Management Plan (Section 5.3.13) is strictly adhered as littering can result in certain animals becoming accustomed to humans and associated activity – e.g. baboon, black-backed jackal, etc.	
Mitigation/ Reduce	– Before commencing daily construction activities, excavations and holes that can serve as shelter to any animal should be inspected and all trapped/hidden fauna should be removed for relocation. – All areas disturbed and affected by the construction works no longer in use (temporary footprints) must be duly rehabilitated, as set out in Section 5.3.7.2.1 – Ensure that after finalising all construction activities in an area adjacent to water resources, the rehabilitation also includes erosion prevention of in siltation and affect aquatic dependent fauna such as amphibian breeding, etc. – Report any animal fatalities of significance to the Owner's Engineer ECO and relevant reserve management (where applicable) and identify measures to avoid reoccurrence.	
Stop work	– Refer to constraints set out in Section 5.3.7.2.1.	

5.3.7.3 Operational Measures

5.3.7.3.1 Loss of or disturbance to flora and habitats (terrestrial and aquatic)

Management measure	Detailed Description	Responsibility
Specifications	– Ensure that all impacts on the terrestrial and aquatic flora and habitats are kept to a minimum	NamPower
Avoidance	– Make sure that existing tracks/roads are used for all required maintenance operations. – Eradicate any invasive alien plants encountered along the line route as set out in Section 5.3.6 referring to the Alien Invasive Management Plan. – Restrict public entrance to the servitude access from the surrounding roads by using a deterring structure that is most practical (e.g. boom, stockpiled brush or earthen berm). – The Grievance Mechanism proposed in Section 8 should also serve as a tool for reporting outsiders misusing natural resources, such as illegal logging or poaching. – Within the maintenance activities, only remove individual trees that pose a threat to the infrastructure and do not eliminate all existing vegetation within the line route/servitude. – Damage to protected tree species must be avoided at all costs, where unavoidable, a permit is required. A booklet to assist in the identification of protected tree species must be generated during the pre-construction phase to support this. – The CLO should consult the adjacent communities to establish if they wish to use any cut vegetation from bush clearing activities. If not, it should be disposed of in a manner that it does not pose a fire risk to the infrastructure and in accordance with any NamPower policies on bush clearing that become available. – No burning of vegetation will be allowed.	

Management measure	Detailed Description	Responsibility
	– Chemicals should be used judiciously if/when used for the maintenance of the line servitude. All chemicals used need to be duly handled, stored and disposed of, as set in Section 5.3.7 and 5.3.8.	
Mitigation/ Reduce	– Implement the erosion control measures provided in Sections 5.3.11, should monitoring identify the need for corrective measures. – Ensure that persons handing pesticides have undergone formal training and are adequately equipped to undertake operation in a responsible and safe fashion. – Continue with the "no tolerance" policy towards invasive alien species. Should they be detected within the monitoring of the line servitude, ensure their removal and destruction as set out in Section 5.3.6, referring to the Alien Invasive Management Plan.	
Stop work	N/A	

5.3.7.3.2 Loss of or disturbance to fauna (terrestrial and aquatic)

Management measure	Detailed Description	Responsibility
Specifications	– Ensure that all impacts on terrestrial and aquatic fauna are kept to a minimum	NamPower
Avoidance	– Make sure that existing tracks/roads are used for all required maintenance operations and maintain track discipline with maximum speed limits (e.g. 40km/h) to prevent reptile road mortalities and dust emissions. – Restrict public entrance to the servitude access from the surrounding roads by using a deterring structure (e.g. boom). – The Grievance Mechanism proposed in Section 8 should also serve as a tool for reporting outsiders misusing natural resources, such as poaching.	
Mitigation/ Reduce	– Should the monitoring plan identify a location/area, within the line servitude, where there are problems with fauna or high animal mortality, correction measures need to be assessed and implemented.	
Stop work	N/A	

5.3.7.3.3 Increased risk of avifauna mortalities due to collisions and electrocution

Management measure	Detailed Description	Responsibility
Specifications	– Ensure that all impacts on avifauna due to collisions and electrocution are kept to a minimum.	NamPower
Avoidance	– Ensure that all specifications included in the specialist report, as set out in Section 5.3.7.1 are put in place.	
Mitigation/ Reduce	– Should the monitoring plan identify a location/area, within the line servitude, where there is a very high rate of bird mortalities, correction measures need to be assessed and implemented.	

Management measure	Detailed Description	Responsibility
Stop work	N/A	

5.3.8 Hazardous Materials Management Plan (including Pesticides and Herbicides)

Identified impacts/risks:	1. Potential contamination of water, soil and other natural resources 2. Potential effect on natural processes, namely on flora, fauna and human health
Objectives of improved management	1. Ensure that the all hazardous material (including pesticides and herbicides) used are properly selected for the end-purpose, handled, stored and disposed of in a responsible manner, in order to guarantee that there is no contamination of any natural resource 2. Ensure that all hazardous material (including pesticides and herbicides) meet the end-purpose, do not include any banned substances that have non-selective residual effect and may be harmful to human health and limit environmental or social collateral damages
Applicable Standards and legislation	PS 1: Assessment and management of environmental and social risks and impacts ESSS1: Project screening: environmental and social risks, impacts and opportunities
	PS 3: Resource efficiency and pollution prevention ESSS10: Resource efficiency, pollution prevention and management
	PS6: Biodiversity conservation and sustainable management of living natural resources ESSS9: Biodiversity conservation and sustainable management of living natural resources and resilience
	EHS Guidelines: General EHS Guidelines – Section 1 Environmental: 1.5 Hazardous material management EHS Guidelines: General EHS Guidelines – Section 2 Occupational health and safety: 2.4 – Chemical hazards EHS Guidelines: General EHS Guidelines – Section 3 Community health and safety: 3.5 Transport of hazardous materials EHS Guidelines: EHS Guidelines for Electric Power Transmission and Distribution – Section 1.0 Industry Specific Impacts and Management: 1.1– Environmental: Hazardous materials EHS Guidelines; EHS Guidelines for Electric Power Transmission and Distribution – Section 1.0 Industry Specific Impacts and Management: 1.2– Occupational health and safety: Exposure to chemicals
	Nature Conservation Ordinance (4 of 1975) Forestry Act (12 of 2001) Nature Conservation Amendment Act (3 of 2017) Plant Quarantine Act (7 of 2008) Agricultural Pests Act (3 of 1973) Weeds Ordinance (19 of 1957) Pollution Control and Waste Management Bill of 1999

	Fertilizers Farm Feeds and Agricultural Remedies Act (36 of 1947)
	NamPower Health and Safety Policy (2011) NamPower Procedure for Herbicide and Pesticide Management (2017) NamPower Procedure for Hydrocarbon Spill Response (2017) NamPower Purchasing, Storage and Distribution of Hazardous Substances (2011) NamPower Incident Reporting Procedure (2011)

5.3.8.1 Pre-construction

Management measure	Detailed Description	Responsibility
Specifications	– The contractor shall review and adjust this Hazardous Materials Management Plan considering the planned construction activities and site-specific constraints. This plan must include all measures to ensure the proper transport, storage, handling and disposal of all chemicals and potentially hazardous materials. Staff handling and use of biocides shall carry the necessary training and current certificates. – The Hazardous Materials Management Plan must include a Contingency Plan that outlines the procedures established and equipment available to respond to spills during construction activities and should, at a minimum, achieve the following: • Establish procedures for responding to spills of oil and hazardous materials • Identify potential sources of spills and the measures in place to control them • Provide information about the presence of spill-response equipment throughout the construction site • Include maps showing the presence of chemical, oil, and hazardous waste storage locations, structures and equipment for diversion and containment of spills, and the location of spill-response equipment • Define the roles and responsibilities of all personnel involved in responding to spills • Clearly define immediate actions to be taken to address spills • Discuss the measures for containment, clean-up, and disposal of contaminated materials and soil • Clearly describe the notification requirements for both internal spill-response teams and outside emergency personnel, and provide contact information for these individuals along with local emergency agencies • Establish documentation procedures for identifying the root causes, devising corrective and preventative actions, and setting time lines for their implementation. – This Hazardous Materials Management Plan must comply with NamPower's Policies and procedures stated above.	Contractor
Avoidance	N/A	
Mitigation/ Reduce	N/A	
Stop work	N/A	

5.3.8.2 Construction and Decommissioning Measures

5.3.8.2.1 Hazardous materials

Management measure	Detailed Description	Responsibility
Specifications	– Ensure that all hazardous materials used in the construction site are properly selected for the end-purpose, handled, stored and disposed of	Contractor
Avoidance	<u>All hazardous materials</u> – Keep a record of all hazardous substances stored on site, including intended use. – All hazardous materials must be stored under lock and key, in a clearly demarcated, bunded area in appropriate manner to prevent contamination of the site. These areas shall be isolated from all other activities and be clearly marked with appropriate symbolic safety signs and have adequate ventilation and PPE and emergency equipment on hand. The containers and emergency equipment / materials must be inspected at regular intervals for any leaks – Use proper non-drip dispensing equipment on containers for hazardous products and store the dispensing equipment in weatherproof containers when not in use. – Reactive substances which may lead to explosions, fires, noxious gasses or other dangerous condition, shall be stored and handled separately from one another and in such a manner that no contact can occur. – Hazardous substances shall be stored in such a way that they are not exposed to heat, radiation or moisture or any environmental condition, which can increase the risk such as an explosion, fire, etc. – All containers shall be clearly labelled to indicate the content and dangers thereof. A copy of the MSDS shall be kept on file with the Health and Safety Officer. – Ensure compliance with international good practice guidelines [7] when installing and operating fuel other and hydrocarbon storage facilities - these standards make provision for observation wells, leak detectors, overfill protectors, etc. As a minimum, all fuel tanks should be contained within an impervious bund wall (sized to 110% of the entire volumes of the substances stored therein) and properly sealed containers to prevent leaks in the event of an accidental spill and an oil/water separator should be fitted to the outlet valve. – The handling and use of hazardous materials/chemicals may only be undertaken by staff competent staff who have the necessary training and certificates for handing and use of said materials and associated PPE and emergency equipment. – Use proper non-drip dispensing equipment on containers for hazardous products and store the dispensing equipment in weatherproof containers when not in use. The disposal of all hazardous materials/chemicals and contaminated containers must be made to a facility duly licenced to dispose/handle/treat them. Empty chemical containers should be returned to the supplier.	

[7] For example South African Bureau of Standards (SABS) 089, 1535, 0131, 0108 and 0400 could be used.

Management measure	Detailed Description	Responsibility
	– The transport of hazardous materials/chemicals to and from the construction site, and even within the construction area (e.g. from storage to the place where it will be used that day), must be made by a person properly trained for this task in a suitable vehicle. – There must be a record keeping of all hazardous materials for at all stages of their use – reception, use, storage, on site disposal, transport and final disposal/treatment. A copy of the waste disposal certificates must be obtained and filed accordingly. <u>Cement / concrete batching:</u> – Concrete shall be batched on an impervious surface or trays or other suitable lining material to prevent contamination of the soil and/ or waterbodies. – Runoff from the cement/ concrete batching areas must be strictly controlled, and contaminated water must be collected, stored and either treated (allowed to settle and pH corrected) or disposed of off-site, at a location approved by the Owner's Engineer ECO. – All spills must be contained and adequately cleaned-up and contaminated materials disposed or via official facility or bioremediated to the ECO's acceptance. The contractor must ensure absorbent and/or clean-up kit (spill kits) are readily available on site to clean up any spillages, as stipulated on the Contingency Plan. – Use only designated washing areas for equipment used for concrete work with the necessary mechanisms in place to retain contaminated runoff and allow for the necessary treatment/filtering of polluted water. Concrete settling / evaporation pond residue must be recovered for disposal in a landfill.	
Mitigation/ Reduce	– Ensure oily wastewater from wash bays undergo treatment in a two-stage oil separator before being discharged to a lined detention pond and eventually discharged to the environment. – Ensure that emergency spill kits are present at strategic locations (including mobile fuel bowsers) with competent people with the necessary training available to use it in the case of accidental spillages. – The Contractor must report major incidents to the Owner's Engineer ECO within 2 hours. Any spill incidents must be cleaned up immediately and in according with the emergency procedure stated in the Contingency Plan. – Use designated washing areas for all equipment used for concrete work with the necessary mechanisms in place to retain contaminated runoff and allow for the necessary treatment/filtering of polluted water. – Concrete spills will be allowed to harden and removed within 2 days for reuse or disposal at an appropriate site or used in fill approved by the Owner's Engineer and their ECO.	
Stop work	– Unauthorised/unpredicted release of contaminated water into the soil or water lines – Repeated mismanagement of waste concrete and/or cement laden runoff can result in the suspension of bulk concrete batching activities via instruction from the Owner's Engineer and their ECO until non-conformances have been rectified to the Owner's Engineer and their ECO's satisfaction. – Should a major spill occur, the Owner's Engineer and their ECO reserves the right to suspend or partially suspend construction via instruction from the Owner's Engineer in order to allow for the assessment, reporting and rectification of the impact.	

Management measure	Detailed Description	Responsibility
	– Depending on the severity of the non-conformance and degree of negligence by the Contractor, the Owner's Engineer and their ECO will also inform the relevant competent authority to confirm the Contractor's liability to be prosecuted and/or fined.	

5.3.8.3 Operational Measures

5.3.8.3.1 Hazardous materials

Management measure	Detailed Description	Responsibility
Specifications	– Follow NamPower's Policies and procedures.	NamPower
Avoidance	– All hazardous materials (such as fuels and insulating oils) should be appropriately separated and stored in designated areas, with appropriate emergency provisions, warning signage, demarcation and entry restrictions. Where appropriate, petrochemicals and other hazardous liquids should be stored in contained areas, surrounded by berms or concrete containment, so as to restrict the movement of hazardous substance into the terrestrial or aquatic environments in the event of spills or leaks. Maintenance/repair vehicles/teams must carry necessary PPE and emergency spill kits to deal with and recover accidental spills in field.	
Mitigation/ Reduce	– Ensure that emergency spill kits are present at strategic locations with people with training available to use it in the case of accidental spillages. Any spill incidents must be cleaned up immediately and in accordance with the emergency procedure stated in the NamPower Procedure for Hydrocarbon Spill Response (2017). Contaminated materials must be recovered from field and disposed of responsibly.	
Stop work	N/A	

5.3.8.3.2 Pesticides and herbicides

Management measure	Detailed Description	Responsibility
Specifications	– General provisions: • Herbicides should be avoided where possible and only used as a last resort and with caution where absolutely necessary; – Even "modern" herbicides have some effect on biodiversity and/or haven't yet been tested on all species especially under local conditions and circumstances. It is thus important to remember that there are no 100% "safe" herbicides; – Should herbicides be required for bush clearing in exceptional circumstances, then the following applies: • Refer to Appendix B for project specific details of herbicide application for bush clearing;	NamPower

Management measure	Detailed Description	Responsibility
	• Do not apply herbicides (or pesticides) within 100m of a watercourse (to be identified during pre-application walkdown by ecologist in Section 5.3.7.1) • The application methods should stringently be adhered to; • Techniques should be employed and/or investigated that minimises impacts on non-target native species; • Herbicides that are deemed non-target specific and/or which are mobile (all granular products) should be avoided as these would kill trees indiscriminately; • Do not use paraquat and diquat as they a are toxic to animals. Product names for paraquat include: Crisquat, Cyclone, Dextrone, Dexuron, Gramoxone Extra, Herbaxone, Ortho Weed and Spot Killer and Sweep. Product names for diquat include: Aquacide, Aquakill, Dextrone, Diquat, Midstream, Reglone, Reglox, Reward, Tag, Torpedo, Vegetrole and Weedtrine-D. • Use of soil sterilant (i.e. tebuthiuron, ethidiumuron, bromacil, uracil and various others) with care as these can be considered products with potentially long-term effects on plant life. • Apply monitoring checklist in Appendix B and retain as proof. – NamPower Procedure for Herbicide and Pesticide Management (2017). – Use only pesticides that are manufactured under license and registered and approved by the appropriate authority and in accordance with the Food and Agriculture Organization's (FAO) International Code of Conduct on the Distribution and Use of Pesticides. – Use only pesticides that are labelled in accordance with international standards and norms, such as the FAO Revised Guidelines for Good Labelling Practice for Pesticides. – Avoid the use of pesticides that fall under the World Health Organization Recommended Classification of Pesticides by Hazard Classes 1a and 1b. – Avoid the use of pesticides listed in Annexes A and B of the Stockholm Convention, except under the conditions noted in the convention.	
Avoidance	– Use motor-manual methods for vegetation (and pest) clearance wherever possible before using a biocide. Biocides should augment motor-manual methods, i.e. as stump treatment to prevent coppicing. – Train personnel to apply pesticides and herbicides and ensure that personnel have received applicable certifications or equivalent training where such certifications are not required. Ensure that all personal applying pesticides and herbicides also received the appropriate training with regards to pest identification, weed identification and field scouting. – Review the manufacturer's directions on recommended dosage or treatment, as well as published reports on using the reduced rate of pesticide and herbicide applications without loss of effect and apply the minimum effective dose (i.e. using wetting agents). – Herbicides shall be applied with exceptional care (avoiding drift and overspray), especially with regards to dosages, as the incorrect use could harm and/or destroy non-target species. Techniques that minimise impacts on non-target native species (i.e. using dyes) should be employed and/or investigated. Herbicides non-target specific and/or mobile (all granular products) should be avoided as these can kill trees indiscriminately.	

Management measure	Detailed Description	Responsibility
	– Apply pesticides / herbicides based on criteria (e.g. field observations, weather data, time of treatment, and dosage) and maintain a logbook to record all relevant information, including their effectiveness. – Select application technologies and practices designed to reduce unintentional drift or runoff only as indicated in the pest specific management plan, and under controlled conditions. Establish untreated buffer zones or strips along watercourses, rivers, streams and ditches to help protect water resources. – Herbicides should be used with caution (avoid use where possible and only use where absolutely necessary). – Store pesticides/herbicides in their original packaging, in a dedicated, dry, cool, frost-free, and well aerated location that can be locked and properly identified with signs, with access limited to authorized people. No human or animal food may be stored in this location. The store room should also be designed with spill containment measures and sited in consideration of potential for contamination of soil and water resources. – Mixing and transfer of pesticides should be undertaken by trained personnel in ventilated and well-lit areas, using containers designed and dedicated for this purpose. – Containers cannot be used for any other purpose (e.g. drinking water). Contaminated containers must be handled as hazardous waste and treated accordingly. Disposal of these containers should be done in a manner consistent with FAO guidelines and with manufacturer's directions. – Purchase and store no more pesticide than needed and rotate stock using a “first-in, first-out” principle so that pesticides do not become obsolete. The use of obsolete pesticides should be avoided under all circumstances. – A management plan that includes measures for the containment, storage and ultimate destruction of all obsolete stocks should be prepared in accordance to guidelines by FAO and consistent with country commitments under the Stockholm, Rotterdam and Basel Conventions. – Ensure that protective clothing worn during pesticide / herbicide application is either cleaned or disposed of in an environmentally responsible manner. – Contamination of soils, groundwater, or surface water resources, due to accidental spills during transfer, mixing, and storage of pesticides must be prevented by following the hazardous materials storage and handling recommendations presented in Section 5.3.8.2.1.	
Mitigation/ Reduce	– Collect rinse water from equipment cleaning for reuse (such as for the dilution of identical pesticides to concentrations used for application). – High biodiversity areas and sensitive areas shall be cleared manually. No herbicides shall be allowed. – *Dichrostachys cinerea* dominated areas shall be cleared manually and/ or with herbicides. No mechanical clearing shall be allowed. All other areas that are sandy shall be cleared mechanically and/or with herbicides. All other areas that are rocky area shall be cleared manually and/or with herbicides. – As aerial application of herbicides is unselective and kills trees indiscriminately over large areas, making it difficult to avoid protected and/or advantageous species, hand application methods should be preferred, as they are more selective and can eradicate the unselective killing of tree species. – Within the maintenance activities, only remove individual trees that pose a threat to the infrastructure and do not eradicate all existing vegetation within the line route/servitude.	

Management measure	Detailed Description	Responsibility
	– Should complaints be received, then water quality monitoring should be undertaken.	
Stop work	– N/A	

5.3.9 Heritage Resources Management Plan

Identified impacts/risks:	1. Potential damage to ceremonial sites and places-of power 2. Potential excavation and destruction of Tertiary and Quaternary fossils (Palaeontological impacts) 3. Potential destruction of unidentified/sub-surface archaeological remains
Objectives of improved management	1. Ensure that the location of existing graves and burial sites are properly identified, managed and protected during the construction phase 2. Ensure that the location of existing ceremonial sites and places-of power are properly identified, managed and protected during the construction phase 3. Anticipate and avoid the destruction of eventual Palaeontological heritage (fossils) 4. Anticipate and avoid the destruction of eventual archaeological remains
Applicable Standards and legislation	PS 1: Assessment and management of environmental and social risks and impacts ESSS1: Project screening: environmental and social risks, impacts and opportunities
	PS8: Cultural heritage ESSS8: Cultural heritage
	EHS Guidelines; EHS Guidelines for Electric Power Transmission and Distribution – Section 1.0 Industry Specific Impacts and Management: 1.3 – Communal health and safety: Visual amenity
	National Heritage Act (27 of 2004) and the Regulations 106 of 2005

5.3.9.1 Pre-Construction Measures

Management measure	Detailed Description	Responsibility
Specifications	– Ensure that the location of all existing graves, burial sites ceremonial sites and places-of power are properly identified and demarcated. – Anticipate and avoid the destruction of palaeontological heritage or archaeological remains. – A heritage specialist must undertake a walkdown of the full length of the transmission line to identify all heritage and relevant cultural sites. Mapping of all heritage resources current and identified by the walkdown survey must be compiled into a GIS database, for ease of access and to enhance planning, management (including conservation)	Contractor Heritage specialist

Management measure	Detailed Description	Responsibility
	and interpretation of these sites. This information shall inform the final site layout plan and no go-areas (to be avoided and clearly marked before the start of construction activities in a certain area). – The specialist must be accompanied by representative/s from the local communities to assist in the identification of heritage and cultural sites; elders must be involved as they hold this knowledge. – The updated Heritage Resources Management Plan must include the location and specifications of all required mitigation and avoidance measures to be applied, namely: • Any Stone Age Sites identified during the proposed walkdown must be indicated on the development map and mitigated as per its significance. • No activities should interfere or conflict with the intangible heritage of the inhabiting communities i.e. ceremonial sites, places-of-power, etc. • Any construction camps or similar infrastructure impacts should be evaluated against the recorded heritage sites and adapted to conform to the requirements of this management plan. • Detailed plans should be compiled for conservation measures at heritage sites with high significance and where they are in direct danger of being affected by the proposed development • Detail the training requirements to ensure that chance finds protocol for fossils and archeologic sites is duly followed during construction operations, specifically in activities such as bush clearing and earthworks • Detail the training requirements to ensure that any heritage site, ceremonial site or place-of power is duly respected, and all the workers know the required protocols and behaviour rules. – Recommendations for future management interventions, to address the issues related to increased accessibility to heritage resources as a result of the development (i.e. access roads, etc.) should also be included. These include: • Research Policy Strategy (for newly accessible areas). • Rural inhabitant education in terms of the value of heritage resources and the need for their protection and conservation. • Interpretation strategy (in terms of the specific heritage significance of each site/area). – Locate the construction camp at the already disturbed area – e.g. area previously used for the Kunene-Omatando line (near the proposed Kunene substation) – instead of disturbing new areas.	
Avoidance	– No development or construction activities should destroy interfere or conflict with the intangible heritage related to graves and sacred sites.	
Mitigation/ Reduce	– The investigation of the existence of these sites should also be supported in the stakeholder engagement process – Should any need relocation some consecration ceremonies might apply, which need to be investigated and agreed with the local population.	
Stop work	N/A	

5.3.9.2 Construction and Decommissioning Measures

5.3.9.2.1 Damage to ceremonial sites and places-of power

Management measure	Detailed Description	Responsibility
Specifications	– All construction activities must be regularly monitored by a heritage specialist (a qualified person with recognised heritage training to monitor and report on the construction activities). No activities should interfere or conflict with the intangible heritage of the inhabiting communities i.e. ceremonial sites, places-of-power, etc.	Contractor Heritage specialist
Avoidance	– Clearly mark as no go areas all identified ceremonial sites and places-of power. – Include in the worker's training a module on environmental awareness that also a contemplates information on how to identify, preserve and avoid the local cultural heritage, as set out in Section 6.	
Mitigation/ Reduce	– All heritage sites identified should clearly marked as no-go areas, be monitored and incorporated into the training and awareness material to ensure that there are no impacts over these sites.	
Stop work	– Should the Contractor fail to remain within the approved construction footprint or intentionally/negligently cause damage to a ceremonial site or place-of power, the Owner's Engineer and their ECO reserves the right to suspend or partially suspend construction in order to allow for the assessment, reporting and rectification of the impact.	

5.3.9.2.2 Excavation and destruction of Tertiary and Quaternary fossils

Management measure	Detailed Description	Responsibility
Specifications	• Where certain activities are to be undertaken with respect to protected places and objects, permits required under Reg 2016 of 2005 of the National Heritage Act (No. 27 of 2004) must be obtained. • A chance find protocol must be implemented in the event that previously unknown archaeological sites, fossils or fossil sites are exposed or found during the construction phase: • Any finding should as soon as practically possible be reported to the National Heritage Council. • Surface excavations should continuously be monitored by the EO and, should any fossil or archaeological material be unearthed, the excavation must be halted and all construction in the immediate vicinity (50m radius of the site) should cease. • If archaeological or fossiliferous material has been disturbed during the excavation process it should be put aside to prevent it from being destroyed. • The EO must then take a GPS reading of the site and take digital pictures of the fossil material and the site from which it came. • The EO then should contact a palaeontologist and supply this specialist with the information (locality and pictures) so that the importance of the find can be assess and recommendations can be made. • If the palaeontologist is convinced that this is a major find an inspection of the site must be scheduled as soon as possible in order to minimise delays to the development. From the photographs and/or the site visit the palaeontologist will make one of the following recommendations:	Contractor Heritage specialist

Management measure	Detailed Description	Responsibility
	• The material is of no value so construction activities in that site can proceed, or • Fossil material is of some interest and a representative sample should be collected and put aside for further study and to be incorporated into a recognised fossil repository after a permit was obtained from the relevant authorities (Namibia) for their removal, after which the construction activities may proceed, or: • The fossils are considered scientifically important and the palaeontologist must obtain a permit to excavate the site and take them to a recognised fossil repository, after which the construction activities may proceed. • If any fossils are found then a schedule of monitoring should be set up between NamPower and a palaeontologist, in case of further discoveries.	
Avoidance	– Clearly mark as no go areas all fossil sites identified and considered relevant. – Include in the worker's training a module on environmental awareness that also a contemplates information on how to identify, preserve and avoid destruction of fossil sites, as set out in Section 6.	
Mitigation/ Reduce	– All heritage sites identified should clearly marked as no-go areas, be monitored and incorporated into the training and awareness material to ensure that there are no impacts over these sites	
Stop work	– Should the Contractor fail to remain within the approved construction footprint or intentionally/negligently cause damage to an identified fossil site, the Owner's Engineer ECO reserves the right to suspend or partially suspend construction in order to allow for the assessment, reporting and rectification of the impact.	

5.3.9.2.3 Destruction of unidentified/sub-surface archaeological remains

Management measure	Detailed Description	Responsibility
Specifications	– Where certain activities are to be undertaken with respect to protected places and objects, permits required under Reg 2016 of 2005 of the National Heritage Act (No. 27 of 2004) must be obtained. – A protocol similar to the chance finding of fossils, set out in Section 5.3.9.2.2, should be followed for the preservation of any unidentified/sub-surface archaeological remains. These remains of heritage sites could be encountered during the construction activities and would offer no surface indication of their presence. The following indicators of unmarked sub-surface archaeological sites could be present: – Ash deposits (unnaturally grey appearance of soil compared to the surrounding substrate); – Bone concentrations, either animal or human; – Ceramic fragments such as pottery shards either historic or pre-contact; – Stone concentrations of any formal nature. – Operators of excavation equipment should be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures should be followed they be encountered. – The assigned project heritage practitioner should be informed immediately. – In the event of obvious human remains the local the Namibian Police Services should be notified.	Contractor

Management measure	Detailed Description	Responsibility
	– All works in a 50m radius of the find must stop and no measures should be attempted to mitigate the disturbance (such as refilling etc.) – The area must be clearly marked, treated as a no-go area until a proper investigation on the actual significance of the site is done is conducted and the area should be placed under guard – No media statements should be released until the heritage practitioner has had enough time to analyse the finds.	
Avoidance	– Clearly mark as no go areas all archaeological sites identified. – Include in the worker's training a module on environmental awareness that also a contemplates information on how to identify, preserve and avoid destruction of fossil sites, as set out in Section 6.	
Mitigation/ Reduce	– All heritage sites identified should clearly marked as no-go areas, be monitored and incorporated into the training and awareness material to ensure that there are no impacts over these sites	
Stop work	– Should the Contractor fail to remain within the approved construction footprint or intentionally/negligently cause damage to sub-surface archaeological sites, the Owner's Engineer ECO reserves the right to suspend or partially suspend construction via instruction from the Owner's Engineer in order to allow for the assessment, reporting and rectification of the impact.	

5.3.9.3 Operational Measures

Management measure	Detailed Description	Responsibility
Specifications	N/A	NamPower
Avoidance	N/A	
Mitigation/ Reduce	– Known heritage sites resources located near the access road should be monitored for potential impacts resulting from erosion linked to the traffic in these roads.	
Stop work	N/A	

5.3.10 Grave Relocation Management Plan

Identified impacts/risks:	1. Potential damage to grave and burial sites
Objectives of improved management	1. Ensure that the location of existing graves and burial sites are properly identified, managed and protected during the construction phase, preferably through avoidance and only resorting to relocation as a last resource
Applicable Standards and legislation	PS 1: Assessment and management of environmental and social risks and impacts ESSS1: Project screening: environmental and social risks, impacts and opportunities
	PS8: Cultural heritage ESSS8: Cultural heritage
	EHS Guidelines; EHS Guidelines for Electric Power Transmission and Distribution – Section 1.0 Industry Specific Impacts and Management: 1.3– Communal health and safety: Visual amenity
	National Heritage Act (27 of 2004)

5.3.10.1 Pre-Construction Measures

Management measure	Detailed Description	Responsibility
Specifications	– Three potential burial sites have been identified by the local communities (see map included in Appendix A). These locations must be investigated during the walkdown survey of the final alignment, referred in Section 5.3.9.1, to assist with avoiding graves or exhumation and relocation as part of the resettlement activities. Should any further burial sites be identified in the walkdown survey or during the project's stakeholder engagement process, the mitigation should also be included in the updated Heritage Resources Management Plan (Section 5.3.9.1), which should include Grave Relocation Plan, should there be the need for one. – After identification of burial grounds, these should be mapped preferably in a GIS platform in order to inform the detailed design stage of the project. Buffer zones and possible secondary impacts should be identified and indicated. – All recommendations resulting from Heritage Resources Management Plan should also integrated into the Resettlement Action Plan (to be developed at a later stage of the project). Where necessary, grave relocations procedures should be reported and managed timeously due to the extended schedules this activity can have.	Contractor
Avoidance	N/A	
Mitigation/ Reduce	N/A	
Stop work	N/A	

5.3.10.2 Construction and Decommissioning Measures

Management measure	Detailed Description	Responsibility
Specifications	– Access by next of kin (NoK) should not be hindered by activities or infrastructure associated with the development.	Contractor Social / Heritage Specialists
Avoidance	– Clearly mark all identified burial sites as no go areas. – Include in the worker's training a module on environmental awareness that also a contemplates information on how to identify, preserve and avoid the local cultural heritage, as set out in Section 6.	
Mitigation/ Reduce	– Any grievances regarding issues surrounding grave relocations or the choice of NoK must be handled on a case-by-case basis between the CLO and the Heritage, Resettlement and Stakeholder Engagement (SE) Specialists. As soon as mention of restitution or wake-fees surface, issues surrounding the legal NoK often get contested. A procedure for the handling of such cases must be formulated in conjunction with the specialists. Such cases should be reported to the CLO to ensure conformity and transparency.	
Stop work	– Should the Contractor fail to remain within the approved construction footprint or intentionally/negligently cause damage to any burial site, the Owner's Engineer ECO reserves the right to suspend or partially suspend construction in order to allow for the assessment, reporting and rectification of the impact.	

5.3.11 Social Management Plan (including Vulnerable Groups)

Identified impacts/risks:	1. Potential physical displacement as a result the loss of shelter/homes 2. Economic displacement as result the loss of livelihoods or sources of income 3. Economic displacement as result the loss of access to natural resources 4. Increased risk of disease transmission 5. Increased risks of work and traffic accidents 6. Interference with the local communities' daily lives 7. Discomfort generated by construction activities affecting the quality of life of local communities
Identified project benefits:	8. Job creation 9. Creation of opportunities for local sourcing of good and services 10. Increased safety after demining activities 11. Increased availability and reliability of electricity
Objectives of improved management:	1. Ensure that all individuals/families displaced as a result of the project are resettled in a fair and adequate manner 2. Ensure that all individuals/families that might lose their livelihoods or sources of income disturbed/affected are compensated in a fair and adequate manner 3. Ensure that all individuals/families that might lose access to the natural resources are compensated in a fair and adequate manner 4. Prevent the transmission of diseases to the working forces and local communities

	5. Prevent the occurrence of accidents both to the construction workers and local communities 6. Ensure that any disturbance to the local communities' daily lives is kept to a minimum 7. Ensure that all potential disturbances associated with the construction works are kept to a minimum 8. Promote the local sourcing of labour for the job opportunities created 9. Promote and encourage the local sourcing of good and services and support the indirect economic growth of local communities 10. Free and release the use of areas that previously had restricted access, were deemed unsafe or had uncertain security due to the potential presence of land mines 11. Prevent the potential occurrence of nuisances associated with project activities such as traffic, air emissions, noise, etc.
Applicable Standards and legislation	PS 1: Assessment and management of environmental and social risks and impacts ESSS1: Project screening: environmental and social risks, impacts and opportunities
	PS4: Community health, safety and security ESSS7: Community health and safety
	PS2: Labour and working conditions ESSS6: Labour and working conditions
	PS7: Indigenous peoples ESSS4: Indigenous peoples
	ESSS2: Stakeholder engagement and information disclosure ESSS3: Gender mainstreaming
	EHS Guidelines: General EHS Guidelines – Section 3 Community health and safety EHS Guidelines: General EHS Guidelines – Section 4 Construction and Decommissioning: 4.3 – Community health and safety EHS Guidelines: EHS Guidelines for Electric Power Transmission and Distribution – Section 1.0 Industry Specific Impacts and Management: 1.3 – Community health and safety
	Traditional Authorities Act (25 of 2000) Affirmative Action (Employment) Act 29 of 1998

5.3.11.1 Pre-Construction Measures

Management measure	Detailed Description	Responsibility
Specifications	– The expectations of the O*vahimba* communities shall be considered throughout the project lifespan in terms of their involvement, compensation and communication. Please refer to the Stakeholder Engagement Plan and the Resettlement Policy Framework**.** – Before project construction, the appointed Social/Stakeholder Specialist will be oriented to its roles and responsibilities and understanding of the vulnerable groups (VG) social and cultural reality. – As entity responsible for services, Ruacana Constituency with the support of Traditional Authority will provide institutional support for the implementation of activities under its supervision. – The Social Specialist with the support of the Traditional Authority will identify at least one male and one female Community Liaison Officers (CLOs) to ensure the communication and involvement with VG. Specific responsibilities of this CLO include (also refer to Section 4.4.3 for responsibilities of the CLO):	Contractor NamPower Social Specialist

Management measure	Detailed Description	Responsibility
	• Participating in data collection from the community; • Awareness creation in the community about the VGP; • Facilitating meetings with VG; • Consolidating VGP at the community level; and • Addressing grievances from VG, including GBV related grievances. – A demining management plan needs to be and implemented prior to construction activities, in consultation with the competent authorities. – A Resettlement Action Plan (RAP) shall be developed and implemented prior to the start of any construction activity. A Resettlement Policy Framework (RPF) has been prepared as part of the ESIA documentation to guide the preparation of the RAP, upon confirmation of the detailed design. The RAP will guide the resettlement process to ensure that appropriate compensation is provided to the people/ social groups that will be directly affected/displaced. The RAP process must also guide the compensation for loss of livelihoods. Based on the needs of local communities, priority should be given to compensation through by provision an asset rather than monetary compensation. – Due to lack of water, which is the local populations' main concern (primarily due to the current drought), the construction of water infrastructure (both for supplying the communities and for livestock) can be a significant compensation for communities. However, the type of compensation for losses shall be agreed with the Traditional Authority; this will ensure Informed Consultation and Participation (ICP) and Free, Prior and Informed Consultation (FPIC) of the communities affected). – The RAP will be prepared in line with Namibia's legal framework and international lenders standards for socially sustainable development (see Section 3). The resettlement should be implemented with a high level of involvement of affected people/ social groups, the Traditional Authority and local host communities to ensure that the process is informed by the social and economic needs, constraints and expectations of all involved. – The following plans and programmes shall be implemented prior to construction commencing: • Water Programme (specifically a proposed borehole) • Local Employment Plan • Local Procurement Plan • Community Education and Awareness Programme • Workers Education and Awareness Programme • Stakeholders Engagement Plan (SEP) • Grievance Mechanism, including for a procedure for GBV grievances – A Local Employment Plan for the construction phase should be developed to ensure that local people are employed wherever possible and that this is done in a fair, consistent and transparent manner by the contractor. • A skills audit must be undertaken by an independent consultant. It will involve visiting the local communities, as well as Ruacana town, and providing the opportunity for people to register their skills, as well as registration for unskilled work such as bush clearing. The Traditional Authority and Ruacana Constituencies can be used to notify these communities / public of the audit, however they should not be custodian of the register to ensure independence and	

Management measure	Detailed Description	Responsibility
	rule out favouritism and gatekeeping. The register can also consider Angolan citizens that are recognised by the traditional chiefs as longstanding members of their villages. • Quotas for local employment should then be set based on the availability of appropriate local skills as indicated in the skills database. It is recommended that a minimum of 10% local people should be employed, 5% women and 5 % men. • Quotas for the employment of women should be set, to include for management positions. • The contractor's contract should specify that these positions may only be filled by persons outside of these categories if it can be demonstrated that no suitable persons are recorded in the skills register to fill these positions, and no other candidates could be identified through local advertising. • Ensure that women, the youth, people with disabilities and migrants benefit through the Plan and that Affirmative Action is applied. – All workers should be adequately trained for the proper performance of their functions, this includes Indigenous People and women in technical roles specifically (see Section 6.4.2). The job creation should be accompanied by protection of the fundamental rights of workers, in according the requirements set out in the national labour law (Labour Act 11 of 2007) and Labour and Work Conditions DBSA and IFC Performance Standards. – Develop a Local Procurement Plan for the construction phase, setting out the purchasing strategy stipulating how local purchase of goods and services (e.g. transportation, acquisition of construction materials from mining operations located in the region, waste management and disposal, water supply and catering) will be done to maximise local sourcing as well as to promote the use of women owned businesses. – Ensure the equal and effective participation of women and men in the Procurement Board. – Accommodation for non-local workers to be in Ruacana town and not near the site (and especially schools) to reduce disruption to local communities especially young girls and women. – When developing the ESMS, quotas for women in operational managerial positions should be recommended.	
Avoidance	– Adjustments to the detailed design of the project should take in consideration the detailed social survey (to be performed within the RAP scope) of the corridor directly affected by the final alignment including all accesses, pylon positions and construction camps location. This survey should inform areas to be avoided in order to minimise impact on livelihood areas. – The social, heritage and ecology specialists that are required to undertake a walkdown of the corridor should be accompanied by representatives of local communities to assist with the identification of natural, cultural and social resources.	
Mitigation/ Reduce	– Priority must be given to the use of existing access roads/ tracks in the servitude of the existing transmission lines next to which the ANNA transmission line will be built, as well as areas already intervened. In case there is a need to create new accesses, livelihood resources (e.g. crops or forests) should not be bisected to avoid fragmentation. The location of new accesses, pylons and construction camps should be defined in agreement with the Traditional Authority and the people/ social groups that use the land. – A Grievance Mechanism as indicated in Section 8 must be implemented.	
Stop work	N/A	

5.3.11.2 Construction and Decommissioning Measures

5.3.11.2.1 Physical displacement

Management measure	Detailed Description	Responsibility
Specifications	– Ensure that the RAP is totally implemented and all people that need to be resettled are duly compensated for they loss before the start of any construction activity in the area.	NamPower
Avoidance	N/A	
Mitigation/ Reduce	– A Grievance Mechanism as indicated in Section 8 must be implemented.	
Stop work	N/A	

5.3.11.2.2 Economic displacement – loss of livelihoods or natural resources

Management measure	Detailed Description	Responsibility
Specifications	– Ensure that the RAP is completely implemented and all people that may experience losses in livelihoods, sources of income or natural resources are duly compensated before the start of any construction activity in the area. – The livelihoods restoration plan as part of the RAP should consider the needs of the community that were raised during the stakeholder engagement, this includes *inter alia*, implementation or repair of an existing borehole, implementation of PV panels onto boreholes to avoid diesel use; implementation of PV on schools in the area (e.g. Otjekua); repair of earth dam (Otjimanagombe).	NamPower
Avoidance	– Apply the mitigation measures proposed in the Biodiversity Management Plan (Section 5.3.7) to limit tree and vegetation clearance to the areas strictly necessary. This recommendation should also be included in the Demining Management plan. – Provide a Grievance Mechanism for the handling of complaints/ requests and information, to consider the need for implementation of new measures	
Mitigation/ Reduce	– Ensure access for local population into the natural resource's areas is maintained, as long as this does not pose any threat or danger for the communities or construction workers (e.g. traffic) – A Grievance Mechanism as indicated in Section 8 must be implemented.	
Stop work	N/A	

5.3.11.2.3 Increased risk of contracting diseases

Management measure	Detailed Description	Responsibility
Specifications	– Implement a the Community and the Occupational Health and Safety Management Plans (see Section 5.3.14 and Section 5.3.15) including the epidemiological control measures to be directly implemented by the contractor on the construction sites, to assist the workers and, thus, avoid pressure on the local health units.	Contractor
Avoidance	– Promote awareness activities among workers about water-related, hygiene-related and sexually transmitted diseases, especially HIV/ AIDS (see Section 6.4). – Promote awareness activities among local communities (particularly women and girls) about the health impacts associated with the presence of non-local workers (see Section 6.4). – The social workers for Ruacana Constituency and Omusati Region have expressed willingness to engage with community awareness activities and should be involved. Materials can also be designed to as to be replicated on other future projects. – Accommodation for non-local workers to be in Ruacana town and not near the site (and especially schools) to reduce disruption to local communities especially young girls and women.	
Mitigation/ Reduce	– A Grievance Mechanism as indicated in Section 8 must be implemented	
Stop work	N/A	

5.3.11.2.4 Site health and safety impacts

Management measure	Detailed Description	Responsibility
Specifications	– Implement the Traffic Safety Management Plan (see Section 5.3.16), enforcing reduced speed limits and adequate signalling to ensure safe traffic conditions and ensure that there is access control on the construction sites, to prevent access to people external to the construction activities.	Contractor
Avoidance	– Implement the SEP, with prior and extended communication of the planned activities (and their timeline) and the accesses to be used during the project construction phase, to enable local communities to increase their perception of danger and manage the potential risks. – Promote awareness activities among local communities (particularly children) about the risk of traffic accidents.	
Mitigation/ Reduce	– A Grievance Mechanism as indicated in Section 8 must be implemented.	
Stop work	N/A	

5.3.11.2.5 Social disruption from construction workers

Management measure	Detailed Description	Responsibility
Specifications	N/A	Contractor
Avoidance	– Promote awareness activities among workers about the culture, beliefs, habits and lifestyles of local communities, and rules of conduct. The code of conduct should apply to both contractors and NamPower staff and should set out the disciplinary and legal implications of certain activities involving local communities. – Promote awareness activities among local communities about the presence of non-local workers. The social workers for Ruacana Constituency and Omusati Region have expressed willingness to engage with community awareness activities and should be involved. Materials can also be designed to as to be replicated on other future projects.	
Mitigation/ Reduce	– A Grievance Mechanism as indicated in Section 8 must be implemented. – Locate the workers accommodation in Ruacana and not in the areas along the corridor to avoid interactions between workers and communities. – Provide worker transport by bus between the site and accommodation to minimise traffic, limit workers remaining in the area after hours, and also to ensure women workers do not have to travel after dark for example.	
Stop work	N/A	

5.3.11.2.6 Discomfort from construction activities

Management measure	Detailed Description	Responsibility
Specifications	– Implement the SEP, with prior and extended communication of the planned activities (and timeline) and the accesses to be used during the project construction phase, to enable local communities to adjust their perception and manage the potential discomfort in their daily lives	Contractor
Avoidance	– Apply mitigation the measures provide for air quality and noise to minimise dust, air pollutants and sound emissions (see Section 5.3.4 and 5.3.5).	
Mitigation/ Reduce	– A Grievance Mechanism as indicated in Section 8 must be implemented.	
Stop work	N/A	

5.3.11.2.7 Job creation and opportunities for local sourcing of good and services

Management measure	Detailed Description	Responsibility
Specifications	– Implement the Local Employment and Procurement Programmes described in Section 5.3.11.1. – Provision of women friendly protective clothing for jobs relating to the project.	Contractor
Avoidance	N/A	
Mitigation/ Reduce	– A Grievance Mechanism as indicated in Section 8 must be implemented.	
Stop work	N/A	

5.3.11.3 Operational Measures

Management measure	Detailed Description	Responsibility
Specifications	– Develop a Local Procurement Plan for the operation phase stipulating how local purchase of goods and services (e.g. vegetation clearance) will be done to maximise local sourcing. – Ensure the equal and effective participation of women and men in the Procurement Board.	NamPower / CLO
Avoidance	– Publish a brochure in the local language for community outreach, with forbidden, dangerous behaviours to be avoided, and with the correct procedures to follow near the transmission lines. The social workers for Ruacana Constituency and Omusati Region have expressed willingness to engage with community awareness activities and should be involved. Materials can also be designed to as to be replicated on other similar projects. – Place, in each pylon, a sign in a visible place stating "danger of death" in the local language and with a symbol for illiterate, so that it can be perceived by all. – Anti-climbing devices (as already included in the design) should be installed. – A code of conduct should be developed, communicated to, and signed by all NamPower employees and sub-contractors working in the area that sets out disciplinary and legal implications of certain activities involving local communities.	
Mitigation/ Reduce	– Monitor public exposure to electromagnetic fields. – Ensure ongoing awareness campaign regarding electricity and safety, where communities are found to be interacting with the infrastructure.	
Stop work	N/A	

5.3.12 Landscape Management Plan

Identified impacts/risks:	1. Visual impacts associated to construction works 2. Visual impacts on potential receptors traveling in local roads or visiting Ruacana Falls 3. Visual impacts on rural receptors, i.e., local communities
Objectives of improved management	1. Ensure that the visual disturbance associated with the construction activities are confined and kept to a minimum 2. Ensure that the presence of the transmission line has as few impacts in the local landscape as possible 3. Ensure that the presence of the transmission line affects the local communities' sense of place as little as possible
Applicable Standards and legislation	PS 1: Assessment and management of environmental and social risks and impacts ESSS1: Project screening: environmental and social risks, impacts and opportunities
	PS8: Cultural heritage ESSS8: Cultural heritage
	EHS Guidelines: EHS Guidelines for Electric Power Transmission and Distribution – Section 1.0 Industry Specific Impacts and Management: 1.3 – Communal health and safety: Visual amenity

5.3.12.1 Pre-Construction Measures

Management measure	Detailed Description	Responsibility
Specifications	– For the construction camp, use the disturbed area previously used for the proposed Kunene Substation platform works so as to avoid disturbance of new areas. If not possible, make use of sites which have been previously disturbed. Do not locate camp sites in areas where it will be necessary to remove trees and shrubs or large areas of well-established vegetation.	Contractor
Avoidance	– Locate construction camps outside of sensitive areas such as public areas and tourist attractions.	
Mitigation/ Reduce	N/A	
Stop work	N/A	

5.3.12.2 Construction and Decommissioning Measures

Management measure	Detailed Description	Responsibility
Specifications	– Only remove individual trees that pose a threat to the infrastructure and do not eliminate all existing vegetation within the line route/servitude as set out in Section 5.3.7.2.1.	Contractor
Avoidance	– Vegetation clearance along the construction footprint of the servitude must be minimised by demarcating the work area and restricting vehicular access outside the.	

Mitigation/ Reduce	– Signage should not be obtrusive and should not be seen against the skyline. – The security lighting around the contractor's camp must be kept as low as possible. Upwards light spill must be minimised by "blinkers" designed to ensure light is directed downwards whilst preventing side spill. – All areas affected by the construction footprint no longer in use must be rehabilitated respecting the sequence set out in Section 5.3.7.2.1, as soon as the works in that area are finalised.	
Stop work	N/A	

5.3.12.3 Operational Measures

Management measure	Detailed Description	Responsibility
Specifications	N/A	NamPower
Avoidance	– Make sure that existing tracks/roads are used for all required maintenance operations	
Mitigation/ Reduce	– Within the maintenance activities, only remove individual trees that pose a threat to the infrastructure and do not eliminate all existing vegetation within the line servitude as they limit the visibility of the transmission line.	
Stop work	N/A	

5.3.13 Waste Management Plan

Identified impacts/risks:	1. Potential contamination of water, soils and other natural resources 2. Potential effect on natural processes, namely on flora, fauna and human health
Objectives of improved management	1. and 2. Ensure that all the waste (hazardous, non-hazardous and biomedical) produced within the project life-cycle is properly handled, stored and disposed of to guarantee that there is no contamination of any natural resource and ensure the prevention of any collateral damage to the ecosystem or effects on human health
Applicable Standards and legislation	PS 1: Assessment and management of environmental and social risks and impacts ESSS1: Project screening: environmental and social risks, impacts and opportunities
	PS 3: Resource efficiency and pollution prevention ESSS10: Resource efficiency, pollution prevention and management
	PS6: Biodiversity conservation and sustainable management of living natural resources ESSS9: Biodiversity conservation and sustainable management of living natural resources and resilience
	EHS Guidelines: General EHS Guidelines – Section 1 Environmental: 1.5 Hazardous material management; 1.6 Waste management

	EHS Guidelines: General EHS Guidelines – Section 2 Occupational health and safety: 2.4 – Chemical hazards; 2.5 – Biological hazards EHS Guidelines: General EHS Guidelines – Section 3 Community health and safety: 3.5 – Transport of hazardous materials EHS Guidelines: General EHS Guidelines – Section 4 Construction and decommissioning: 4.1– Environment: Contaminated land EHS Guidelines: EHS Guidelines for Electric Power Transmission and Distribution – Section 1.0 Industry Specific Impacts and Management: 1.1– Environmental: Hazardous materials EHS Guidelines: EHS Guidelines for Electric Power Transmission and Distribution – Section 1.0 Industry Specific Impacts and Management: 1.2– Occupational health and safety: Exposure to chemicals
	Pollution Control and Waste Management Bill of 1999
	NamPower Health and Safety Policy (2011) NamPower Procedure for Herbicide and Pesticide Management (2017) NamPower Procedure for Hydrocarbon Spill Response (2017) NamPower Purchasing, Storage and Distribution of Hazardous Substances (2011) NamPower Incident Reporting Procedure (2011)

5.3.13.1 Pre-Construction Measures

Management measure	Detailed Description	Responsibility
Specifications	– The contractor shall review and adjust this Waste Management Plan considering the planned construction activities and site-specific constraints, including measures to manage the different waste streams in accordance with the waste management hierarchy (avoid, reuse, recycle and reprocess and disposal). The option of reuse of materials or products for other purpose should be considered prior to considering the recycling. – This Waste Management Plan must respect NamPower's Policies and procedures stated above.	Contractor
Avoidance	– Identify the service providers to be used for the disposal of hazardous, biological/healthcare, non-hazardous and recyclable waste (recycle, disposal, transport, etc.)	
Mitigation/ Reduce	N/A	
Stop work	N/A	

5.3.13.2 Construction and Decommissioning Measures

Management measure	Detailed Description	Responsibility
Specifications	– Ensure that all the waste (hazardous and non-hazardous) produced within the construction phase is properly handled, stored and disposed of.	Contractor
Avoidance	– Implement the waste management procedures stated in the Construction Waste Management Plan and train all staff in the correct handling of all waste streams. – All work area must have a sufficient number of colour coded / labelled waste bins to deal with hazardous, non-hazardous and food waste. Waste bins should have lids and must be emptied at daily intervals, or as needed.	

Management measure	Detailed Description	Responsibility
	– Assign staff responsible for the implementation of the waste manage procedure, making sure that all work sites are kept free of waste and including a litter collection programme, in order to prevent problems with wild animals (e.g. baboon, black-backed jackal, etc.). Routine clean-ups must be arranged during the work shift. – Waste generated in the construction site must be segregated into different categories to facilitate their reuse, recycling or disposal. Separate hazardous and non-hazardous waste streams. – Containers used for storage of wastes must be in good condition and be maintained to minimise corrosion and wear. Waste identified as hazardous will need suitable containers duly identified (e.g. tanks, drums etc.) separated from common/non-hazardous waste and stored on weatherproof containers when not in use. – All hazardous waste storage sites must have a concrete/impermeable hardstanding and bunding to prevent spillage. – Whenever possible and feasible re-use inert construction waste (such as excavated subsoil and building rubble) as backfilling. – No solid waste may be burned or buried on site or disposed of by any other method on site. Solid waste must be disposed via the formal waste management facilities and systems in the region. – All waste must be recovered and safely disposed of and all removals for disposal or recycling must be recorded and the appropriate documentation, such as proofs of safe disposal certificates, must be compiled and filed appropriately. – All batteries must be disposed at a registered municipal landfill site. – All hazardous waste transporters have to be appropriately licensed.	
Mitigation/ Reduce	– Conduct regular inspections of waste storage areas to check for problems, littering, over filling (e.g. collection schedule unadjusted), spillages, etc. and address them accordingly. – Ensure that oily wastewater is treated in an oil separator and pond before being discharged to the environment. – Ensure that emergency spill kits are present at strategic locations with capable people with the necessary training available to use it in case of accidental spillages. Any spill incidents must be cleaned up immediately and in according with the emergency procedure stated in the Contingency Plan include in the Hazardous Materials Management Plan (see Section 5.3.8)	
Stop work	– Mismanagement of waste with a consequent major spillage, repeat littering or runoff to adjacent water courses can result in the suspension of the activities via instruction from the Owner's Engineer and their ECO until non-conformances have been rectified to the ECO's satisfaction. – Should a major spill/contamination occur, the Owner's Engineer and their ECO reserves the right to request a suspension or partial suspension construction in order to allow for the assessment, reporting and rectification of the impact. – Depending on the severity of the non-conformance and degree of negligence on the Contractor's part, the Owner's Engineer and their ECO will also inform the relevant competent authority to confirm the Contractor's liability to be prosecuted and/or fined.	

5.3.13.3 Operational Measures

Management measure	Detailed Description	Responsibility
Specifications	– Follow NamPower's Policies and procedures stated above.	NamPower
Avoidance	– All hazardous wastes should be appropriately separated and stored in designated signed areas, with appropriate demarcation and entry restrictions. Where appropriate, hazardous waste should be temporarily stored in contained central areas, surrounded by berms or concrete containment, to restrict the movement of hazardous substances into the terrestrial or aquatic environments in the event of spills or leaks.	
Mitigation/ Reduce	– Conduct regular inspections of waste storage areas to check for problems, littering, over filling (e.g. collection schedule unadjusted), spillages, etc. and address them accordingly. – Ensure that emergency spill kits are present at strategic locations in the substation with people with training available to use it in the case of accidental spillages. Any spill incidents must be cleaned up immediately and in accordance with the emergency procedure stated in the NamPower Procedure for Hydrocarbon Spill Response (2017).	
Stop work	N/A	

5.3.14 Community Health and Safety Plan

Identified impacts/risks:	1. Potential injury, illness or loss of life of community members due to contact with construction equipment or materials. 2. Potential injury, illness or loss of life of community members due to poorly designed and constructed infrastructure. 3. Potential injury, illness or loss of life of community members due to contact with high-voltage infrastructure. 4. Potential contracting of diseases by community members from contact with construction workers. 5. Potential of nuisance or risk of contracting diseases by community members from emissions, hazardous materials, or other vectors associated with construction activities.
Objectives of improved management	1. Promote and retain a safe and healthy environment for community members
Applicable Standards and legislation	PS 1: Assessment and management of environmental and social risks and impacts ESSS1: Project screening: environmental and social risks, impacts and opportunities
	PS4: Community health and safety ESSS7: Community health and safety
	EHS Guidelines: General EHS Guidelines – Section 3 Community health and safety EHS Guidelines for Electric Power Transmission and Distribution – Section 1.3 Community health and safety
	Public and Environmental Health Act (01 of 2015)

	Labour Act (11 of 2007) Regulations relating to the health and safety of employees at work
	SAPP ESMF (2018) Appendix G: Transmission EMP NamPower Health and Safety Policy (2011)

5.3.14.1 Pre-Construction Measures

Management measure	Detailed Description	Responsibility
Specifications	– Final design for the transmission line route should adhere to regional or national air traffic safety regulations and consultation with regulatory air traffic authority is required if necessary. – Structural safety of infrastructure should be ensured through compliance with relevant national and international design standards or codes. – Risk of electrocution (through direct contact with high-voltage electricity) to be addressed by: • Use of signs, barriers (e.g. locks on doors, use of gates, use of steel posts surrounding transmission towers, where relevant). Signage must be understandable to illiterate community members. • Education / public outreach to prevent public contact with potentially dangerous equipment as detailed in Section 5.3.15 and 5.3.16. • Grounding conducting objects (e.g. fences or other metallic structures) installed near power lines, to prevent shock. – A Community Health and Safety Plan should be developed to include i*nter alia*, reduced speed limits, adequate signs to ensure safety and traffic conditions, access control of construction sites to prevent access to people from the surroundings etc. It should align with the Traffic Management Plan specified in Section 5.3.16. The Plan should provide for a register whereby health and safety incidents can be recorded, including the causes and any remedial actions. – Community awareness training is required as detailed in Section 6.4. – An Emergency Preparedness and Response Plan should be developed to include procedures to assist staff and emergency response teams during real life emergency and training exercises (see Section 7).	Contractor
Avoidance	N/A	
Mitigation/ Reduce	– A Grievance Mechanism as indicated in Section 8 must be implemented.	
Stop work	N/A	

5.3.14.2 Construction and Decommissioning Measures

Management measure	Detailed Description	Responsibility
Specifications	– The site security services must be carried out in accordance with relevant human rights principles and in a manner that avoids and minimises all potential risks to the affected communities. – Site security services are required, and security management must include the following:	Contractor

Management measure	Detailed Description	Responsibility
	• Restrict the number of entry and exit points for security reasons; • Erect a physical barrier (e.g. a removable fence) to ensure that there is no unauthorized access outside of the construction area; and • Erect safety and security signage at the access points. – Workforce training to provide for social awareness as detailed in Section 6.	
Avoidance	– All measures relating to water (Section 5.3.2) and soil (Section 5.3.3.2) pollution, as well as air quality (Section 5.3.4.1) and noise (Section 5.3.5.1) must be adhered to. – The use of local labour during construction will reduce the interactions and health risks from a non-local workforce.	
Mitigation/ Reduce	– A Grievance Mechanism as indicated in Section 8 must be implemented.	
Stop work	N/A	

5.3.14.3 Operational Measures

Management measure	Detailed Description	Responsibility
Specifications	N/A	NamPower
Avoidance	N/A	
Mitigation/ Reduce	– A Grievance Mechanism as indicated in Section 8 must be implemented. – Monitor public exposure to electromagnetic fields.	
Stop work	N/A	

5.3.15 Occupational Health and Safety Plan

Identified impacts/risks:	1. Potential worker injury, illness or loss of life due to pollutants and noise 2. Potential worker injury, illness or loss of life due to risk of contracting diseases 3. Potential worker injury, illness or loss of life due to poorly designed and constructed infrastructure. 4. Potential worker injury, illness or loss of life due to working with live power lines 5. Potential worker injury, illness or loss of life due to working at height 6. Potential worker injury, illness or loss of life due to exposure to chemicals

Objectives of improved management	1. Promote and retain a safe and healthy work environment for workers
Applicable Standards and legislation	PS 1: Assessment and management of environmental and social risks and impacts ESSS1: Project screening: environmental and social risks, impacts and opportunities
	PS6: Labour and working conditions ESSS6: Labour and working conditions
	EHS Guidelines: General EHS Guidelines – Section 2 Occupational Health and Safety EHS Guidelines for Electric Power Transmission and Distribution – Section 1.2 Occupational Health and Safety
	Public and Environmental Health Act (01 of 2015) Labour Act (11 of 2007) Regulations relating to the health and safety of employees at work
	SAPP ESMF (2018): Appendix G: Transmission ESMP NamPower Health and Safety Policy (2011)

5.3.15.1 Pre-Construction Measures

Management measure	Detailed Description	Responsibility
Specifications	– Prior to commencement of the construction activities, the Ministry of Labour is to be notified in relation to Regulation 20 of the Labour Act (11 of 2007). – A detailed Operational Health and Safety Plan must be developed by the contractor. – Conduct a risk assessment of construction activities to determine the potential risks that may arise. The risk assessment must inform: • Awareness management; • Management tools; • Inspections of tools; and • Re-assessment of activities and tasks. – Develop a Health Management Plan to address the following: • Providing surveillance and active screening and treatment of workers. • Conducting immunisation programs for workers in local communities to improve health and guard against infection. • Collaboration with local authorities to enhance access of workers families and the community to public health services and promote immunisation.	Contractor
Avoidance	N/A	
Mitigation/ Reduce	– An Emergency Preparedness and Response Plan must be developed to include procedures to assist staff and emergency response teams during real life emergency and training exercises (see Section 7). – A Grievance Mechanism as indicated in Section 8 must be implemented.	

Management measure	Detailed Description	Responsibility
Stop work	N/A	

5.3.15.2 Construction and Decommissioning Measures

Management measure	Detailed Description	Responsibility
Specifications	– The contractor will be responsible for placing a health and safety officer on site to maintain a safe work environment for all employees and respect the following conditions: • Promote fair treatment, non-discrimination, and equal opportunity of workers. • Establish, maintain, and improve the worker-management relationship. • Promote compliance with national employment and labour laws. • Protect workers, including vulnerable groups such as children, migrant workers, workers engaged by third parties, and workers in the client's supply chain. • Promote safe and healthy working conditions, and the health of workers. • The use of child labour or forced labour is absolutely forbidden. – The officer will also ensure that all the health and safety related polices and regulations (i.e. labour laws) are adhered to, regularly reviewed and communicated to workers. – OHS orientation training must be provided to all new employees to ensure they are apprised of the basic site rules of work at/on the site and of personal protection and preventing injury to fellow employees. Training should consist of basic hazard awareness, site-specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate. Any site-specific hazard or colour coding in use should be thoroughly reviewed as part of orientation training. – Any health and safety incidents must be reported to the Owner's Engineer Project Manager immediately. A record of health and safety incidents must be kept on site. – First aid facilities must be available on site at all times and a number of employees trained to carry out first aid procedures as per Section 6.3. – Only allow trained and certified workers to install electrical equipment as required in Section 6.3.. <u>Working at height</u> Prevention and control measures for working at height include: – Testing structures for integrity prior to undertaking work. – Implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures, inspection, maintenance, and replacement of fall protection equipment; and rescue of fall-arrested workers, among others. – Establishment of criteria for use of 100 percent fall protection (typically when working over 2 m above the working surface, but sometimes extended to 7 m, depending on the activity). The fall protection system should be appropriate for the tower structure and necessary movements, including ascent, descent, and moving from point to point.	Contractor

Management measure	Detailed Description	Responsibility
	– Installation of fixtures on tower components to facilitate the use of fall protection systems. – Provision of an adequate work-positioning device system for workers. Connectors on positioning systems should be compatible with the tower components to which they are attached. – Hoisting equipment should be properly rated and maintained and hoist operators properly trained. – Safety belts should be of not less than 16 mm (5/8 inch) two-in-one nylon or material of equivalent strength. Rope safety belts should be replaced before signs of aging or fraying of fibres become evident. – When operating power tools at height, workers should use a second (backup) safety strap. – Signs and other obstructions should be removed from poles or structures prior to undertaking work. – An approved tool bag should be used for raising or lowering tools or materials to workers on structures. <u>Working with live power lines:</u> Prevention and control measures associated with live power lines include: – Only allow trained and certified workers to install, maintain, or repair electrical equipment as required in Section 6.3. – Isolate and properly ground live power distribution lines before work is performed on, or in close proximity, to the lines. – Ensure that live-wire work is conducted by trained workers with strict adherence to specific safety and insulation standards. Qualified or trained employees working on transmission or distribution systems should be able to achieve the following: • Distinguish live parts from other parts of the electrical system; • Determine the voltage of live parts; • Understand the minimum approach distances outlined for specific live line voltages; and • Ensure proper use of special safety equipment and procedures when working near or on exposed energized parts of an electrical system. – Workers should not approach an exposed energized or conductive part even if properly trained unless: • The worker is properly insulated from the energized part with gloves or other approved insulation; • The energized part is properly insulated from the worker and any other conductive object; or, • The worker is properly isolated and insulated from any other conductive object (live-line work). – Workers not directly associated with power transmission and distribution activities who are operating around power lines or power substations should adhere to local legislation, standards, and guidelines relating to minimum approach distances for excavations, tools, vehicles, pruning, and other activities. – Minimum hot stick distances may only be reduced provided that the distance remaining is greater than the distance between the energized part and a grounded surface.	
Avoidance	– Personal protective equipment (PPE) must be worn by all employees and contractors when onsite. – Employees and contractors must receive proper training before receiving their PPE.	
Mitigation/ Reduce	– Appropriate traffic safety must be in place and must be included in inductions, refer to the Plan (Section 5.3.16) and Inductions (Section 6.3.). – All measures relating to water (Section 5.3.2) and soil (Section 5.3.3.2) pollution, as well as air quality (Section 5.3.4.1) and noise (Section 5.3.5.1) must be adhered to.	

Management measure	Detailed Description	Responsibility
Stop work	N/A	

5.3.15.3 Operational Measures

Management measure	Detailed Description	Responsibility
Specifications	– Conduct a risk assessment of operational activities to determine the potential risks that may arise. – Prevention and control measures associated with live power lines stated in Section 5.3.15.2 must be followed. Where maintenance and operation is required within minimum setback distances, specific training, safety measures, personal safety devices, and other precautions should be defined in a health and safety plan. – Prevention and control measures for working at height as stated in Section 5.3.15.2 must be followed. – Occupational Electromagnetic Field (EMF) exposure should be prevented or minimised through the preparation and implementation of an EMF safety program including the following components: • Identification of potential exposure levels in the workplace, including surveys of exposure levels in new projects and the use of personal monitors during working activities. • Training of workers in the identification of occupational EMF levels and hazards. • Establishment and identification of safety zones to differentiate between work areas with expected elevated EMF levels compared to those acceptable for public exposure, limiting access to properly trained workers. • Implementation of action plans to address potential or confirmed exposure levels that exceed reference occupational exposure levels developed by international organizations such as the International Commission on Non-Ionizing Radiation Protection (ICNIRP), and the Institute of Electrical and Electronics Engineers (IEEE). • Personal exposure monitoring equipment should be set to warn of exposure levels that are below occupational exposure reference levels (e.g. 50 percent). Action plans to address occupational exposure may include limiting exposure time through work rotation, increasing the distance between the source and the worker, when feasible, or the use of shielding materials.	NamPower
Avoidance	N/A	
Mitigation/ Reduce	N/A	
Stop work	N/A	

5.3.16 Traffic Safety Management Plan

Identified impacts/risks:	1. Potential worker or community injury or loss of life due to traffic accidents
Objectives of improved management	1. Prevent and reduce traffic accidents and injuries
Applicable Standards and legislation	PS 1: Assessment and management of environmental and social risks and impacts ESSS1: Project screening: environmental and social risks, impacts and opportunities
	PS6: Labour and working conditions ESSS6: Labour and working conditions
	EHS Guidelines: General EHS Guidelines – Section 3.4 Traffic safety
	Public and Environmental Health Act (01 of 2015) Labour Act (11 of 2007) Regulations relating to the health and safety of employees at work
	SAPP ESMF (2018): Appendix G: Transmission ESMP NamPower Health and Safety Policy (2011)

5.3.16.1 Pre-Construction Measures

Management measure	Detailed Description	Responsibility
Specifications	– Compile and implement a site-specific Traffic Safety Management Plan for the construction phase to address all impacts from increases in traffic, including measures herein.	Contractor
Avoidance	– Collaborate with local communities and responsible authorities to improve signage, visibility and overall safety of roads, particularly along stretches located near schools or other locations where children may be present. – Collaborate with local communities on education about traffic and pedestrian safety (e.g. school education campaigns) as stated in Section 6.4.	
Mitigation/ Reduce	– Use locally sourced materials, whenever possible, to minimise transport distances. – Provide worker bus transport to minimise external traffic, where necessary.	
Stop work	N/A	

5.3.16.2 Construction and Decommissioning Measures

Management measure	Detailed Description	Responsibility
Specifications	– Provide training in traffic safety management (Section 6.3.1) to all workers. They also should have the necessary qualifications or licenses to operate the vehicles, equipment and eventual attachments. – Training in incident reporting is required (Section 6.3.1). – Establish traffic control measures (both on-site and on access roads to the site), including road signs and flag persons to warn of dangerous conditions. – Adopt best transport safety practices to include: • Improving driving skills and require licensing of drivers • Enforce speed limits on site • Adopt limits for trip duration and arrange driver rosters to avoid overtiredness • Avoid dangerous routes and times of day to reduce the risk of accidents • Use speed control devices (governors) on trucks, and remote monitoring of driver actions • Regular maintenance of vehicles and use of manufacturer approved parts to avoid equipment malfunction or premature failure. – Relevant permits from the Roads Authority must be sought and drivers must adhere to the regulated road rules. – Minimise pedestrian interaction with construction vehicles by controlling passage way in construction areas.	Contractor
Avoidance	– Access to construction vehicles should be managed, with the driver signing for the vehicle in use. – All vehicles accessing the site should adhere to a low speed limit. – Avoid off-road driving and unnecessary nocturnal driving in the area. – Inspect and maintain access roads where applicable.	
Mitigation/ Reduce	– Coordinate with emergency responders to ensure that appropriate first aid is provided in the event of accidents.	
Stop work	N/A	

5.3.17 Resource Efficiency Management Plan

Identified impacts/risks:	1. Wasteful use of energy 2. Wasteful use of water 3. Wasteful use of materials
Objectives of improved management	1. Use resources efficiently
Applicable Standards and legislation	PS 1: Assessment and management of environmental and social risks and impacts ESSS1: Project screening: environmental and social risks, impacts and opportunities
	PS 3: Resource efficiency and pollution prevention ESSS10: Resource efficiency, pollution prevention and management
	Water Act (54 of 1956)

5.3.17.1 Pre-Construction Measures

Management measure	Detailed Description	Responsibility
Specifications	– The Integrated Water Resource Management Plan specified in Section 5.3.2 should also provide for effective provision of freshwater for all on-site processes, operations, facilities and services for staff, contractors, subcontractors, based on best estimates of such requirements. The Plan must demonstrate how water will be reused, recycled or treated where possible. – Contract document to include fines for excessive or wasteful water usage. – Where lighting is required, energy saving lighting must be used. – Fuel efficient vehicles must be used. – SEP engagements should identify any conflicting water use demands and the community's dependency on water resources and conservation requirements within the area. – Construction materials to be sourced locally or regionally where possible.	Contractor
Avoidance	– Avoid wasteful use of materials and double handling.	
Mitigation/ Reduce	– Manage and reduce the use of water, fuel and energy as much as possible	
Stop work	N/A	

5.3.17.2 Construction and Decommissioning Measures

Management measure	Detailed Description	Responsibility
Specifications	– Contractor training must provide for water and energy awareness training as included in Section 6.2.2.	Contractor
Avoidance	– Use ready mixed concrete instead of mixing on site where possible. – Site buildings to make provision for rainwater harvesting if works occur in wet season. – Water for dust suppression purposes must come from recycling/recirculating as set in Section 5.3.2. – Equipment not in use will be switched off and unplugged to save on unnecessary energy costs.	
Mitigation/ Reduce	– Fit all hoses on site with a 'squirt' or 'squeeze' nozzle to minimise water use. – Flush toilets should not to be used at the construction camp. – Contractors to issue workers with refillable bottles for daily use rather than drinking directly from a tap or hose. – Minimal lighting should be used at night, taking cognisance of any health and safety requirements. – Block-cutting or angle-grinding to be accompanied by water poured from a bucket and not a hose. – All workers to wash their tools/equipment (after daily activities) at a dedicated bucket / facility on the site – instead of under running water. Wash water to be reduced.	
Stop work	N/A	

5.3.17.3 Operational Measures

Management measure	Detailed Description	Responsibility
Specifications	– Institutional training as set out in Section 6.2.1 should include awareness of energy and water conservation behaviours of staff.	NamPower
Avoidance	– Equipment not in use must be switched off and unplugged to save on unnecessary energy costs.	
Mitigation/ Reduce	– Manage and reduce the use of water, fuel and energy as much as possible	
Stop work	N/A	

5.3.18 Decommissioning Management Plan

Identified impacts/risks:	1.Abandoned infrastructure poses a health and safety risk to the public 2. Ongoing environmental impacts after operation ceases e.g. erosion
Objectives of improved management	1. Safe and efficient removal of all transmission line infrastructure components. 2. Rehabilitation of the project footprint to conditions as close to pre-construction characteristics as possible including restoration of indigenous vegetation, habitat and/ or land use.
Applicable Standards and legislation	PS 1: Assessment and management of environmental and social risks and impacts ESSS1: Project screening: environmental and social risks, impacts and opportunities

5.3.18.1 Pre-Construction Measures

Management measure	Detailed Description	Responsibility
Specifications	– A detailed decommissioning plan should be developed and should consider, at the least, the requirements for decommissioning below. This plan should be based on current site conditions and should involve specialists able to provide inputs into potential ecological/biodiversity resources and appropriate and specific rehabilitation techniques. – Before decommissioning commences, the SEP should be revised and provide for consultations with the surrounding communities and the Traditional Authorities. – The Grievance Mechanism should remain available for stakeholders to lodge any grievances.	NamPower
	– Local Labour and Procurement Plans should be developed that comply with NamPower policies and requirements of the funders. – Environmental legislation relevant at that point in time should be adhered to and the necessary permits or licences shall be obtained.	Decommissioning Contractor
Avoidance	N/A	
Mitigation/ Reduce	N/A	
Stop work	N/A	

5.3.18.2 Decommissioning Measures

Management measure	Detailed Description	Responsibility
Specifications	– Dismantling and removal of all infrastructure. – Identify options for re-use, recycling or disposal of infrastructure in accordance with NamPower's waste minimisation and disposal practices and relevant legislation at the time. – Restore servitude to surrounding land use as far as practical. – Restore rights to the Traditional Authority and communities adjacent to the servitude. – Removal of foundations and access roads will include work to alleviate soil compaction, shaping of the ground to natural contours, replacing topsoil and rehabilitation with indigenous vegetation.	Decommissioning Contractor
Avoidance	N/A	
Mitigation/ Reduce	– Limit temporary disturbance footprint. – Temporary and permanently disturbed areas to be rehabilitated with indigenous vegetation. – Work in watercourses and wetland areas should be limited and where possible, manual labour should be used as a preference. – Measures to limit water pollution (Section 5.3.2), soil erosion (Section 5.3.3.2), dust and emissions (Section 5.3.4.1), noise (Section 5.3.5.1), biodiversity (Section 5.3.7.2), alien vegetation (Section 5.3.6.1), hazardous materials (Section 5.3.8.2), social (Section 5.3.11.2), waste (Section 5.3.13.2), community health and safety (Section 5.3.14.2), occupational health and safety (Section 5.3.15.2), traffic (Section 5.3.16.2) and resource efficiency (Section 5.3.17.2) impacts are included in the above sections and are applicable where relevant.	
Stop work	N/A	

5.4 Environmental and social monitoring plans

5.4.1 Pre-construction phase

Parameters	Sampling		Indicator	Target	Responsibility	Estimated Cost
	Location and requirements (if applicable)	Method and Frequency				
Climate change						
GHG management plan	N/A	Pre-construction and monitored during construction and operation	GHG emissions during project lifecycle (tonnes CO_2 equiv. emissions saved, captured or displaced p.a.)	Target established prior to construction Minimum GHG emissions	NamPower	Refer to costing table (Table 9.1)
Water resources						
Baseline groundwater levels	Water levels of nearby boreholes	Measure groundwater level in nearby borehole	Groundwater levels	N/A as it is for baseline purposes	EO	Included in contractors' obligations
Social						
Resettlement Action Plan	PACs	Pre-construction	Detailed RAP prepared and identified indicators / targets are monitored (refer RPF)	RAP implemented prior to construction No grievances with regards to RAP	NamPower CLO; RAP specialist	Refer to costing table (Table 9.1)

Parameters	Sampling		Indicator	Target	Responsibility	Estimated Cost
	Location and requirements (if applicable)	Method and Frequency				
Local Employment Programme	N/A	Pre-construction and monitored during construction and operation; Construction – twice a year; Operation - annually	Direct operational jobs (number of women, youth and indigenous people) Number of training opportunities provided (number of women, youth and indigenous people)	Programme established prior to construction Maximum women, youth and indigenous people employment (minimum of 10% local people, 5% women and 5% male) Maximum training opportunities created	Contractor NamPower CLO	Included in Contractor's obligations
Local Procurement Programme	N/A	Pre-construction and monitored during construction and operation	Number of local service providers	Programme established prior to construction Maximum local service providers	Contractor NamPower CLO	Included in Contractor's obligations
Community health and safety						
Emergency Preparedness and Response Plan	N/A	Pre-construction and monitored during construction	Detailed Emergency Preparedness and Response Plan prepared and identified indicators / targets are monitored	Plan established prior to construction	Contractor	Included in Contractor's obligations
Occupational health and safety						
OHS Plan	N/A	Pre-construction and monitored during construction	Detailed OHS plan prepared and identified indicators / targets are monitored	Plan established prior to construction	Contractor	Included in Contractor's obligations
Health Management Plan	N/A	Pre-construction and monitored during construction	Health Management Plan prepared and identified indicators / targets are monitored	Plan established prior to construction	Contractor	Included in Contractor's obligations

Parameters	Sampling		Indicator	Target	Responsibility	Estimated Cost
	Location and requirements (if applicable)	Method and Frequency				
Traffic safety						
Traffic Management Plan	N/A	Pre-construction and monitored during construction	Traffic Management Plan prepared and identified indicators / targets are monitored	Plan established prior to construction	Contractor	Included in Contractor's obligations
Sourcing of materials	On site	Procurement documentation; Pre-construction	% of materials sourced locally or within the region	All materials sourced locally or within the region	Contractor	Included in Contractor's obligations
Resource efficiency						
Integrated Water Use Management Plan	N/A	Pre-construction and monitored during construction	Integrated Water Use Management Plan prepared and identified indicators / targets are monitored	Plan established prior to construction	Contractor	Included in Contractor's obligations

5.4.2 Construction and decommissioning phases

Parameters	Sampling		Indicator	Target	Responsibility	Estimated Cost
	Location and requirements (if applicable)	Method and Frequency				
Climate change						
Heat waves	All areas to be affected by construction works	Visual inspection: daily	Provision of water to staff; Training on heat stress; Inclusion frequent breaks in construction schedules; Protective clothing	All staff have water during all day All staff to have induction on what to do in case of a heat wave Evidence of breaks taken All staff with adequate clothing for weather conditions	Contractor	Included in Contractor's obligations
Water resources						
Water quality of perennial watercourses	Construction works on the Kunene River (when crossing and/or within a 100 m radius of the watercourse)	Visual inspection: daily (only during works near the Kunene River)	Turbidity and sedimentation	No visible abnormal water turbidity or sedimentation close to works	EO	Included in contractors' obligations
		Water sampling: monthly (only during works near the Kunene River)	IFC and Namibian water quality parameters (whichever is the more stringent)	pH - 6-9 DO - at least 75%saturation BOD5 (20°C) – 30 mg/l COD - 75 mg/l TSS - 25 mg/l Free & Saline Ammonia - 10 mg/l as N Oils and greases - 2,5 mg/l (gravimetric method) Total Coliform – 400 MPN/100ml	EO	When working in proximity to the Kunene River (max 3 months) Refer to costing table (Table 9.1)

Parameters	Sampling		Indicator	Target	Responsibility	Estimated Cost
	Location and requirements (if applicable)	Method and Frequency				
Quality of effluent (including stormwater) discharged directly to the environment, or reused for dust suppression	Active construction fronts	Visual inspection: daily	Contaminated water	No evidence of contaminated water being discharges	EO	Included in contractors' obligations
	Active construction fronts; if any contamination is detected upon visual inspection	Water sampling: if required	IFC and Namibian water quality parameters (whichever is the more stringent)	pH - 6-9 DO - at least 75%saturation BOD5 (20°C) - 30 mg/l COD - 75 mg/l TSS - 25 mg/l Free & Saline Ammonia - 10 mg/l as N Oils and greases - 2,5 mg/l (gravimetric method) Total Coliform – 400 MPN/100ml	EO / Owner's Engineer ECO	*Ad hoc* sampling if required Refer to costing table (Table 9.1)
Quantity of effluent (including stormwater) discharged to the environment	Active construction fronts	Visual inspection: daily	Volume of water discharged	No evidence of large volumes of water discharged No evidence of effluent discharged	EO	Included in contractors' obligations
Groundwater levels	Water levels of construction borehole/s	Measure water level in borehole: weekly	Groundwater levels Groundwater use	No abnormal/ unexplained depletion of water levels	EO	Included in contractors' obligations
	Water levels of nearby boreholes	Measure water level in nearby borehole: every second week	Groundwater levels	No abnormal/ unexplained depletion of water levels	EO / Owner's Engineer ECO	Included in contractors' obligations
Erosion of watercourses	Active construction fronts and accesses	Visual inspection: daily	Erosion	No evidence of erosion	EO	Included in contractors' obligations

Parameters	Sampling		Indicator	Target	Responsibility	Estimated Cost
	Location and requirements (if applicable)	Method and Frequency				
Contamination of watercourses	Active construction fronts	Visual inspection: daily	Contamination of water sources	No evidence of contamination	EO	Included in contractors' obligations
Soils and land use						
Removal of topsoil	All areas affected by construction activities, e.g. construction camps, access roads, pylon and substation implantation areas	Visual inspection: daily	Depth of topsoil removed Contamination of topsoil	Topsoil is removed to a maximum depth of 15 cm No contamination of topsoil by other materials	EO	Included in contractors' obligations
Storage of topsoil	All topsoil stockpiles	Visual inspection: weekly, from beginning of construction until finalisation of rehabilitation	Quality of topsoil in stockpiles Disturbance of topsoil stockpiles	No evidence of compaction of topsoil. No evidence of topsoil stockpile being eroded by wind or water No evidence of weeds and alien invasive species No evidence of handling of topsoil (other than initial removal and final reapplication)	EO	Included in contractors' obligations
Topsoil application	All topsoil stockpiles	Visual inspection upon application of topsoil in the areas under rehabilitation	Quality of topsoil used for rehabilitation	Topsoil applied during rehabilitation matches the quality and thickness of topsoil removed during site clearance	EO	Included in contractors' obligations
Soil contamination	Active construction fronts	Visual inspection: daily	Contaminated soil	No evidence of soil contamination	EO	Included in contractors' obligations

Parameters	Sampling		Indicator	Target	Responsibility	Estimated Cost
	Location and requirements (if applicable)	Method and Frequency				
Air Quality						
Air emissions, especially dust	Active construction fronts and accesses	Visual inspection: weekly	Number of air quality related complaints Dust deposits	No air quality related complaints No evidence of excessive dust on vegetation or on community assets (e.g. houses, crops etc)	EO	Included in contractors' obligations
	Location relating to a persistent complaint even after implementation of dust suppression mitigation measures	Dust sampling: if and when required	WHO guidelines for particulate matter	No exceedances: PM_{10} (24hour) – 50 µg/m^3 $PM_{2.5}$ (24hour) – 25 µg/m^3	EO / Owner's Engineer ECO	*Ad hoc* sampling if required Refer to costing table (Table 9.1)
Noise						
Noise nuisance	Active construction fronts and accesses	Noise inspection: weekly	Number of noise complaints Excessive noise	No noise related complaints No evidence of excessive noise	EO	Included in contractors' obligations

Parameters	Sampling		Indicator	Target	Responsibility	Estimated Cost
	Location and requirements (if applicable)	**Method and Frequency**				
	Location relating to a persistent complaint even after implementation of mitigation measures	Noise emission sampling: if and when required	WHO Guidelines on noise	No exceedances of the below or maximum increase in background levels of 3 dB at the nearest receptor location off-site: Daytime (07:00 - 22:00) One Hour L_{Aeq} • Residential; institutional; educational[8]: 55 dBA • Industrial; commercial: 70 dBA	EO / Owner's Engineer ECO	*Ad hoc* sampling if required Refer to costing table (Table 9.1)
Biodiversity						
Vegetation and habitats	All areas to be affected by construction works	Visual inspection: before construction starts in an area	Avoidance of sensitive areas Avoidance of unnecessary vegetation removal or damage	All work areas demarcated All sensitive areas identified by ecologist demarcated as no-go areas No evidence of disturbance outside construction footprint No evidence of unnecessary vegetation removal or damage	EO	Included in contractors' obligations
		Specialist inspection: monthly			Ecology specialist	Refer to costing table (Table 9.1)

[8] Guidelines values are for noise levels measured out of doors. Source: Guidelines for Community Noise, World Health Organization (WHO), 1999.

Parameters	Sampling		Indicator	Target	Responsibility	Estimated Cost
	Location and requirements (if applicable)	Method and Frequency				
	Active construction fronts and accesses and surrounding areas of potential impact	Visual inspection: weekly	Quality of surrounding vegetation: • species composition • vegetation density • vegetation structure • plant health	No evidence of impacts to quality of surrounding vegetation	EO	Included in contractors' obligations
		Specialist inspection: monthly			Ecology specialist	Refer to costing table (Table 9.1)
	Where project crosses perennial (Kunene River) and ephemeral watercourses	Visual inspection: weekly	Quality of riparian vegetation	No evidence of impacts to riparian vegetation outside active work areas All impacted areas rehabilitated after completion of works	EO	Included in contractors' obligations
		Specialist inspection: monthly			Ecology specialist	Refer to costing table (Table 9.1)
	Areas affected by construction works no longer in use	Visual inspection: weekly	Duration between completion of works and rehabilitation Indigenous plant species used Presence of alien invasive plant species	Immediate rehabilitation of inactive work areas No evidence of non-indigenous species used for rehabilitation No evidence of alien invasive vegetation plant species	EO	Included in contractors' obligations
		Specialist inspection: monthly			Ecology specialist	Refer to costing table (Table 9.1)
Fauna (including avifauna)	All areas to be affected by construction works	Visual inspection: before construction starts in an area	Unnecessary tree felling (especially trees with nests; known perching sites – e.g. large and/or dead trees)	No evidence of unnecessary tree felling	EO	Included in contractors' obligations
		Specialist inspection: monthly			Ecology specialist	Refer to costing table (Table 9.1)

Parameters	Sampling		Indicator	Target	Responsibility	Estimated Cost
	Location and requirements (if applicable)	Method and Frequency				
	Active construction fronts and accesses	Visual inspection: daily	Presence of fauna in work areas	No fauna trapped or killed in active work areas	EO	Included in contractors' obligations
		Visual inspection: weekly	Damage to surrounding vegetation Driving at night Fauna mortalities Litter	No evidence of disturbance outside construction footprint No evidence of driving outside of official access roads No evidence of driving at night No evidence of fauna mortalities, especially reptiles No evidence of litter	EO	Included in contractors' obligations
		Specialist inspection: monthly			Ecology specialist	Refer to costing table (Table 9.1)
Erosion	Access roads	Visual inspection, Annually, before rainy season	Erosion	No evidence of erosion	EO	Included in contractors' obligations
Ecosystem services	All construction areas	As needed	Illegal capture or use of species	No evidence of illegal capture, use, or collection of fauna and flora species	EO	Included in contractors' obligations
Alien invasive plant species						
Alien invasive plant species	All construction areas	Visual inspection: daily	Presence of invasive alien plant species	No evidence of alien invasive plant species	EO	Included in contractors' obligations
		Specialist inspection: monthly			Ecology specialist	Refer to costing table (Table 9.1)

Parameters	Sampling		Indicator	Target	Responsibility	Estimated Cost
	Location and requirements (if applicable)	Method and Frequency				
Hazardous materials						
Management of hazardous materials	All construction areas, storage and disposal areas	Visual inspection: daily Detailed inspection: weekly	Storage of the hazardous materials Functioning of oil separators and retention ponds	All hazardous materials in clearly marked sealable containers in bunded areas Oil separators and retention ponds functioning correctly	EO / Owner's Engineer ECO	Included in contractors' obligations
		Inspection of records: monthly	Record keeping of of all hazardous substances stored on site, their location, date of reception, use, on site disposal, transport and final disposal/treatment Frequent inspection of containers Requisite vehicle and drivers licences Number of incidents, contingency plans and appropriate disposal of hazardous material	All hazardous substances stored on site to have records pertaining to their location, date of reception, use, on site disposal, transport and final disposal/treatment All containers to be regularly inspected All drivers and vehicles to hold requisite licence No contamination of water or soil, no spills All incidents to follow respective contingency plan All hazardous waste disposed of (including spills) to be recorded	EO / Owner's Engineer ECO	Included in contractors' obligations

Parameters	Sampling		Indicator	Target	Responsibility	Estimated Cost
	Location and requirements (if applicable)	Method and Frequency				
Cement / concrete batching	Active construction fronts	Visual inspection: daily Detailed inspection: weekly	Occurrence of spills or contamination events Record keeping of incidents, contingency plans and concrete waste disposal	No contamination of water or soil, no spills All incidents to follow respective contingency plan All concrete waste disposed of (including spills) to be recorded	EO / Owner's Engineer ECO	Included in contractors' obligations
Heritage						
Management of heritage sites	All areas to be affected by construction works and accesses	Visual inspection: daily		All identified heritage sites are clearly marked as no-go areas No evidence of disturbance or damage to ceremonial sites, paleontological or archaeological sites	EO	Included in contractors' obligations
		Specialist inspection: monthly			Heritage specialist	Refer to costing table (Table 9.1)
		Specialist inspection: if and when required	Chance Find Procedure	Chance Find Procedure (and subsequent specialist recommendations) adhered to if artefacts/fossils are found	Heritage specialist	*Ad hoc* inspection if required Refer to costing table (Table 9.1)
Grave relocation						
Management of graves and burial sites	All areas to be affected by construction works and accesses	Visual inspection: daily	Protection of burial sites	All identified burial sites are identified as no-go areas	EO	Included in contractors' obligations

Parameters	Sampling		Indicator	Target	Responsibility	Estimated Cost
	Location and requirements (if applicable)	Method and Frequency				
		Specialist inspection: monthly		No evidence of damage to burial sites	Heritage specialist	Refer to costing table (Table 9.1)
Landscape						
Visual disturbances	All areas to be affected by construction works and accesses	Visual inspection: before construction starts in an area	Avoidance of unnecessary vegetation removal or damage	No evidence of unnecessary vegetation removal or damage All work areas demarcated	EO	Included in contractors' obligations
	Active construction fronts and accesses	Visual inspection: daily Detailed inspection: weekly	Avoidance of unnecessary vegetation removal or damage Design of security lighting Dust deposits	No evidence of disturbance outside construction footprint All security lighting around the camp is dimmed/attenuated No evidence of excessive dust on vegetation	EO	Included in contractors' obligations
	Areas affected by construction works no longer in use	Visual inspection: weekly	Duration until rehabilitation Indigenous plant species used Presence of alien invasive plant species	Areas no longer in use are immediately rehabilitated. Vegetation in rehabilitated areas is only composed by native species No alien invasive vegetation present	EO	Included in contractors' obligations

Parameters	Sampling		Indicator	Target	Responsibility	Estimated Cost
	Location and requirements (if applicable)	Method and Frequency				
Waste						
All the waste (hazardous, non-hazardous and biomedical) is properly handled, stored and disposed of	All construction areas, storage and disposal areas	Visual inspection: daily Detailed inspection: weekly	Categories of waste stored separately Implementation of waste management hierarchy (avoid, reuse, recycle and reprocess and disposal) Marking of different waste streams Storage of hazardous waste in clearly marked, sealable containers in bunded areas Litter Regular inspection of waste disposal areas to check for spills or leakages	All waste is duly stored and segregated into different categories Proof of implementation of waste management hierarchy (avoid, reuse, recycle and reprocess and disposal) All hazardous and non-hazardous waste streams are separate and clearly marked All hazardous waste stored in clearly marked, sealable containers in bunded areas No litter is present No evidence of spills or leakages	EO	Included in contractors' obligations
Waste	All project activities	Records, annually	Waste to landfill avoided (tonnes p.a.) Waste to landfill recycled (tonnes p.a.) Waste to landfill reused (tonnes p.a.)	Minimal waste to landfill	Contractor	Included in contractors' obligations

Parameters	Sampling		Indicator	Target	Responsibility	Estimated Cost
	Location and requirements (if applicable)	Method and Frequency				
		Inspection of records: monthly	Record keeping (and proof) of all waste streams (hazardous, non-hazardous and biomedical) stored on site, their location, date of reception, use, on site disposal, transport and final disposal/treatment Frequent inspection of containers Requisite vehicle and drivers licences Number of incidents, contingency plans and appropriate disposal of all waste streams	All waste stored on site to have records pertaining to their location, date of reception, use, on site disposal, transport and final disposal/treatment All containers to be regularly inspected All drivers and vehicles to hold requisite licence No contamination of water or soil, no spills All incidents to follow respective contingency plan	EO	Included in contractors' obligations
Community health and safety						
Workforce training	N/A	Training records; prior to operation	Training undertaken as per content included in Section 6 Number of non-conformances that relate to topics covered under the training	All staff to have induction in environmental and social awareness and health and safety as per content included in Section 6 No non-conformances relating to topics covered under the training	EO	Included in Contractor's obligations
Security	At site	Continual watching brief	Security services present	No evidence of security services being absent	EO	Included in Contractor's obligations

Parameters	Sampling		Indicator	Target	Responsibility	Estimated Cost
	Location and requirements (if applicable)	Method and Frequency				
Occupational health and safety						
PPE	On site	Continual watching brief	Personnel wearing appropriate PPE	No evidence of PPE being absent	EO	Included in Contractor's obligations
First aid	On site	Visible inspection and training records; monthly	First aid facilities present on site	No evidence of first aid facilities being absent	EO	Included in Contractor's obligations
Health and safety incidents	On site	Records; monthly	Number of health and safety incidents Records of incidents in register	No health and safety incidents All health and safety incidents recorded in the register	EO	Included in Contractor's obligations
Working with live power lines	On site	Continual watching brief	Requirements in Section 5.3.15 met (as per EHS Guidelines)	No health and safety incidents All health and safety incidents recorded in the register	EO	Included in Contractor's obligations
Working at height	On site	Continual watching brief	Requirements in Section 5.3.15 met (as per EHS Guidelines)	No health and safety incidents All health and safety incidents recorded in the register	EO	Included in Contractor's obligations
Traffic safety						
Transport of workers	N/A	Records; monthly	% of workers provided with shared transport	All workers provided with shared transport	EO	Included in Contractor's obligations

Parameters	Sampling		Indicator	Target	Responsibility	Estimated Cost
	Location and requirements (if applicable)	Method and Frequency				
Traffic safety and control	On site and areas where interactions with communities are likely	Vehicle accident records; Pedestrian accident records; Near misses; Compliance with speed limits; Training records; Continual watching brief	Traffic control measures present Number of traffic related incidents Number of vehicles exceeding speed limit Traffic safety included in training	No evidence of absent traffic control measures No evidence of traffic related incidents No evidence of vehicles speeding No non-conformances relating to traffic safety covered under the training	EO	Included in Contractor's obligations
Resource efficiency						
Water use	On site	Water use records; Monthly	Volume of water used per source, % of water recycled or reused	Unable to set target at this design stage, ECO to report on whether adequate efforts are being implemented to reduce water use and maximise recycling and reuse	EO	Included in Contractor's obligations
Energy use	On site	Energy use records; Monthly Behaviours; Continual watching brief	Amount of energy used per source (e.g. petrol, diesel, Acetylene, electricity) Zero equipment on when not in use	As above	EO	Included in Contractor's obligations

5.4.3 Operational phase

Parameters	Sampling		Indicator	Target	Responsibility	Estimated Cost
	Location and requirements (if applicable)	Method and Frequency				
Water resources / Soil / Heritage / Landscape						
Erosion	Watercourses traversed by the corridor; access roads	Visual inspection; incident reports; annually after rainy season	Erosion Offroad driving	No evidence of erosion No evidence of offroad driving	NamPower EM	Included in NamPower's obligations
Biodiversity / landscape						
Protection of trees and vegetation	Servitude and access roads	Visual inspection; annually	Unnecessary tree felling Ground clear-felled	No evidence of unnecessary tree felling No evidence of clear-felling	NamPower EM	Included in NamPower's obligations
Alien invasive species	Servitude and access roads	Visual inspection; incident report (if necessary) annually	Presence of alien invasive plant species	No evidence of alien invasive vegetation plant species	NamPower EM;	Included in NamPower's obligations
Bird and mammal mortalities	Servitude	Visual inspection; incident report (if necessary) every 6 months	Number of bird and mammal mortalities	No evidence of mortalities	NamPower EM	Included in NamPower's obligations)
	Servitude	Visual inspection; incident report (if necessary) quarterly	Number of bird and mammal mortalities	No evidence of mortalities	Ecologist	Refer to costing table (Table 9.1)
Reptile mortalities	Access roads	Visual inspection; incident report (if necessary); every 6 months	Number of reptile mortalities	No evidence of mortalities	NamPower EM	Refer to costing table (Table 9.1)
Heritage						
Heritage resources	Heritage sites adjacent to access roads	Visual inspection, annually	Erosion	No evidence of erosion	NamPower EM	Included in NamPower's obligations

Parameters	Sampling		Indicator	Target	Responsibility	Estimated Cost
	Location and requirements (if applicable)	Method and Frequency				
Waste						
Waste	All project activities	Records, annually	Waste to landfill avoided (tonnes p.a.) Waste to landfill recycled (tonnes p.a.) Waste to landfill reused (tonnes p.a.)	Minimal waste to landfill	NamPower	Included in NamPower's obligations
Hazardous materials						
Herbicide use	Servitude and access roads	Visual inspection every 6 months Records of pesticide application	Use of herbicide (*If used then refer to relevant monitoring measures below as well as application of checklist in Appendix B*)	No herbicides used (manual bush clearing preferred)	NamPower EM	Included in NamPower's obligations
	Servitude and access roads	Records: Chemical records, training records, storage facilities, application methods, safety procedures, effectiveness of chemical used Annually	Staff trained Choice of chemical Correct application of chemical (season, conditions, procedures) Storage and handling of chemicals	All staff trained / certified All records retained All procedures followed All equipment stored correctly	NamPower EM;	Included in NamPower's obligations
	Areas where herbicide applied	Survey 6 months after application (Year 1)	Impacts on adjacent vegetation from herbicides Impacts on protected tree species from herbicides	No evidence of impacts to adjacent vegetation from herbicides No evidence of impacts on protected tree species from herbicides	NamPower EM	Included in NamPower's obligations

Parameters	Sampling		Indicator	Target	Responsibility	Estimated Cost
	Location and requirements (if applicable)	Method and Frequency				
	Areas near perennial water bodies	Records of complaints Visual inspection after herbicide application and again 6 months after application	Watercourse buffers applied Complaints regarding water quality	No evidence of herbicide application within watercourse buffer areas No complaints regarding water quality	NamPower EM	Included in NamPower's obligations
	Areas where herbicide applied	Survey 1 year application (Year 2)	Extent of coppicing and regrowth	Limited coppicing and regrowth in areas of application	NamPower	Included in NamPower's obligations
Community health and safety						
Signage on electrical infrastructure	On infrastructure and any replacement infrastructure	Visual inspection; on commencement of and as per scheduling for maintenance activities	Signage present	All electrical infrastructure accessible to the public to have signage	NamPower	Included in NamPower's obligations
Occupational health and safety						
EMF safety programme	N/A	Prior to operation	EMF safety programme prepared	To be specified in the programme	NamPower	Included in NamPower's obligations
Cross-cutting issues						
Stakeholder engagement	N/A	Progress reports Registration sheets Complaints forms; Every 6 months	Number of personnel on SEP implementation team Number of SEP actions / activities implemented Budget spent on SEP Number of complaints received regarding SEP	Compliance with SEP Zero complaints relating to SEP activities	NamPower CLO	Refer to costing table (Table 9.1)

Parameters	Sampling		Indicator	Target	Responsibility	Estimated Cost
	Location and requirements (if applicable)	Method and Frequency				
Vulnerable groups engagement	N/A		Number of VGP actions / activities implemented Budget spent on VGP Number of complaints received regarding VGP	Compliance with VGP Zero complaints relating to VGP activities	NamPower CLO	As per above
Community awareness training	At PACs	Refer to VGP methods and frequency of monitoring	Refer to VGP indicators	Refer to VGP targets	NamPower CLO	Refer to costing table (Table 9.1)
Grievance mechanism	N/A	Established pre-construction, incidents monitored monthly during construction; incidents monitored every 6 months during operation	Number of complaints % repeated complaints Average speed of resolution % closed-out % escalated to alternative dispute resolution	Zero complaints, Zero repeated complaints Resolution of complaints within 30 days All complaints closed out Zero complaints escalated	NamPower CLO	Included in NamPower's obligations

5.4.4 All phases

Overall project performance and effectiveness in terms of sustainability will be measured on an annual basis. A detailed biophysical and social baseline document will be produced during the pre-construction phase that provides for a baseline as a reference against which such changes will be measured. The process will identify relevant quantitative indicators and targets. The indicators and targets identified for specific project phases above can be included where relevant.

Parameters	Sampling		Indicator	Target	Responsibility	Estimated Cost
	Location and requirements (if applicable)	Method and Frequency				
Project performance						
Sustainability	N/A	Annual	Indicators and targets to be established once the detailed baseline has been documented. Examples include: • Natural habitat lost / restored (ha) • GHG emissions during project lifecycle (tonnes CO_2 equiv. emissions saved, captured or displaced) • Waste to landfill avoided / recycled / reused (tonnes) • Direct operational jobs (number of women, youth and indigenous people) • Number of training opportunities provided (number of women, youth and indigenous people) • Number of households benefitting • Length of power lines constructed/rehabilitated • Reduction in electricity losses • Total Energy Savings (KWh)		NamPower	Included in NamPower's obligations

6 Training and environmental and social awareness

6.1 Objective

Training is required to ensure that all personnel are trained, qualified and competent as far as environmental and social aspects of their roles are concerned. In addition, communities will also be involved in awareness training to ensure they are aware of the project activities and are encouraged to maintain a safe distance.

6.2 Environmental and social management

6.2.1 Institutional

Training is an essential component needed to build institutional capacity and to ensure that the ESMP is well implemented effectively. It should (1) raise awareness of the ESMP; (2) gain commitment at all levels; and (3) provide people the knowledge and skills they need to comply with the ESMP. This training will also provide insights in cross cutting issues such as climate change, ecosystem services and protection of indigenous and vulnerable groups, including gender related issues.

There should be a distinction between those needing basic training and those requiring more advanced ESMP implementation training to carry out their responsibilities, this includes both social and environmental components. A training needs matrix should be developed to identify NamPower employees and their capacity to undertake implement the various actions in the ESMP, as well as any gaps. On this basis, a detailed training programme must then be developed to meet the needs of the organisation.

An in-house training programme for non-environmental specific personnel (particularly management) that require basic training should be developed and implemented during the pre-construction phase. A sample of relevant topics is included in Table 6-1 below.

Table 6-1: Project staff and involvement per project phase (adapted from IFC ESMS Toolkit, 2015)

Department	Relevant topics for training
Senior management	Introduction to IFC PS and ESMS; sectorial best practices.
ESMP Team	Introduction to IFC PS; environmental legal requirements; identification and evaluation of environmental and social risks and impacts; stakeholder engagement; monitoring of performance indicators; internal auditing; and environmental and social reporting.
HR Department	Introduction to IFC PS 2 – Labour and Working Conditions; hiring, non-discrimination, anti- harassment, remuneration and other labour policies; effective complaint management and resolution procedures for workers; and worker-management interaction.
Workers and managers	Introduction to ESMS; ESMS policies; instructions on new or modified operational procedures relevant to the tasks performed (e.g. waste management procedure; storage and handling of hazardous chemicals; use and maintenance of PPE); emergency response procedures; instruction on complaint management system; worker-management interaction.
Procurement	Supply chain assessment based on environment and social requirements; supply chain audits.

Signed registers for all training must be kept on record.

6.2.2 Contractor

The Contractor must undertake training during construction in the form of induction training and a scheduled series of ongoing sessions (toolbox talks) as indicated below.

6.2.2.1 Induction training

Induction training will be done prior to site establishment and construction commences and a refresher will be conducted after every break (for example the holiday closure period over December / January).

All contractor teams must be briefed on their environmental obligations in terms of this ESMP. Environmental awareness training must also ensure that all workers understand the risks and how to implement effective mitigation measures. It is recommended that training be undertaken by the EO and CLO, with inputs from the Owner's Engineer ECO and Community Manager. The education / awareness programme should be aimed at all levels of management and construction workers within the Contractor's team (handled in separate sections). A translator should be provided where necessary to the cost of the Contractor.

The Contractor should retain attendance registers on completion of any training (all attendees must sign these registers as proof of attendance and comprehension) and make these available on request to the Owner's Engineer ECO, Independent ECO or relevant authority.

Content of the training and inductions **may** include the following (as relevant):

- Material to ensure that all personnel understand their roles and responsibilities and the implications of non-compliance with the ESMP (punitive measures that maybe institute against them directly).
- Material to address, but not be limited to:
    - Contents of the code of conduct and consequences for failing to adhere to them;
    - Basic environmental awareness;
    - Safety on site;
    - Basic hygiene;
    - Prevention of water, soil, and air pollution;
    - Waste management system (hazardous, non-hazardous and domestic wastes);
    - Prevention of soil erosion and sedimentation;
    - Water saving practices;
    - Energy saving practices;
    - Protection of ecological resources;
    - Basic principles of materials handling and storage;
    - Fire risks and prevention;
    - Emergency preparedness and incident responses;
    - Spill response provisions;
    - Social awareness and responsibility (including HIV/AIDS and TB awareness, as well as respect for cultural sensitivities);
    - Chance finds procedures for cultural / heritage resources; and
    - Administrative and reporting procedures.

6.2.2.2 Ongoing environmental training

Relevant environmental site matters, incidents and issues must form part of the Contractor's ongoing environmental training, which could take the form of tool box talk sessions. These sessions must be used as a tool for continuous training of employees and must be conducted weekly. It is also recommended that the toolbox talks are conducted in an interactive way as to ensure the employees understand the content and purpose of the ESMP requirements. The Contractor shall keep records of the environmental subjects discussed in the toolbox talk sessions.

As construction continues, an effort must be made by the Contractor to assess the training needs of workers on site. If necessary, additional training on environmental requirements must be conducted to ensure all workers understand the risks and how to mitigate them.

6.3 Health and safety

For construction, a site specific operational health and safety (OHS) plan is required, refer to Section 5.3.15 and will be developed by the contractor once project detail is known.

For operational purposes, NamPower's corporate health and safety policy, guidelines, standards and operating policies have reference.

6.3.1 Basic OHS training

A basic occupational training program and speciality courses should be provided, as needed, to ensure that workers are oriented to the specific hazards of individual work assignments.

- Training should consist of basic hazard awareness, site-specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate.
- Training should generally be provided to management, supervisors, workers, and occasional visitors to areas of risks and hazards.
- Workers with rescue and first-aid duties should receive dedicated training so as not to inadvertently aggravate exposures and health hazards to themselves or their co-workers.
- Training would include the risks of becoming infected with blood–borne pathogens through contact with bodily fluids and tissue.

Through appropriate contract specifications and monitoring, the employer should ensure that service providers, as well as contracted and subcontracted labour, are trained adequately before assignments begin.

6.3.2 Traffic safety management

Induction for drivers and employees should include traffic safety management as per measures in the Traffic Safety Management Plan (Section 5.3.16).

All workers should have the necessary training to operate the vehicles, plant equipment and attachments they use.

All workers need to know and understand the traffic rules, site and community safety policies, and traffic safety procedures, any restrictions on vehicle size or type.

Training in terms of the incident reporting should be provided during the inductions, providing information relating to:

- Prioritisation of urgent medical treatment for people injured before reporting the incident;
- Who should be informed of incidents;
- How the incident should be reported; and
- What the time limits for reporting incidents and feedback are.

6.3.3 Visitor orientation

If visitors to the site can gain access to areas where hazardous conditions or substances may be present, a visitor orientation and control program should be established to ensure visitors do not enter hazard areas unescorted.

6.3.4 New task employee and contractor training

Workers and contractors, prior to commencement of new assignments, must receive adequate training and information enabling them to understand work hazards and to protect their health from hazardous ambient factors that may be present. The training should adequately cover:

- Knowledge of materials, equipment, and tools.
- Known hazards in the operations and how they are controlled.
- Potential risks to health.
- Precautions to prevent exposure.
- Hygiene requirements.
- Wearing and use of protective equipment and clothing.
- Appropriate response to operation extremes, incidents and accidents.

6.3.5 Other communication

- Appropriate marking of hazardous areas, installations, materials, safety measures, and emergency exits, etc. is required. Signage to be in accordance with international standards and easily understood by all. Refer to Section 5.3.7.
- Labelling of equipment is required - all vessels that may contain substances that are hazardous as a result of chemical or toxicological properties, or temperature or pressure, should be labeled as to the contents and hazard, or appropriately color coded. Similarly, piping systems that contain hazardous substances should be labeled with the direction of flow and contents of the pipe, or color coded whenever the pipe passing through a wall or floor is interrupted by a valve or junction device.
- Communication of hazard codes is required.
- Copies of the hazard coding system should be posted outside the facility at emergency entrance doors and fire emergency connection systems where they are likely to come to the attention of emergency services personnel.
- Information regarding the types of hazardous materials stored, handled or used at the facility, including typical maximum inventories and storage locations, should be shared proactively with emergency services and security personnel to expedite emergency response when needed.
- Representatives of local emergency and security services should be invited to participate in periodic (annual) orientation tours and site inspections to ensure familiarity with potential hazards present.

6.3.6 Operation and maintenance

In addition to the general OHS requirements above, the following training is also required with regards to operation and maintenance:

- Pesticide application – Provide those responsible for deciding on pesticides application with training in pest identification, weed identification, and field scouting; also train personnel to apply pesticides and ensure that personnel have received applicable certifications or equivalent training where such certifications are not required.
- Live power lines – Working within minimum safe working distances that includes the installation, maintenance, or repair electrical equipment, should only be undertaken by trained and certified workers.
- Working at height – Training in climbing techniques and use of fall protection measures is required.
- Electric and magnetic fields - Training of workers in the identification of occupational EMF levels and hazards.

6.3.7 *Monitoring of training*

Signed registers for all induction, environmental training and awareness programmes must be kept on record.

The Contractor must monitor the performance of workers to ensure that the points relayed during their induction have been properly understood and are being followed.

6.4 Community

6.4.1 *Awareness training*

Community awareness training is required at the pre-construction, construction and operational phases of the project for the following activities:

- During construction, to address the risk of contracting diseases, a health awareness and education programme is required to include the following:
  - Communicable diseases – address factors that can influence individual behavior as well as promoting individual protection, and protecting others from infection, by encouraging condom use.
  - Vector-borne diseases - appropriate education materials should also be distributed relating to risks, prevention and available treatment.
  - Gender – address risks specifically to women and girls from non-local workers including sexually transmitted diseases (especially HIV/AIDs) and unwanted pregnancies. Men should also be educated on their support women to women. Include awareness of Gender Based Violence (GBV) prevention and response, including sexual harassment and rape involving both men and women. Educate communities on the relevant legal instruments in this regard.
  - Trafficking – address potential vulnerabilities of the community to trafficking in persons.
- Safety training for the local communities should include:
  - Identification of a liaison point(s) for community facilities such as schools, clinics and community centres through which to disseminate information to communities.
  - Identify suitable means of dissemination of information including pamphlets, fliers, radio announcements and skits at schools. It is essential for children to be included.
  - Forbidden behavior and correct practices to be provided, including bush clearing by fire for agricultural purposes.
  - Pre-construction and construction phase issues include demining, traffic safety, construction site risks.
  - Climate change awareness.
  - Operation phase issues include safety risks with regards to electrical components.
- During all project phases, community training on the incident and grievance reporting mechanism (set out in Section 8), must be made widely available to communities including at public places such as schools, police stations, clinics, community centres, on laminated sheets to ensure that it is readily available when required. This must at a minimum note:
  - Who should be informed of an incident;
  - How should incidents should be reported; and
  - What the time limits for reporting incidents and feedback are.
- With regards to protection of natural resources, training on the Grievance Mechanism should include the request for communities to report any outsiders illegally using natural resources in the study area so that it can be followed up by the CLO.
- Community awareness programmes should be prepared and implemented in consultation with the relevant social workers from the Ruacana Constituency and the Omusati Regional Council. The materials for such training programmes should be packaged in a way that can be replicated for social workers to use on other projects in the future.

- Awareness activities can also consider using existing networks for communication such as the Childcare and Protection Forum (CPF). The social workers should advise in this regard. It can also be considered to have a NamPower representative in the forum.

6.4.2 Technical training

- During all project phases, where communities are employed, appropriate training should be provided with the intention of skills development and capacity building so that these skills could be transferrable to projects in the future. Areas of potential training include bush clearing, identification of alien vegetation, environmental monitoring etc.
- Training should be specially tailored for Vulnerable Groups, specifically Indigenous Peoples due to the language barrier, skills levels and any cultural sensitives. Furthermore, women should also receive tailored training to build technical competencies.
- Women from affected communities should be hired and trained to implement education and awareness raising activities.
- This could form part of the Local Employment and Procurement Plans described in Section 5.3.11.

7 Emergency preparedness and response

It is important to prepare to respond effectively to prevent and minimise any harm to workers, community and the environment, should a momentary lapse or gaps in the system (e.g. someone not properly trained, someone not following the procedures, a machine breakdown), or an external force (e.g. natural disaster) that can lead to an accident or emergency situation at the site or facility. This is a Framework Plan, a detailed Emergency Preparedness and Response Plan should be developed for the construction and operational phases, taking into account the relevant policies and standard operating procedures of NamPower.

7.1 Hazard identification

Construction activities for the project can pose potential hazards or threats. The most effective response to any situation is awareness of the hazard, its potential effects and consequences, and an understanding of the resources and actions necessary to respond. Listing all the potential hazards and a detailed each response is not appropriate for this Framework Plan.

Reponses to different events may vary as the event evolves, but reasonable response methods and responsibilities will be determined in future updates to this Plan. Scenarios that may be considered are, *inter alia*:

- Equipment or structure failure
- Electrocution
- Serious personal injury or fatality (e.g. vehicle accident or snake bite etc.)
- Weather
- Natural disasters
- Evacuation

Responses should be identified for each scenario, Table 7-1 serves as an example.

Table 7-1: Example of an emergency response procedure

Purpose and Scope	Set out the responsibilities and activities to respond to a fire related emergency.
Definitions	**Fire emergency** A situation which poses or signals an immediate threat in the form of uncontrolled fire of imminent threat of uncontrolled fire, smoke or burning, uncontrolled release or spillage of flammable or combustible substances and sounding of the fire alarm.
Responsibility and Authority	Project Manager Health and Safety Officer **Approving Manger: Construction Manager**
Emergency Response Team	Emergency Co-ordinator
Training	Induction training Training in fire-fighting equipment
Reference Documents	Evacuation plan, site plan with location of assembly points, firefighting equipment and first aid stations.
Records	Training logs, drill logs, firefighting and medical equipment maintenance, and inspection logs.
Issue/Revision date	Issue 1

Response
If a fire is discovered, report it to the site office immediately or to one of the emergency telephone numbers.
When the alarm (siren) sounds, commence with the evacuation drill.
Take all your valuable items with you.
Determine if the fire can be extinguished within an appropriate time limit with the portable equipment on site. If the equipment is sufficient, use it to extinguish the fire. If not, call the fire department, activate the alarm and evacuate.

7.2 Responsibilities

NamPower and the Contractor are responsible for the effective response to any emergency situation or event related to the construction, operation and maintenance of the project. To ensure a coordinated and effective response, a chain of command will be developed as part of this Plan and followed in the event of an emergency.

In the establishment of a chain of command, considerations such as the level of activation and the participation necessary to respond to specific situations are to be taken into account. The following are factors for the establishment of a chain of command:

- Type of event (natural, environmental, electrical supply/outage, external forces)
- Severity and geographic area (multiple or combination of events)
- Anticipated duration
- Multi-division/discipline response required
- External agency coordination

7.3 Emergency communications

A communications diagram must be included in the Plan to allow for easy interpretation and reaction times.

An emergency contacts list must be developed so that the relevant public and emergency response agencies are contacted.

This emergency contact list shall be developed at the start of construction and updated throughout the project by the contractor to ensure accurate contact information.

Emergency plans and contact lists should be kept at easy to access locations for quick access.

7.4 Ongoing activities

Procedures should be prepared for:

- Induction should include these emergency procedures and responsible personnel should be trained accordingly.
- Documenting first aid and emergency medical treatment.
- Reviewing and updating the emergency response plan to reflect changes and ensuring that employees are informed of such changes.
- Using, inspecting, testing, and maintaining the emergency response equipment.

8 Grievance mechanism

8.1 Objective

The Grievance Mechanism (GM) refers to a complaint instrument through which project affected persons and communities may raise their concerns to the project developer and find ways through which these grievances could be handled throughout the project lifecycle. It also provides a mechanism for workers to raise workplace concerns during the construction phase. Refer to the SEP and RPF for more detail on external stakeholders in this regard.

8.2 Terminology and definitions

The Grievance Mechanism uses the following definitions:

- **Complainant**: an individual, community group or organisation that submits a verbal or written complaint against the project or Contractor;
- **Complaint or grievance**: any expression of dissatisfaction with the project/Contractor activities that complainant wants to resolve. Grievances usually refer to actual or perceived specific incidents, damage or impact;
- **Dispute**: a point of disagreement between the project and one or more aggrieved parties.
- **Concern or issues**: concerns or issues can be defined as a question, comment, requests for information, or general perceptions that may or not be related to a specific impact or incident. If not addressed satisfactorily, concerns may become complaints.

8.3 Publicising of the Grievance Mechanism

For the GM to work effectively, the process must be known by potential complainants and considered legitimate for them. Thus, the GM and avenues for lodging a complaint will be widely publicised within the project area.

8.4 Construction

The Contractor will erect a project signboard where they are working and maintain it throughout the construction period. The sign shall contain the relevant emergency telephone numbers and email address where specific site project staff can be reached and where grievances may be lodged. As part of the SEP, the mechanism will be also communicated verbally at communities and public meetings during community engagement.

The Contractor should also inform their workers of the grievance mechanism as part of their induction and make sure it is accessible to them and that they are aware that anonymous grievances may be lodged.

Existing networks such as the Childcare and Protection Forum (CPF) can be used to report grievances. Social workers from the Ruacana Constituency and Omusati Regional Council should advise in this regard. It can also be considered to have a NamPower representative in the forum.

8.5 Operation

The Implementing Agent will erect a project noticeboard at conspicuous locations along the servitude or in public places in settlement areas along the route, providing the contact details (telephone and email) where grievances may be lodged.

Existing networks such as the Childcare and Protection Forum (CPF) can be used to report grievances. Social workers from the Ruacana Constituency and Omusati Regional Council should advise in this regard. It can also be considered to have a NamPower representative in the forum.

8.6 Grievance management process

The GM follows the steps presented below, beginning with the receipt of the complaint and ending with its resolution or close-out.

1. **Receive:**

Any project affected party who has a reasonable belief that a DBSA funded project or programme may potentially result in a health or environmental risk or adverse impact may raise a concern or report a complaint verbally in person or through a trusted representative (face-to-face or by phone) or in writing (letter or e-mail) through any of the following channels:

- Community Liaison Officer (CLO), (during project construction and operation);
- Contractor local office, in project area (during project construction);
- NamPower local office branches (during project operation); and
- DBSA Grievance Manager: Libby Dreyer, Tel: +27 82 888 6258 / +27 11 313 3507, E-Mail: libbyd@dbsa.org; or
- https://www.dbsa.org/EN/About-Us/ContactUs/Pages/default.aspx

The concerns or grievances must be genuine and be raised without malice and in good faith. When reporting a concern or grievance it is important that the complainant provide sufficient information that will enable thorough investigation. When a verbal or written complaint is received the ELO record these in the complaints form with as much detail as possible (data, time, name, contact details, preferred means of contact, nature of grievance or complain) and forwards it to complaints coordinator. The complaints coordinator assigns a unique registration number, enters the complaint into the complaints database.

2. The Project Grievance Form in the SEP can be used to gather complaints. **Acknowledge:**

Once a complaint has been registered, complainants should receive a timely acknowledgement that their case is in the system. The complaints coordinator prepares a letter of acknowledgement of receipt and the CLO delivers the letter to the complainant or its representative (face-to-face) and verbally explains the next steps and their timeframes. When delivery of a letter is not possible, the acknowledgement should be in another culturally appropriate manner (for example, in person).

Acknowledgement will be occur within 24 - 48 hours of the complaint being received and acknowledgement of receipt of the concern and/or grievance will be communicated to the complainant through email and/or in writing.

3. **Assess and assign:**

The complaints coordinator undertakes preliminary screening of the complaint to determine whether: (i) it is a complaint (not a concern or issue); (ii) the complaint is related to project activities or whether it needs to be referred to another party; or (iii) the complaint involved an allegation about human rights violation or possible criminal activity. Grievances outside the GM scope should be referred to an appropriate office/level for handling through different processes.

The level of severity can help to quickly identify what action is required to address the grievance in proportion to its potential impact. The grievances classified can be classified as “low”, “moderate” or “high”.

Conducting a rapid assessment (within 24 – 48 hours) can help to satisfactorily address smaller issues, so that they do not escalate. It can also remove the need for investigation and if possible close out the complaint. Many complaints can be addressed quickly by the complaints coordinator. However, if assessment indicates that complaint is complicated or the facts are less clear, a field investigation will be initiated to provide evidence for analysis and to support the resolution and assign to the department with the technical expertise to conduct the investigation or that is associated with the complaint.

4. **Investigate:**

Depending on the nature of the complaint, the investigation may need to involve specialists and should take steps to build confidence in the fact-finding process:

- An investigation will be conducted as speedily as possible and the outcomes / action plan communicated to the complainant within three weeks (15 working days);
- Ideally, investigators should meet face-to-face with the complainant. The investigation team could encourage complainants to be accompanied by their representative;
- Consider using interpreters to avoid misunderstanding;
- Document the facts: the investigation team should prepare a succinct report on investigation findings. All information gathered should be maintained and/or logged to ensure that a company response is fully documented; and
- Ensure coordination with the investigation team and the complainant: throughout the investigation process, complainants should be kept informed on progress. If the company is unable to provide a response within an agreed period, an updated time frame should be provided.

5. Response:

The grievance investigations will be reviewed at monthly project meetings and will remain active until resolved and an official response provided to the aggrieved. The outcome of the investigation will inform if:

- Complaint is found to be unrelated to the project. In this case, the complainant is informed (other avenues can be suggested) and the complaint is recorded as closed;
- There is evidence to prove that the complaint is false, the complainant is informed of the investigation's findings and the complaint is recorded as closed;
- Complaint is found to be unsubstantiated, the complainant is informed of the investigation's findings and other possible avenues can be indicated;
- Complaint needs resolution options. It is important to verify that the proposed resolution addresses the root cause of the grievance to minimise the chance of recurrences. It is also important check whether the proposed resolution is in line with the complainant's human rights (and that, in solving the complainant's grievance, it does not infringe someone else's rights); and
- Where feedback within three weeks (15 working days) is not possible, the person, community of project stakeholder will be notified of the reason of the delay.

In some cases, the proposed resolution should be discussed with the complainant rather than unilaterally announcing the verdict. The complainant should have an opportunity to accept or reject the proposition or offer an alternative for discussion. Dialogue and negotiation should take place on an equal power base (this means that the complainant should be allowed to bring their representative to accompany them during discussions regarding the response to the investigation). If the response is rejected, another resolution process may be needed.

The final agreement should be made both verbally and in writing. It must be specific, time bound, agreed by both parties and generally remain confidential. However, complainant themselves may choose to make the outcome public.

The DBSA Stakeholder Engagement and Information Disclosure Standard (ESSS 2) makes provisions for circumstances where a complainant is unable to obtain an adequate response. In this case, the complainant should bring their concerns directly to the DBSA's attention, following the procedures outlined on the web. These procedures should be shared with stakeholders so that they can follow the correct approach if the situation arises and will form part of the Grievance Plan.

6. Resolve or appeal:

The GM should consider a recourse or appeals mechanism for complaints where the complainant and the operation cannot reach agreement. If access to judicial process is complex, very expensive or unavailable, the project and the complainant may mutually agree to negotiation facilitated by a neutral third party (mediation professional or organisation, an NGO, a lawyer or other respected local, national or international figure). This neutral third party will be agreed between the Project and the complainant or aggrieved parties. Findings will be non-binding to either party and they will not preclude either party pursuing legal action.

7. Follow up and close out:

Once a resolution has been agreed or a decision made, response must be implemented and monitored (adjustments may be necessary to ensure that the root causes of complaints are addressed and outcomes are consistent with the spirit of the original agreement with the complainant).

Grievance close-out occurs after the implementation of an agreed resolution has been verified. Results must be documented and parties' evaluation of the process must be request (close-out form). Even when an agreement is not reached, it is important to close the case.

Conduct a follow up and close out can help to maintain the complainant's trust. It is suggested that implementation of response and complaint close-out occur within thirty days of the complaint being received.

9 Budget for ESMP implementation

At this stage of the project lifecycle, a full suite of management plans and procedures have not yet been developed. The core management plans, some of which have been developed as frameworks will still need to be expanded on once the project design is finalised.

With regards to construction, this ESMP will form part of the construction tender documents to be published to ensure that the activities required to be placed under the responsibility of the Contractor will be accurately costed as part of their proposals.

The following table provides a preliminary ESMP budget estimate, based on the main costs for implementation, including all remaining plans and procedures that need to be developed. For operation, a 5-year period has been provided, after which it is recommended that the inputs and associated costs are reviewed.

It should be noted that this budget should be refined once the detailed design is available and there is more certainty regarding project activities. The resettlement and compensation costs specifically require revisiting; also once the opportunity for net positive contribution of the project has been further considered (as listed in Section 8.7 of the ESIA), this budget can be refined.

Table 9-1: Budget for implementation

Item / Action	Assumptions	USD	USD (5-yrs)	TOTAL (USD)
Pre-construction Phase				
Project Environmental and Social Management System		100,000		100,000
Project Stakeholder Engagement Plan (including VGP activities)		100,000		100,000
Project Resettlement Action Plan	Upper range based on number of PAPs, travelling costs, number of engagements, political interference, disagreement on compensation, project design changes.	70,000		70,000
Compensation of Project Affected People (through RAP)	Cost estimate of the physical resettlement in Namibia including a 15% disturbance allowance	110,850		110,850
Detailed Project Baseline (as reference for Monitoring & Evaluation, M&E)	20 days	11,000		11,000
Project Performance M&E Plan	60 days	35,000		35,000
Ecologist walkdown, mapping of sensitive areas (including engagements with team) and input to contractor specs for rehabilitation requirements and assistance on adjudications	10 days (including travel costs)	6,500		6,500
Ecologist to prepare a booklet on protected tree species as a NamPower resource	5 days	3,000		3,000
Heritage walkdown and mapping, including revision of Grave Relocation Plan (GRP) and engagement with SE specialist	15 days (including travel costs)	10,000		10,000
Water plan (as per VGP)	Extent of water infrastructure to be revised after quantification of affected VG	35,000		35,000
Community Education and Awareness Plan (as per VGP)	Preparation of materials, training of CLO & SHEW, pilot training sessions, follow up (10 days plus travel)	10,000		10,000
Institutional Training - basic ESG and ESMS awareness	10 days (materials and training) plus travel	7,000		7,000
Institutional Training - implementation of ESMP	10 days (materials and training) plus travel	7,000		7,000
GHG Plan	5 days	3,000		3,000
Emergency Preparedness and Response Plan	2 days	1,500		1,500
Bird flight diverters	17 km (R57,600 / km)	70,000		70,000
'Net positive contribution' initiative	Estimation of current preferred option	350,000		
			Sub-Total (USD)	**929,850**
Construction Phase				
Ecologist monitoring	5 x 2 day visits (10 days including travel costs)	9,000		9,000
Ecologist environmental awareness materials and training (capture and removal of fauna, identification of dangerous / protected species etc.)	5 days (including travel costs)	4,000		4,000

Item / Action	Assumptions	USD	USD (5-yrs)	TOTAL (USD)
Heritage monitoring	4 visits (including travel costs)	10,000		10,000
Heritage specialist to update of DHMP	Annually (therefore 2 times)	1,500		1,500
Heritage environmental awareness materials and training (identification of resources and procedures)	5 days (including travel costs)	4,500		4,500
Heritage specialist to implement Chance finds mitigation	As and when required (per site)	3,500		3,500
Water quality sampling (when working across Kunene River)	Cost per month (assume 3 months max)	1,500		1,500
Stormwater quality sampling (ad hoc)	Cost per sample (assume 2)	500		500
Air quality sampling (ad hoc)	Cost per sample (assume 1)	5,000		5,000
Noise sampling (ad hoc)	Cost per sample and reporting (assume 1)	5,000		5,000
Community awareness training (support)	1 day every 6 months (including travel)	10,000		10,000
			Sub-Total (USD)	**54,500**
Operation Phase (*annual costs only included for first five years of operation)				
Ecologist bird and mammal monitoring	Annually - 20 days (4 visits per year including travel costs)	10,000	50,000	*50,000
Ecologist training maintenance staff on identification of alien plant species	Once -off - 1 day	3,000		3,000
Ecologist monitoring of herbicide management plan (including water quality sampling)	Annually - 10 days (including travel costs)	3,000	15,000	*15,000
			Sub-Total (USD)	**68.000**
Decommissioning Phase				
Decommissioning Plan	15 days (including travel costs)	10,000		10,000
			Sub-Total (USD)	**10,000**
			GRAND TOTAL (USD)	**1,062,350**

10 ESMP reporting, monitoring and auditing

The ESMP is a working document as described in Section 5.1 and requires continual review to ensure performance is maintained.

10.1 Monitoring

10.1.1 Pre-construction and Construction phases

The Owner's Engineer ECO will routinely monitor the site for compliance with the ESMP and must engage with the other parties where relevant. Activities include the following:

10.1.1.1 Routine site meetings:

- The purpose of the meetings will be to discuss general construction progress. The meetings must be held between the Implementing Agent, Contractor, the Owner's Engineer and their ECO and Community Manager.
- Monthly meetings to align with the compliance inspections below.
- Minutes shall be kept of these meetings.

10.1.1.2 Routine compliance inspections:

- Monthly for all active sites, or at the defined intervals as provided in the conditions of the ECC if these are more frequent.
- Inspections include visual inspections and consultations / interviews with other staff e.g. EO, or CLO.
- Documenting the findings of each of the inspections. This may take the form of a diary entries, a checklist, a report or similar, but should include dated photographic evidence of any identified issues (where possible). Any findings of non-compliance must be clearly communicated to the Contractor, together with timeframes for the implementation of remedial action and close out.
- Inspections should include any environmental related grievances that have been reported to the CLO or Owner's Engineer Community Manager.

10.1.1.3 Monthly reports:

These summarise the findings of the routine compliance inspections and progress on any remedial action required during the month in question.

- In the event of non-compliance, the report may include:
  - Relevant/ supporting documentation or evidence of the non-compliance (e.g. minutes of any meetings held to discuss the non-compliance, email/written correspondence on the matter, dated photographic evidence).
  - Remedial action to remedy non-compliance or prevent recurrence, including responsible persons and deadlines for actions.
  - Date of close-out by the Contractor on previous non-compliance findings.
- Reports must be made available to the Implementing Agent's Project Manager and the Contractor and to the environmental authority on request.
- Attend monthly progress meetings with the Owner's Engineer and Contractor.

The monthly reports must also include the record of all monitoring activities performed within the concerned month, as defined in Section 5.4.

10.1.1.4 Quarterly reports

The quarterly reports summarise the events and actions taken within the monthly reports and assess the monitoring records against the targets set out in Section 5.4. These reports provide an opportunity to check whether the indicators and targets set, are adjusted to the project reality and mitigate the anticipated

impacts, and whether the residual impacts are within the expected range. If deviations for set targets are identified, these reports should be used as a tool to assess the causes for these deviations and, if the level of non-conformities is considered high, to review and adjust the proposed mitigation measures to ensure that environmental and social performances are kept within the required standards.

These summary reports can also act as an opportunity to include enhancements to the project performance and/or adjust the targets to higher levels, if a positive pattern is detected.

The quarterly reports should be submitted to the Implementing Agent, Owner's Engineer and Independent ECO for information and comment.

10.1.1.5 Annual report

The annual report compiles, assesses and summarises the information set out in the quarterly reports. This report provides an overview of the project performance over the period of a year, and should be submitted to the Environmental Authorities (if required) and Sponsors, as proof of environmental and social performance of the project, after being reviewed and approved by the Implementing Agent, Owner's Engineer and Independent ECO.

10.1.1.6 Environmental Incident Reporting

- The Contractor shall document any environmental incidents that occurred as a result of the construction activities, and any resulting action taken to remedy the harm, and/or prevent repeat occurrences.
- The Contractor should notify the Owner's Engineer and their ECO about all the environmental incidents that have occurred on the site during the relevant reporting period.
- The Contractor must ensure that all the environmental incidents are investigated and that remedial actions are implemented to address the root causes of the incidents.
- The Owning Engineer's ECO monitors that the Contractor follows the necessary procedures and responses to close out the incident within the specified timeframe.
- The Owning Engineer's Community Manager and CLO should be involved where necessary to ensure any incidents that affect PAPs / PACs are communicated and followed up effectively.

10.1.1.7 Reporting

10.1.1.7.1 Record Keeping

Copies of documentation required by the ESMP must always be available on site; they shall be retained, they shall be easily retrievable for the duration of the Contract and shall be filed by the Contractor for a minimum of 12 months after contract completion.

These records and documents must be made available to the Contract Manager, the ECO, the competent and environmental authorities upon request.

At least the following documents must be kept in the environmental file:

- Copies of all monthly, quarterly and annual reports, as requested in this ESMP
- Records of all monitoring/sampling campaigns performed within the scope of this ESMP, as defined in Section 5.4
- Records of negotiations relating to land access and physical access plans
- Copy of this ESMP Report and associated management plans
- Copy of the ECC
- Copy of water use licenses
- Copy of all other relevant permits, licenses and wayleaves
- Environmental incident reports
- Staff induction attendance registers
- ECO audit reports
- Certificates for waste disposal
- Disciplinary action (including time penalties or monetary fines) for environmental transgressions

- Other environmental audits e.g. authority audits
- Photographic records must show conditions before construction and post construction after rehabilitation.

Stakeholder related documentation in relation to the SEP, the VGP or the GM is also to be retained on site. This includes the following:

- The Complaints Register managed as part of the Grievance Mechanism (refer to Section 8)
- Any agreements with PAPs/PACs as part of the SEP, the VGP or the GM shall be recorded in writing, signed by all parties (including the Implementing Agent) and filed.

10.1.1.8 Non-conformance with the ESMP

If a transgression of ESMP conditions; of the Owner's Engineer, their ECO, or Authority instructions; or legal requirements occurs due to negligence, or due to wilful disregard, this could result in disciplinary action (e.g. a time penalty or a monetary fine, withholding payment certificates if in accordance with the terms of Contract, or legal action). The terms of Contract shall include mechanisms for disciplinary action (such as the issuing penalties, fines or dismissal or removal from site of certain persons or equipment), and the recovery of monies due (including for any remedial costs where these were born by a third party).

The Contractor is required to comply with the environmental management requirements of this ESMP at all times. Any failure on their part to do so will entitle the Owner's Engineer Project Manager, in consultation with their ECO, to impose a fine, where deemed necessary. The value of the fine will be agreed between the Owner's Engineer Project Manager and their ECO based on the nature, extent and duration of the offence and subsequent environmental damage. Such penalties shall be payable in addition to any remediation costs for correction of environmental damage caused by the non-conformance.

In addition, the Owner's Engineer may also instruct the Contractor to remove from site any person(s) who in their opinion is guilty of misconduct, incompetent or grossly negligent or guilty of repeat non-conformances.

Where the Owner's Engineer Project Manager deems the Contractor to be in breach of any of the requirements of this ESMP, he/she may order the Contractor to suspend the progress of the works or any part thereof.

The Owner's Engineer and their ECO also has the authority to stop any works until the matter is resolved if, in his/her opinion, there is or may be a serious threat to or impact on the environment; caused directly by the Contractor's actions or activities. In all such work stoppage situations, the Owner's Engineer ECO is to inform the Contractor of the reasons for the stoppage within 24 hours.

In the event of a non-conformance, the EO will be required to compile an Incident Report. This report must describe, in detail, the cause, nature and effects of any environmental non-conformance by the Contractor. The Incident Report must be updated on completion of the corrective measures. The report must indicate whether the remediation measures have been implemented timeously and assess the effectiveness of the remediation measure in order to close out the non-conformance to the satisfaction of the Owner's Engineer ECO and Project Manager.

The Contractor is deemed to have contravened the ESMP and/or the specification above if:

- Within the boundaries of the works, site extensions and access roads there is evidence of contravention of the requirements of the ESMP;
- Environmental damage ensues due to negligence and repeat offences;
- The Contractor fails to comply with corrective or other instructions issued within a specific time;
- The Contractor fails to comply with a site instruction given by the Owner's Engineer based on the their ECO's report;
- The Contractor fails to respond adequately to complaints from the public; and
- The Contractor is found guilty or pays an admission of guilt fine for non-compliance with environmental legislation.

10.1.2 Operational phase

Compliance monitoring by the Implementing Agent during the operational phase can take place less frequently, as required by the Implementing Agent's management procedures, the lender requirements and/or the ECC (whichever requires the most frequent monitoring). However, it is recommended to be undertaken twice a year (6 month intervals) - once during the dry season and once during the rainy season.

Monitoring should include compliance inspections and associated reports and meetings with the Implementing Agent on site if deemed necessary.

10.2 Auditing

An on-site verification audit programme is required and will define scheduling, conducting, and documenting of internal and external health, safety and environment audits. It should focus on the following:

- Avoidance of recurrence of non-conformances;
- Execution of timeous corrective actions;
- Conducting follow ups with site management to ensure that non-conformance is corrected and recommendations are implemented within required timeframes;
- Report any areas of non-compliance to corrective actions to the Implementing Agent's Project Manager and/or relevant management structure; and
- Ensures methodical record-keeping.

The Implementing Agent has responsibility for ensuring audit recommendations are undertaken and are used as an input to update the ESMP where necessary.

An Independent ECO has been included in the organogram (see Section 4.7) to provide the role of independent auditor for all phases of the project.

10.2.1 Construction phase

During construction, an external auditor should be appointed to audit the project 6 months after commencement of construction, thereafter every 6 months.

The auditor shall prepare a report documenting the effectiveness of environmental management, problem areas, remedial actions proposed and taken, and compliance/non-compliance by the Contractors with the regards to the ESMP.

The results of the audit will be discussed in project lessons learnt, ongoing environmental and social awareness training (e.g. tool-box talks), and project meetings, to ensure that best practice continues to be adopted on the ground.

On completion of construction activities including rehabilitation, a close-out audit must be undertaken.

10.2.2 Operational phase

During operation, the ESMP should be audited every five years by an external auditor depending on the requirements of the third parties.

10.3 Safeguard Reporting

It is a requirement of the lender (DBSA) that safeguard reporting is undertaking every 6 months and this should be undertaken both during construction and operational phases. It is the responsibility of the independent ECO. This will include results and records of the monitoring of the indicators included in Section 5.4. In addition, the project performance indicators set out in Section 5.4.4 will be reported on an annual basis and recommendations provided in order to support an adaptive management approach.

10.4 Review

Continual updates to the ESMP are required as part of the Plan-Do-Check -Act cycle. The findings of monitoring and audit results should inform these iterative changes. However in addition, as and when the scope evolves, the specifications or requirements contained in this ESMP may need to be reviewed and amended to ensure applicability to the project.

It is recommended that the Implementing Agent reviews the ESMP on an annual basis during pre-construction and construction phases, and every five years during the operational phase. Additional reviews can be undertaken in the event of any major project or institutional changes.

The review should include the identification of additional environmental and social risks that may have emerged since the commencement of the project and establish appropriate mitigation measures for such risks. This is done in consultation with the relevant environmental authority for approval.

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APPENDICES

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Appendix A: Maps

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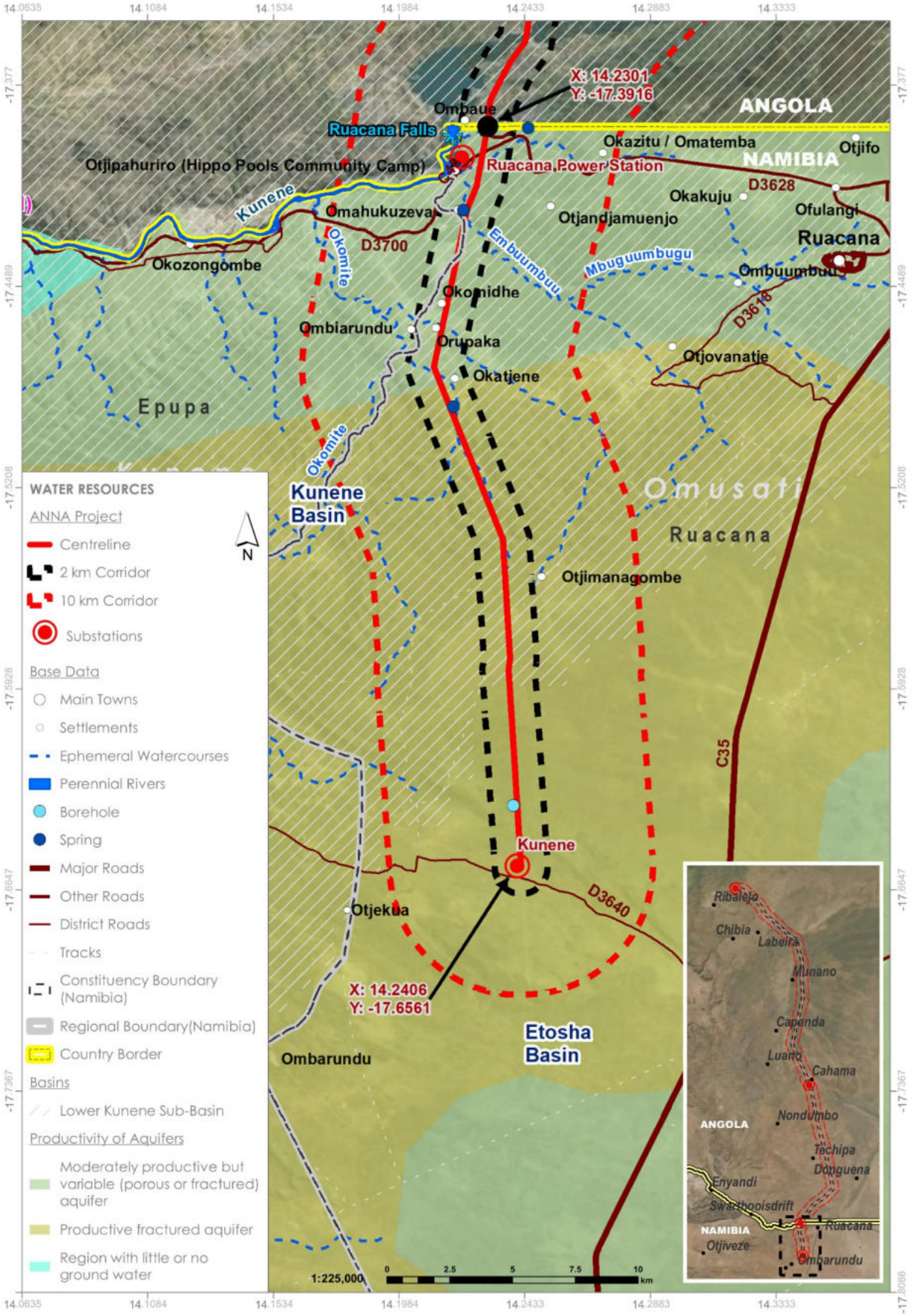
Appendix A1: Watercourses



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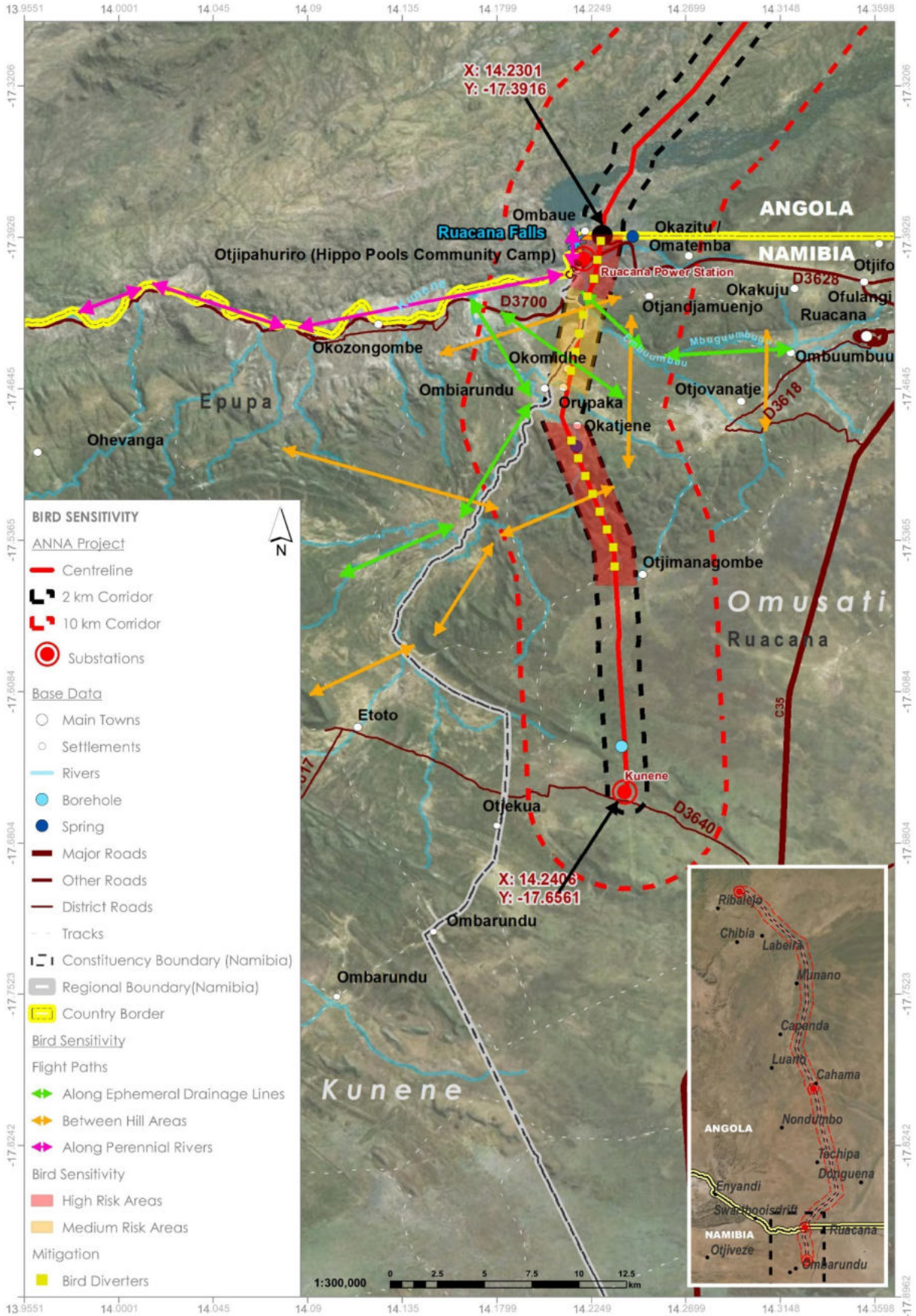
Appendix A2: Bird flight diverters



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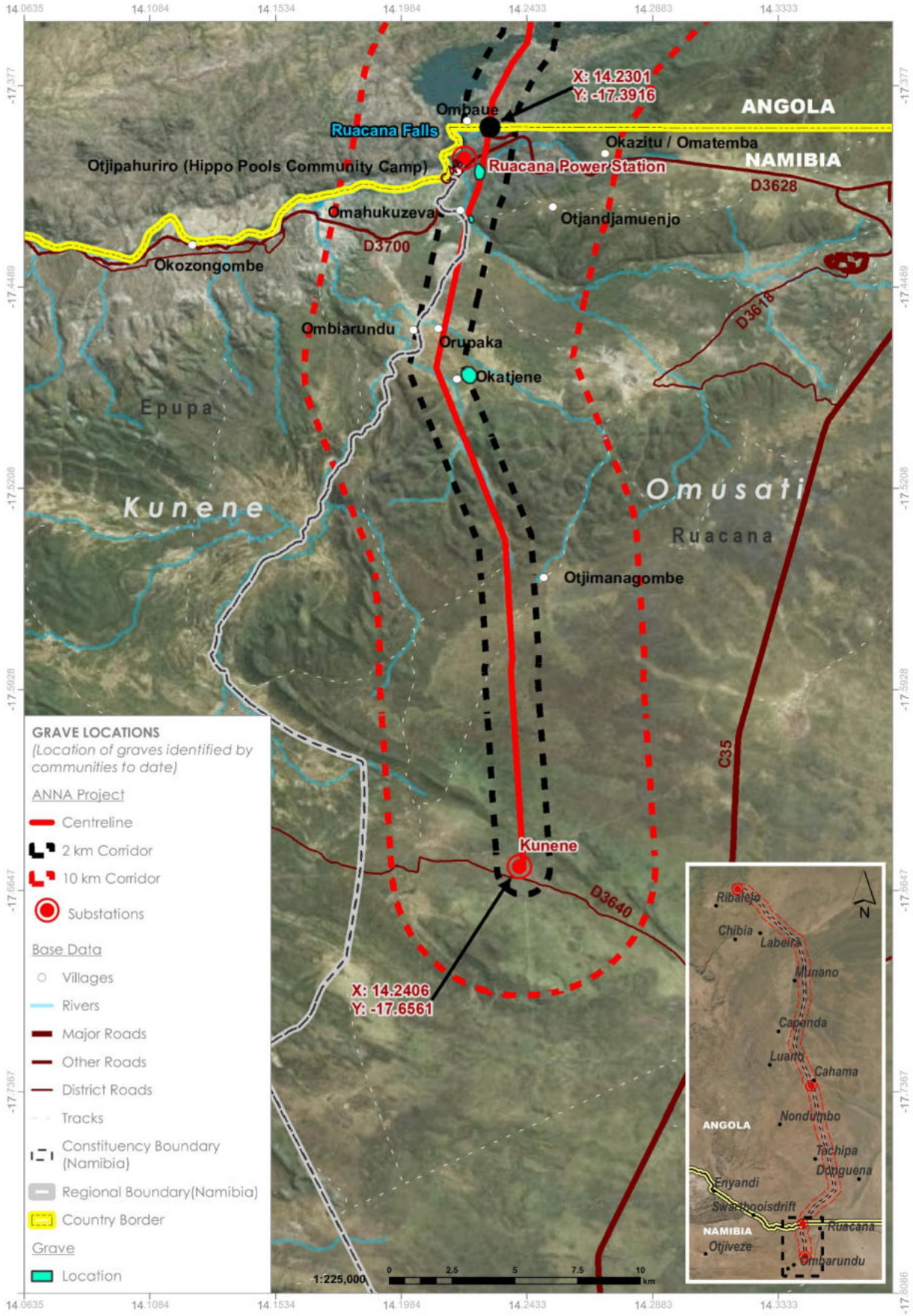
Appendix A2: Grave locations



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Appendix B: Herbicide application for bush clearing

Management of Bush thickening along the route

Management units

The estimated distance between the Ruacana and proposed Kunene Substations is in the vicinity of 30km. The most important areas would be those identified as “high biodiversity” – i.e. Kunene River (High), mountains (high) and ephemeral rivers (medium) or 0-4.2 km and 10.9-18.4km from the Ruacana Substation area (see Figure 1 and Table 1).

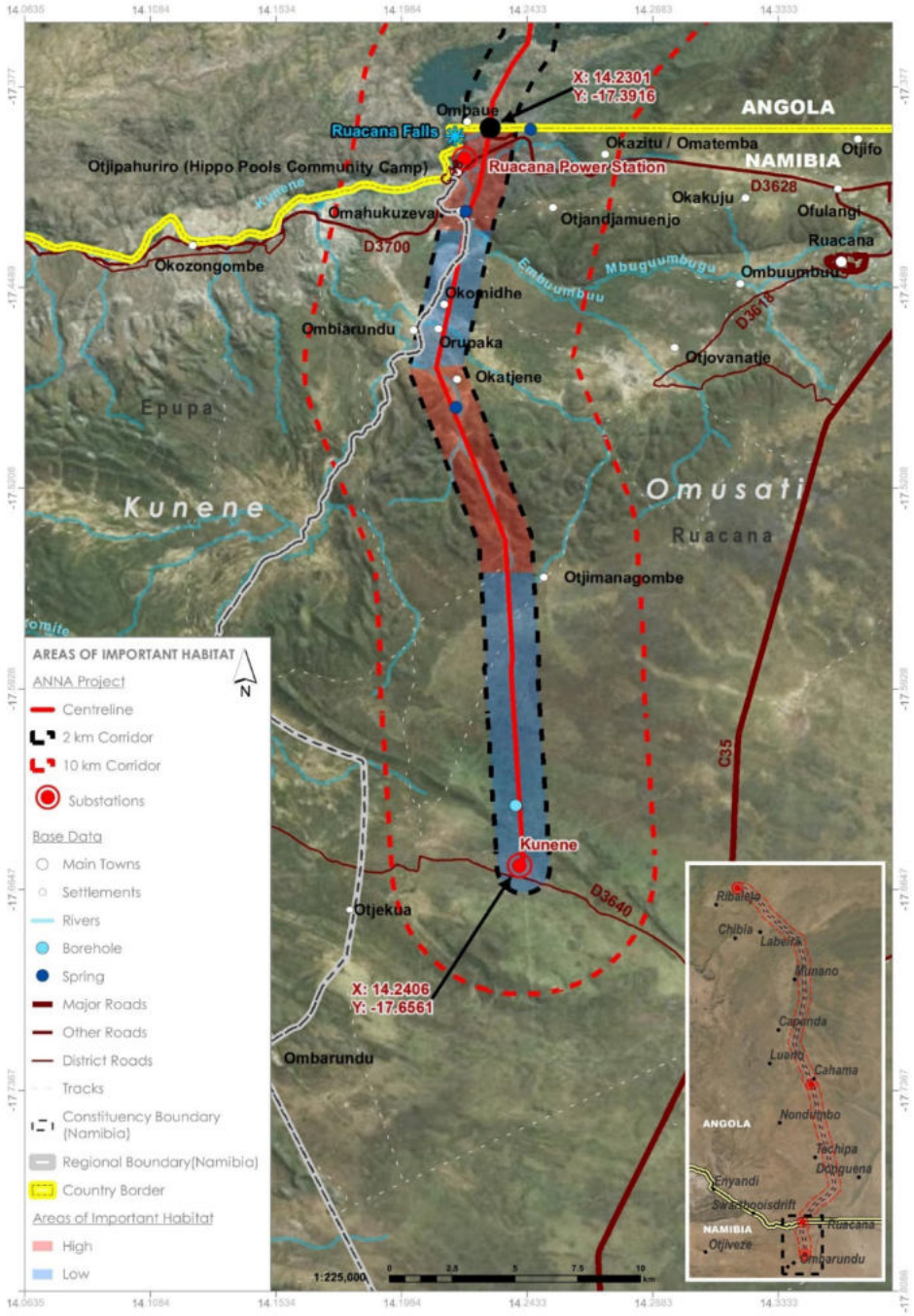

Figure 1: Areas of important habitat

For bush clearing purposes the route could be divided into the following management units:

- A. High biodiversity areas – manual clearing only (no herbicide application allowed);
- B. *Dichrostachys cinerea* dominated areas – manual and herbicide clearing only (no mechanical clearing allowed); and
- C. Other areas – sandy areas = mechanical and herbicide clearing; rocky areas = manual and herbicide clearing.

The *Dichrostachys cinerea* dominated areas would have to be determined prior to access route clearing operations commence in a proposed walkdown.

Table 1. Areas of importance, with protected species potentially affected, between Ruacana and Etosha NP [Direction: Ruacana to Etosha NP] (Cunningham 2015)

Distance (km)	Area	Important species	Common names	Other important features	Importance ranking
0 to 4.2	Ruacana area	*Adansonia digitata* *Colophospermum mopane* *Sterculia africana*	Baobab; Mopane; African star chestnut	Escarpment	High
4.2 to 10.9	Ruacana area	*Colophospermum mopane*	Mopane		Low
10.9 to 18.4	Ruacana area	*Adansonia digitata* *Colophospermum mopane* *Sterculia africana*	Baobab; Mopane; African star chestnut	Mountains; Fountains	High
18.4 to 88.7	Opuwo area	*Colophospermum mopane*	Mopane	Calcrete pans; Opuwu Rd	Low

Areas outside the 31.8km – i.e. south of the proposed Kunene Substation area – are not relevant for this study.

Management objectives

The main objective is to maintain the access routes for inspection/maintenance purposes – i.e. avoid bush thickening hampering such activities.

Areas with high biodiversity and *Dichrostachys cinerea* dominated areas should be avoided and/or treated separately.

Should bush thickening become a problem along the access route in future the following should be implemented:

- Preventative measures – attempt to prevent this occurring by applying the correct treatment method along the various management units – see above;
- Detection methods – inspection/maintenance records should identify problem species and areas before these become untenable;
- Rapid response measures – contractor or own staff employed to deal with immediately; and
- Monitoring – ensure that bush thickening issues are dealt with timeously.

Herbicide Control

Introduction

Numerous herbicides/arboricides are commercially available for the combating of bush thickening in Namibia (the following section is adapted and derived from: Cunningham and Joubert 2002). Two broad types i.e. soil and foliar applied herbicides are available for use locally. Brand names such as Access,

Bushwacker, Garlon, Graslan, Grazer, Grazon, Hyvar, Molopo, Pathway, Reclaim, Roundup, Savana, Spike, Tordon, Ustilan are currently in use or have been in use until recently in Namibia and Southern Africa. Although research into the effectiveness of some of the different herbicides has been conducted (Versveld 1988), very little research has focused on the ecological consequences of chemical control measures, especially in Namibia.

The main active ingredients used in herbicides commonly used and locally available are:

- bromacil/ethidimuron/tebuthiuron (e.g. Bushwacker, Graslan, Grazer, Molopo, Reclaim, Savana, Spike);
- glyphosates (e.g. Roundup);
- picloram (e.g. Access, Grazon, Pathway, Tordon); and
- triclopyr (e.g. Access, Garlon, Grazer).

According to Verdoorn (*pers.com.*) herbicides in general have a very low toxicity towards animals, including mammals, fish, amphibians and insects. He does however mention that there are two products that one should be concerned about – paraquat and diquat – that are quite toxic to animals:

Product names for paraquat include: Crisquat, Cyclone, Dextrone, Dexuron, Gramoxone Extra, Herbaxone, Ortho Weed and Spot Killer and Sweep.

Product names for diquat include: Aquacide, Aquakill, Dextrone, Diquat, Midstream, Reglone, Reglox, Reward, Tag, Torpedo, Vegetrole and Weedtrine-D.)

However, when used according to instructions, most products (except paraquat and diquat) pose very little threat to animal life.

When talking about biodiversity the entire natural system comes to mind and the impact of herbicides is then much more significant as they kill plants, i.e. the basis of the ecosystem. Plants are very important and if impacted upon by the incorrect and improper application of herbicides, the plant ecology will be destroyed and this will have a wide impact on all living organisms. Should the herbicides be used according to instructions, the impact is very low and the recovery of any impacted life forms is guaranteed. However, there are cases where herbicides have been applied incorrectly and the impacts have been vast (Verdoorn *pers.com.*). Verdoorn (*pers.com.*) furthermore states that the most important active ingredients to keep an eye on include the so called soil sterulants (i.e. tebuthiuron, ethidiumuron, bromacil, uracil and various others) as these should be considered to be products with potentially long term effects on plant life. Verdoorn (*pers.com.*) states that previously mentioned products would possibly have little direct effect on birds, mammals, etc., with the most significant problem being the impact on trees that support birds.

Areas treated by chemicals and/or artificially cleared – i.e. disturbed areas – are often colonised by the shrubs *Laggera decurrens* (Silky Sage; Wolbos) and *Pechuel-loeschea leubnitziae* (Wild Sage) which can form dense stands (*pers.obs.*). According to Burke (2012) *Laggera decurrens* is mostly found along disturbed areas; can taint the milk of animals that eat it and contains phytotoxins which suppress the growth of some species, consequently resulting in mono-specific stands. According to Roodt (1998) *Pechuel-loeschea leubnitziae* thrives on alkaline and sandy soil in disturbed areas. Although domestic stock are known to utilise it as a source of food, the meat and milk is often tainted (Roodt 1998) due to the aromatic properties of the plant. *Laggera decurrens* and *Pechuel-loeschea leubnitziae* are probably part of the new succession in the disturbed areas (after chemical bush control), but further monitoring and/or research is recommended regarding these shrub species.

Aerial application of herbicides is unselective and kills trees indiscriminately over large areas thus making it difficult to avoid protected and/or advantageous species. Hand application methods are more selective and can eradicate the unselective killing of tree species.

Whatever herbicide is used, exceptional care should be taken with the application thereof, especially with regards to dosages, as the incorrect use could harm and/or destroy non-target species.

Two broad types of herbicide are available – either applied as granules to the soil (e.g. Tebuthioron, Ethidimuron, Bromocil – active ingredients) or sprayed onto the plant and taken up by the aboveground parts of the plant (e.g. Picloram – active ingredient). Changes in trade names make recommending a specific brand difficult and therefore it is more important to know the active ingredient.

Impacts on biodiversity

The following are the possible effects that the active ingredients could possibly have on biodiversity as determined through a literature study on the topic (see Cunningham and Joubert 2002):

A. Bromacil/Tebuthiuron [Bushwacker, Destroyer, Graslan, Grazer, Molopo, Reclaim, Savana, Spike]

Acacia mellifera and Acacia reficiens are very sensitive while Dichrostachys cinerea is less sensitive to tebuthiuron as indicated by Versveld (1988) in the Grootfontein area. The effectiveness of tebuthiuron depends on the clay content of the soil with soils with clay contents >20% being less effective.

Ecological Effects:

Effects on birds: Tebuthiuron is practically nontoxic to birds (Anon 1994, Kidd and James 1991). However, according to Anon (1995a) it is slightly toxic to birds. Bromacil is toxic to birds at high dosages (Clayton and Clayton 1981).

Effects on aquatic organisms: Tebuthiuron is slightly or practically non-toxic to fish and other aquatic species (Anon 1994, Anon 1995b). On the other hand Anon (1995a) states that Tebuthiuron is slightly toxic to aquatic invertebrates and fish.

The median tolerance limit, or the concentration of bromacil that will kill 50% of the exposed fish after 48 hours of exposure, varies from 40 ppm to 164 ppm, depending on the type of fish tested (Clayton and Clayton 1981).

Effects on other organisms: Tebuthiuron is low in toxicity to mammals and it breaks down rapidly in mammals and also does not accumulate or build up in mammals (Anon 1995a).

Tebuthiuron is slightly toxic to bees (Anon 1995b) although Anon (1995a) states that it is not toxic to bees.

Tadpoles have a 48-hour median tolerance limit of 230 ppm bromacil (Clayton and Clayton 1981). In high dosages it is toxic to sheep and dogs. Bromacil is not toxic to either aquatic invertebrates or honeybees (Van Driesche 1985, Meister 1992).

Tebuthiuron is toxic to many plants. Even if a small amount comes in contact with roots it may injure or kill trees or shrubs (Anon 1995a). Smit et.al. (1999) and Anon (1994), state that other non-target trees may be affected even by selective application. Some tree species, especially “evergreens”, are not killed while D. cinerea requires very heavy dosages (Smit et.al. 1999). The destruction of stream-side vegetation should be avoided as it may adversely affect the habitat of some aquatic animals (Anon 1995). The use of tebuthiuron on range and pastureland could be a hazard to endangered plants (Anon 1995a).

Tebuthiuron is low in toxicity to soil microorganisms (Anon 1995a).

Environmental Fate:

Breakdown in soil and groundwater: Tebuthiuron is highly persistent in soil with reported field half-lives from 12 to 15 months in areas with over 1,000 mm annual rainfall and longer half-lives expected in drier areas or in soils with high organic matter content (Anon 1994). It is poorly bound to soil, suggesting high mobility. In field studies, however, little or no lateral movement has been seen in soils with appreciable clay or organic matter content (Anon 1994). Neither tebuthiuron nor its degradation products have been detected below the top 24 inches of soil in field studies (Anon 1994).

Bromacil binds, or adsorbs, only lightly to soil particles, is soluble in water, and has a relatively lengthy soil half-life (60 days). For these reasons, bromacil is expected to move (leach) quite readily through the soil and it can contaminate groundwater. The potential for bromacil to leach and contaminate groundwater is greatest in sandy soils (Van Driesche 1985). Bromacil should not be used near drinking water reservoirs or

in well recharge areas because of its mobility in soil. Directions and precautions listed on product labels must be followed to minimize potential bromacil movement into groundwater (Van Driesche 1985, Meister 1992, Anon 1990). Field dissipation studies have shown that phytotoxic residues of bromacil have persisted in both sand and clay soils for longer than 2 years (Anon 1989).

Breakdown in water: No degradation was observed in a 33-day study of photolysis of tebuthiuron in water (Anon 1994).

There is little information available on the breakdown rate of bromacil in water, although a two-month half-life is suggested for this herbicide in clean river water which is low in sediment (Van Driesche 1985).

Breakdown in vegetation: Tebuthiuron is readily absorbed through roots and translocated to other plant parts. It produces its effect by inhibiting photosynthesis, the process by which plants receive light from the sun and convert it into energy (Anon 1994).

Bromacil is taken up rapidly by the roots and slightly absorbed through the leaves. Bromacil destroys most annual plants in the treated area (Melnikov 1971). Improper application of bromacil will destroy shade trees and other desirable vegetation. Label instructions should be followed carefully. Equipment and containers should not be emptied or rinsed out near desirable trees or shrubs (Van Driesche 1985).

B. Glyphosates [Roundup]

Ecological Effects:

Effects on birds: Glyphosate is slightly toxic to wild birds (Kidd and James 1991).

Effects on aquatic organisms: Technical, glyphosate acid is practically nontoxic to fish and may be slightly toxic to aquatic invertebrates (Anon 1994). Some formulations may be more toxic to fish and aquatic species due to differences in toxicity between the salts and the parent acid or to surfactants used in the formulation (Anon 1994, Anon 1985). There is a very low potential for the compound to build up in the tissues of aquatic invertebrates or other aquatic organisms (Anon 1985).

Effects on other organisms: Glyphosate is nontoxic (Anon 1994, Kidd and James 1991) or relatively non-hazardous (Tew 1996) to bees. Label instructions should still be followed carefully.

A study conducted in Australia suggests that glyphosate used to combat an alien weed species negatively affected an endangered indigenous plant species (Matarczyk et.al. 2002). The above-mentioned authors state that glyphosate may also affect biodiversity adversely.

Environmental Fate:

Breakdown in soil and groundwater: Glyphosate is moderately persistent in soil, with an estimated average half-life of 47 days (Anon 1994, Wauchope et.al. 1992). It is strongly adsorbed in most soils, even those with lower organic and clay content (Anon 1994, Wauchope et.al. 1992) and even though it is highly soluble in water, it does not leach appreciably, and has low potential for runoff (Edwards et.al. 1991, Wauchope et.al. 1992). One estimate indicated that less than 2% of the applied chemical is lost to runoff (Malik et.al. 1989).

Breakdown in water: In water, glyphosate is strongly adsorbed to suspended organic and mineral matter (Anon 1984) and its half-life in pond water ranges from 12 days to 10 weeks (Anon 1992).

Breakdown in vegetation: Glyphosate may be translocated throughout the plant, including to the roots. It is extensively metabolised by some plants, while remaining intact in others (Wauchope et.al. 1992).

C. Picloram [Access, Grazon, Pathway, Tordon]

Acacia mellifera and *Dichrostachys cinerea* are very sensitive to picloram as indicated by Versveld (1988) in the Otjiwarongo area. The effectiveness depends on the environmental conditions, stage of phenological development and application dosage. Versveld (1988) stated that at low dosages the small shrubs/trees of <2m were not seriously affected. He also states that at higher dosages the selectiveness of the application declines.

Ecological Effects:

Effects on birds: Picloram is slightly to practically nontoxic to birds (Anon 1984).

Effects on aquatic organisms: Picloram is slightly to moderately toxic to fish and aquatic invertebrates (Anon 1994). Most salts are of similar or lesser toxicity, but the isooctyl ester may be highly toxic (Anon 1983a). Picloram is not expected to accumulate appreciably in aquatic organisms (Howard 1991).

Effects on other organisms: The compound is nontoxic (Kidd and James 1991) or relatively non-hazardous (Tew 1996) to bees. Label instructions should still be followed carefully.

Environmental Fate:

Breakdown in soil and groundwater: Picloram is moderately to highly persistent in the soil environment, with reported field half-lives from 20 to 300 days and an estimated average of 90 days (Wauchope et.al. 1992). It is soluble in water, and therefore may be mobile (Kidd and James 1991). These properties, combined with its persistence, mean it may pose a risk of groundwater contamination (Howard 1991).

Breakdown in water: In laboratory studies, sunlight readily broke down picloram in water, with a half-life of 2.6 days (Anon 1994, Howard 1991).

Breakdown in vegetation: Picloram is readily absorbed by plant roots, less so by the foliage, and is readily translocated throughout plants. It remains stable and intact in plants (Anon 1994).

D. Triclopyr [Access, Garlon, Grazer]

Ecological Effects:

Effects on birds: Triclopyr is slightly to practically nontoxic to birds (Anon 1984, Anon 1994).

Effects on aquatic organisms: The parent compound and amine salt are practically nontoxic to fish (Anon 1984). The compound is practically nontoxic to the aquatic invertebrate Daphnia magna (a waterflea) (Gersich et.al. 1984). The compound has little if any potential to accumulate in aquatic organisms.

Effects on other organisms: The compound is nontoxic (Kidd and James 1991) or relatively non-hazardous (Tew 1996) to bees. Label instructions should still be followed carefully.

Environmental Fate:

Breakdown in soil and groundwater: In natural soil and in aquatic environments, the ester and amine salt formulations rapidly convert to the acid, which in turn is neutralised to a relatively nontoxic salt. It is effectively degraded by soil microorganisms and has a moderate persistence in soil environments (Anon 1984). The half-life in soil ranges from 30 to 90 days, depending on soil type and environmental conditions, with an average of about 46 days (Anon 1983b). Longer half-lives may occur in cold or arid conditions. Triclopyr is not strongly adsorbed to soil particles and has the potential to be mobile (Anon 1984).

Breakdown in water: Triclopyr is not readily hydrolyzed at pH 5 to 9 (Anon 1984). Reported half-lives in water are 2.8 to 14.1 hours, depending on season and depth of water (Anon 1983b). The ester formulation half-life is from 12.5 to 83.4 hours (Anon 1983b).

Breakdown in vegetation: Triclopyr is readily translocated throughout a plant after being taken up by either roots or the foliage. The estimated half-life in aboveground drying foliage as in a forest overstory is 2 to 3 days (Anon 1984).

General recommendations:

- Herbicides should be used with caution (avoid use where possible and only use where absolutely necessary);
- The application methods should stringently be adhered to;
- Techniques should be employed and/or investigated that minimises impacts on non-target native species;

- Herbicides that are deemed non-target specific and/or which are mobile (all granular products) should be avoided as these would kill trees indiscriminately; and
- Even "modern" herbicides have some effect on biodiversity and/or haven't yet been tested on all species especially under local conditions and circumstances. It is thus important to remember that there are no 100% "safe" herbicides.

Application Methods

The following application methods and applicable advantages and disadvantages are derived from Tainton (1999):

a. Soil Applied Herbicides (e.g. Tebuthiuron, Ethidimuron and Bromacil)

Advantages:

- Rapid treatment;
- No mechanical treatment;
- Residual effect can suppress seedling regeneration for up to 4-5 years;
- Most inexpensive of the chemical methods;
- Small quantities required depending on the species.

Disadvantages:

- Non-target species affected due to root spread;
- Slow acting (becomes active when rain water carries it into the soil profile and may take up to 2 years to kill target trees/shrubs;
- Dead trees remain standing and nutrients in wood are not available for use by other plants;
- Required dosages are affected by soil's clay and organic matter content – e.g. the higher these levels, the higher the dosages and some chemicals not effective with soil content >35%;
- Some tree species (e.g. especially evergreens) are not killed;
- Some require large dosages (e.g. *D. cinerea*);
- Dead trees left standing are unattractive.

b. Plant Applied Herbicides (e.g. Access)

Advantages:

- Application can be selective when applied by hand and little danger of non-target species being affected;
- Trees which are cut and then treated, die immediately;
- Trees cut can be used to recoup some of the costs – e.g. firewood, charcoal, etc.;
- Aesthetically pleasing.

Disadvantages:

- Time consuming;
- Labour intensive;
- More expensive than other methods (e.g. aerial).

c. Aerial Application

[In addition to any other advantages/disadvantages which apply to plant applied herbicides in general, the following apply specifically to aerial application]

Advantages:

- Uniform application – no individuals escape treatment;
- Large areas handled rapidly;
- Little labour required.

Disadvantages:

- Expensive;
- Valuable plants also affected – i.e. non-selective.

Recommendations

Various other bush clearing techniques are not discussed in this report, but include hand clearing (bush pick, axe, etc.), mechanical clearing (bulldozer, grader, etc.), fire, browsers and biological. Although hand clearing, and in some case, mechanical clearing is currently being used by NamPower to clear vegetation beneath various lines throughout Namibia, it is a slow and tedious process with many labour related issues although advantageous from a job creation perspective. Chemical control measures are now being investigated as an alternative.

From an ecological perspective, hand clearing would be the best technique to employ. This would also have added social benefits – i.e. job creation. However, if this is not feasible for whatever reason(s) then the following is recommended regarding chemical application:

All chemicals have potential negative environmental consequences, but identifying the active ingredient and effect it may have on the environment as well as most important flora species in an area (protected, etc.) including high risk habitats (e.g. drainage lines, rocky outcrops, etc.) beforehand, coupled with environmentally acceptable mitigating factors, lessens the overall impact of chemical use.

The following is suggested should chemical control measures be implemented:

Table 2: Recommendations should chemical control measures be implemented

Aspect	Recommendations
Herbicide	Access 240SL (or any other similar products with the active ingredient stated below – e.g. Garlon, Turflon, Pathfinder, Brush-B-Gone, Confront, Crossbow)
Active ingredient	Triclopyr (Not listed by FSC – Forestry Stewardship Council – Highly Hazardous chemicals – see www.ic.fsc.org) (FSC 2017)
Application	Foliar application – spray – 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.
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.
Area	See Table 1 for areas classified as “high” sensitivity – i.e. unique features and/or viewed as biodiversity sensitive areas (“hotspot” areas). Chemical should not be applied to these areas; especially water features (e.g. rivers, etc.) classified as “high” sensitivity, but rather revert to hand clearing.

Depending if the proposed recommendations within this report are incorporated aimed at indicating environmental sensitivity and commitment, the selective use of the proposed herbicide is not expected to seriously negatively affect any “unique” vertebrate fauna and flora along the ANNA transmission line.

Monitoring checklist for bush clearing

Table 2: Monitoring checklist for bush clearing

		Compliance	
		Yes	**No**
1	**Activity: Bush clearing**		
1.1	Obtain necessary licenses in terms of the Forestry Act (for protected species and all species with diameter >18cm)		
1.2	Manual clearing conducted only for vegetation high enough to cause a disruption / fire risk to the infrastructure (unless within road access area)		
1.3	Area adequately cleared – i.e. 12m from centre line		
1.4	Protected tree species on 12m boundary only trimmed		
1.5	Protected tree species not affecting line left *in situ*		
1.6	Raptor and vulture nesting sites left undisturbed		
2	Overall access improved		
2,1	**Activity: Chemical application**		
2.2	Active ingredient used = Triclopyr		
2.3	Application method used = spray		
2.4	Application technique used = spray leaves/cut stumps		
2.5	Application season = Sep to April (Sep to Nov = best)		
2.6	Application conditions = no wind		
2.7	Application procedures = protective masks/equipment used		
2.8	Application knowledge = certified users only		
2.9	Storage = safe/secure		
2.10	Storage = chemical register maintained		
2.11	Storage = equipment clean/functional		
2.12	Concentration: Foliar application = 350ml/100l water + Actipron Super 500ml/100l spray mix		
2.13	Concentration: Cut stump application = 2l/100l water + Actipron Super 2l/100l spray mix		
2.14	Repeatability: Year 1		
2.15	Repeatability: Year 2		
2.16	Repeatability: Year 3		
2.17	Sensitive “hotspot” areas avoided, including 100m from watercourses		
2.18	Water – open surface water encountered		
2.19	Water – open surface water samples taken		
2.20	Collateral damage observed (i.e. non target areas/species affected)		
2.21	Any complaints from communities		