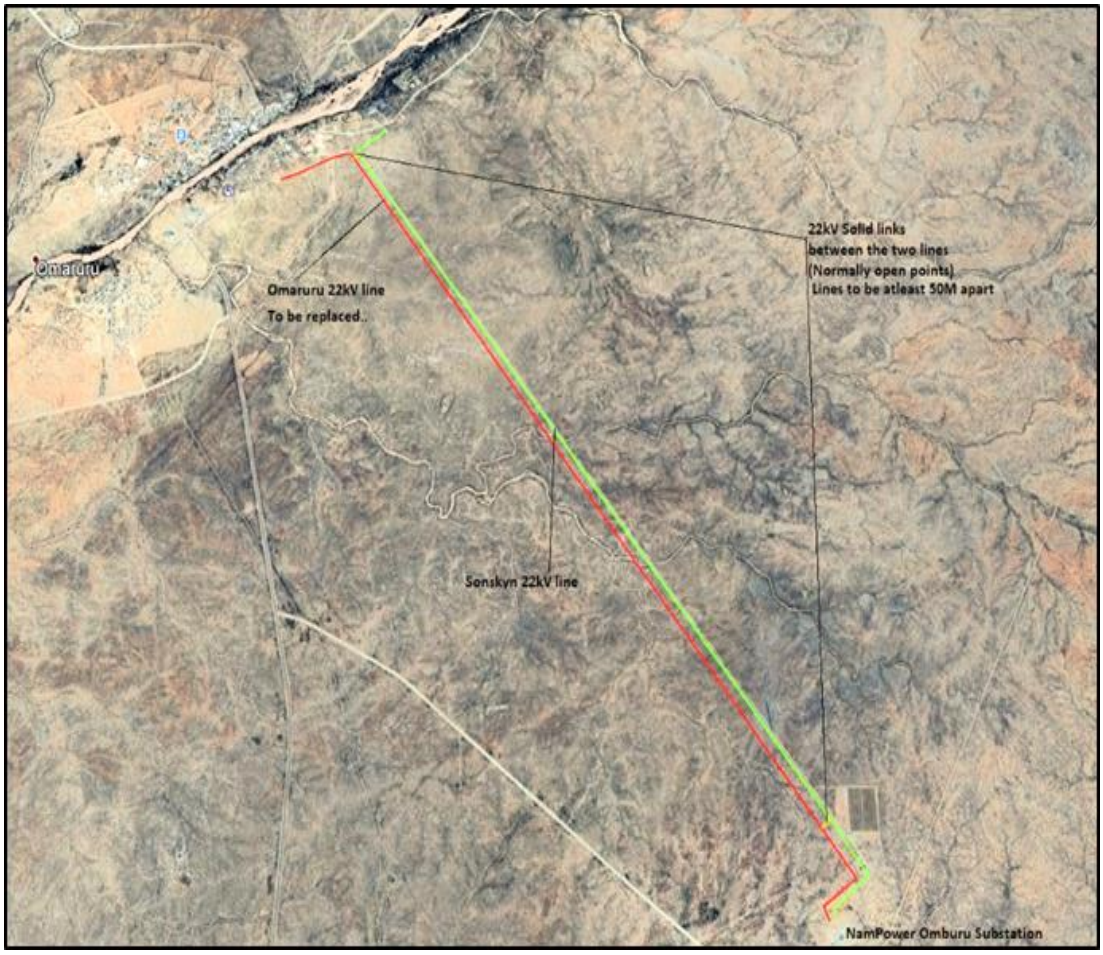
ENVIRONMENTAL IMPACT ASSESSMENT FOR THE CONSTRUCTION AND OPERATION OF THE PROPOSED NEW OMBURU – OMARURU MEDIUM VOLTAGE OVERHEAD LINE REROUTE

Scoping Report



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Assessed by:

Gea Source Investment
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Assessed for:

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EXECUTIVE SUMMARY

Gea Source Investment CC was appointed by the Erongo Regional Electricity Distributor (Erongo RED) to undertake an Environmental Impact Assessment (EIA) for the proposed construction of the new Omburu–Omaruru 44 kV overhead line (OHL). The line will be re-routed to maintain a minimum 50 m clearance from the existing Omburu–Omaruru OHL, running from NamPower's Omburu Substation to the Omaruru Intake Substation. The purpose of the EIA is to identify and evaluate the potential environmental, health, safety, and social impacts associated with the construction and operation of the proposed development, thereby providing decision-makers and stakeholders with a sound basis for informed decision-making.

At present, NamPower's Omburu Substation supplies three 22 kV OHLs operated by Erongo RED: Omaruru, Sonskyn, and Orupoko. The Omaruru and Sonskyn lines run parallel for approximately 10 km from the substation and are highly vulnerable to failures such as pole collapses, conductor snaps, and faults caused by severe weather conditions including heavy rainfall, strong winds, and lightning. This vulnerability is aggravated by the aging infrastructure and the close 10 m spacing between the two lines. In the event of a fault on one line, the adjacent line must be de-energised for safe repair, which poses a significant risk to supply reliability.

To address these challenges, Erongo RED proposes to construct a new 44 kV Omburu–Omaruru OHL that will increase the clearance between the two lines to 50 m. The new line will largely run parallel to the existing alignment for approximately 10 km and will include two cross-link structures to provide redundancy. This upgrade is essential to ensure a reliable and secure electricity supply to Omaruru town and surrounding farms, while replacing the aging 22 kV infrastructure with a modern, higher-capacity line.

The scope of the EIA included assessing potential environmental and social impacts associated with the construction, operation, and future decommissioning of the proposed OHL. Information was gathered through site reconnaissance, a specialist bird study, review of secondary data, and consultation with stakeholders. The assessment identified potential impacts including:

- Disturbance and destruction of natural habitats and biodiversity
- Noise and dust pollution during construction
- Waste generation and sanitation management issues
- Bird collisions with power line structures
- Bird electrocutions
- Bird nesting on power infrastructure
- Physical/human disturbance of fauna, including road mortalities and poaching
- Fire and explosion hazards

Most impacts can be mitigated to acceptable levels. However, given the ecological sensitivity of the area, particular attention is required to manage bird interactions with the power line. Continuous monitoring of bird incidents is recommended, and the precautionary principle should apply. Specifically, high-risk sections intersecting a major drainage system in the western part of the study area must be fitted with bird flight diverters or line markers to reduce collision risk.

An Environmental Management Plan (EMP) has been developed to provide detailed guidance for the construction, operational, and eventual decommissioning phases of the project. The EMP must serve as an on-site reference document, and all contractors and responsible personnel should be trained on its requirements. Non-compliance with the EMP should result in accountability and, where necessary, rehabilitation of affected areas. To reinforce compliance, Erongo RED should also adopt and implement a Health, Safety, Environment, and Quality (HSEQ) management system alongside an overarching Environmental Policy.

Therefore, based on the findings of this assessment, and provided that all recommended mitigation measures are effectively implemented, there are no environmental grounds to withhold the issuance of an Environmental Clearance Certificate for the proposed 44 kV Omburu–Omaruru OHL and associated infrastructure.

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ACRONYMS AND ABBREVIATIONS

Acronyms / Abbreviations	Definition
BID	Background Information Document
DEA	Department of Environmental Affairs
ECC	Environmental Clearance Certificate
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
IAP	Interested and Affected Party
Km	Kilometer
kV	Kilo Volts

m	Metre
MEFT	Ministry of Environment, Forestry and Tourism

1 INTRODUCTION

1.1 INTRODUCTION TO THE PROPOSED POWERLINE PROJECT

Erongo RED has appointed Gea Source Investment cc to conduct an Environmental Impact Assessment (EIA) for the proposed construction of a new Omburu-Omaruru 44kV overhead line (OHL) re-route (to be operated at 33 kV). The new OHL is to replace the existing 22kV OHL that currently supplies electricity to Omaruru and its surrounding areas, ensuring enhanced reliability and capacity of supply. Henceforth the proposed new 44-33 kV Omburu-Omaruru overhead line will be referred to as 44 kV overhead line (OHL) for conformity reasons. Construction of facilities for energy transmission and supply of electricity is a listed activity that may not be undertaken without an Environmental Clearance Certificate in terms of the Environmental Management Act, 7 of 2007 and its Regulations. Therefore, an application for the Environmental Clearance Certificate will be submitted once the EIA process is completed.

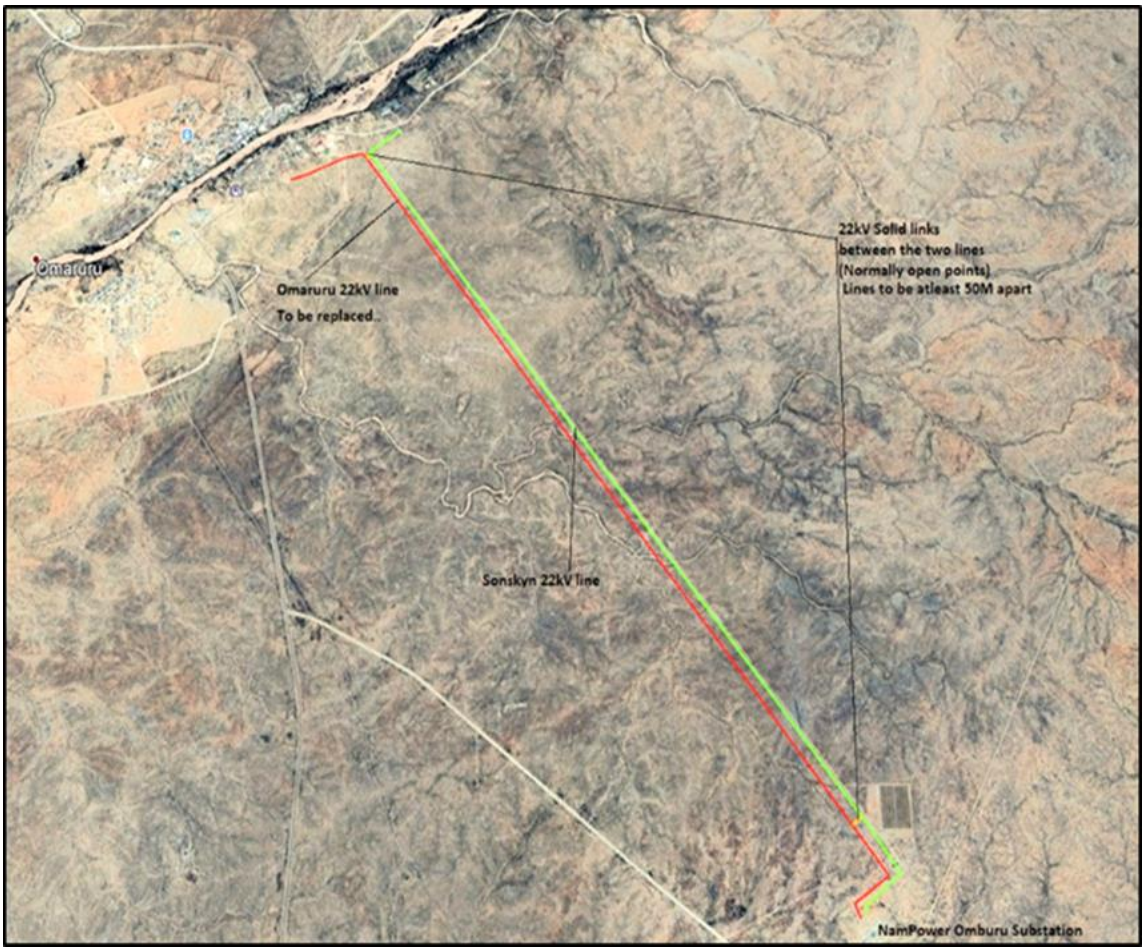


Figure 1.1. Project area showing new/replacement 44 kV Omburu-Omaruru OHL (red) and existing 22 kV Omburu-Sonskyn OHL (green), to be 50 m apart with links in between (based on a Google Earth map and BID).

NamPower's Omburu substation currently supplies three 22kV OHLs operated by Erongo RED: Omaruru, Sonskyn and Orupoko. The Omaruru and Sonskyn OHLs run in parallel for approximately 10km from NamPower's Omburu substation. To improve safety and operational efficiency, Erongo RED proposes to re-route the Omburu/Omaruru 22 kV line by constructing a new overhead line from NamPower's Omburu Substation, ensuring a minimum clearance of 50 meters between the two parallel lines.

1.2 PROJECT JUSTIFICATION

The Omburu-Omaruru and Omburu-Sonskyn overhead lines run parallel for approximately 10 km from the NamPower Omburu Substation. The terrain is rocky and the lines cross several rivers/ drainage lines. These two lines are particularly susceptible to failures such as pole collapses and snapped conductors due to severe weather conditions in the area - including heavy rainfall, strong winds and intense lightning strikes. This vulnerability is further exacerbated by the ageing infrastructure and the fact that much of the Omburu-Sonskyn overhead line was constructed using a "wishbone" structure (see below). Moreover, the two lines are only 10 m apart. In the event of a fault on one line, the adjacent line must be de-energised to allow for safe repair work. This close proximity poses a significant risk to the reliability and operation of both lines.

Therefore, Erongo RED proposes to re-route the 22 kV Omburu-Omaruru line to increase the clearance between the two lines to 50 m by constructing a new Omburu-Omaruru 44 kV overhead line from the NamPower Omburu Substation to Omaruru in parallel to the existing 22 kV OHL. The new OHL is to replace the existing 22kV OHL that currently supplies electricity to Omaruru and its surrounding areas, ensuring enhanced reliability and capacity of supply. As part of this proposal, Erongo RED also plans to build two cross-link structures for redundancy between the lines (one near Omburu and the other near Omaruru), ensuring that electricity supply can be maintained on one OHL if the other OHL experiences a fault.

1.3 ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The Environmental Impact Assessments procedure is regulated by the Ministry of Environment and Tourism (MET) in terms of the Environmental Management Act, 7 of 2007. This Act was gazetted on 27 December 2007 (Government Gazette No. 3966). The Environmental Impact Assessment Regulations: Environmental Management Act, 2007 (Government Gazette No. 4878) were promulgated on 6 February 2012.

Erongo RED wishes to obtain an Environmental Clearance Certificate for the construction of a new 44 kV OHL from the NamPower Omburu Station through to Omaruru Intake station. Gea Source Investment cc conducted the EIA process in terms of the Environmental Management Act, 7 of 2007. This process includes: a screening phase and a scoping phase, which includes an impact assessment and development of an Environmental Management Plan (EMP).

This report is the Scoping Report, the main purpose of which is to provide information relating to the proposed new 44 kV Omburu-Omaruru overhead power line such as:

- Identify existing environmental (bio-physical and socio-economic) conditions of the area in order to determine the sensitivity of key environmental features;
- Consult all Interested and Affected Parties (I&AP's), with specific emphasis on the community closest to the affected area to ensure that their needs and concerns are taken into account;
- Comply with relevant Namibian legislation, policies and procedures and guidelines;
- Recommend methods to minimise the identified negative impacts (identified throughout the project life cycle) of the proposed project and its associated infrastructure and enhanced the positive ones;
- Recommend further investigations if some of the issues identified cannot be adequately addressed.

Information applicable to the site has been collated from the review of desktop information, satellite imagery, an avifaunal assessment, site visits by the EIA team and through stakeholder consultation. The potential impacts of the proposed new 44 kV Omburu-Omaruru overhead line could therefore be assessed.

This Scoping Report is the culmination of the first phase of an EIA process. During this scoping phase, information was gathered concerning any potential impacts whether positive or negative in nature and their relative significance was determined. This document provides information regarding whether further in-depth investigation (i.e. a full EIA) is required or not. If all issues/impacts can be addressed without further investigation, this document will be submitted to the Directorate of Environmental Affairs (DEA) along with the EMP. It is the opinion of the Lead Consultant that sufficient information is available to address all impacts that have been identified thus far with a high level of confidence. Thus, this Scoping Report will be submitted for immediate consideration for Environmental Clearance, without the need for further investigations.

1.4 EIA TEAM

Gea Source Investment cc (GEA) is an independent firm of consultants who was appointed to undertake the environmental impact assessment processes.

Dr. Faye Brinkman, the EIA Project Manager has experience of over 15 years in managing, advising and compliance to environmental management, natural resource management and environmental impact assessment practices in the fishing, mining and construction sector. She has a proven track record of creating, building and implementing environmental strategies and global sustainability initiatives in government and industrial organizations.

Nangula Amutenya, the EIA Stakeholder Consultant has 10 years environmental and natural resources management experience with a wide range of knowledge, experience and skills in local government environmental management systems, EIAs, EMPs and climate change.

Mike and Dr. Ann Scott are avifauna specialists with a wide range of environmental conservation activities in Namibia. They have been involved with avifauna specialist studies for environmental impact assessment for over 10 years.

The relevant curriculum vitae documentation is attached in Appendices G. The environmental project team is outlined in Table 1.1 below.

Table 1.1: The Environmental Project Team

Team	Name	Designation	Tasks and Roles	Company
ErongoRED	Adelino Batista	Project Engineer	Responsible for the project implementation	ErongoRED (Pty) Ltd
	Yvonne Nghilumbwa	Environmental Advisor	Advising and compliance to environmental legal requirements and standards	ErongoRED (Pty) Ltd
EIA Project Management	Dr. Faye Brinkman	EIA Project Manager	Management of the process and stakeholders. Compilation of reports and management of Public Participation Process	Gea Source Investment cc
	Nangula Amutenya	EIA Stakeholder Consultant	Stakeholder Engagement, project administration, EIA report review	Gea Source Investment cc
	Mike and Dr. Ann Scott	Avifauna Specialist	Avifauna Assessment	African Conservation Services cc

1.5 Contact Details of the Project Proponent

The contact details of those responsible for the project at Erongo RED are included in Table 1.2.

Table 1.2: Contact details of Erongo RED

Title	ErongoRED Project Engineer: Network Planning
Name	Fillipus Nandiinotya
Postal Address	P.O. Box 2925 Walvis Bay
Physical Address	76, Hannah Mupetami Road
Telephone	+264(64) 217614
Email	aBatista@erongored.com.na

2 SCOPE

The scope of the EIA is to:-

- ❖ Provide sufficient information to determine whether the Development will result in significant adverse impacts;
- ❖ Identify a range of management actions which could mitigate the potential adverse impacts to acceptable levels;
- ❖ Comply with the Environmental Management Act; and
- ❖ Provide sufficient information to the Ministry of Environment and Tourism and the Ministry of Mines and Energy to make an informed decision regarding The Development.

3 METHODOLOGY

The following method was used to investigate the potential impacts of the proposed Development on the socio-economic and biophysical environment:

- ✓ Baseline information about the operational area was obtained from existing secondary Information such as Maps and documents, outlining the proposed upgrade, Design drawings and other EIAs in the region
- ✓ Site visits to the proposed project area by GEA
- ✓ Consultation with the Erongo RED technical project team
- ✓ Primary data was obtained from a Bird Specialist Study (Appendix A)
- ✓ The comments and questions of interested and affected parties (I&APs) were gathered at a public stakeholders meeting and through other forms of correspondence.

The main purpose of this Scoping Report is to indicate which environmental aspects relating to the proposed power line project need to be considered and to provide an assessment and/or mitigation measures, where required. Furthermore, this Scoping Report has determined a number of potential environmental impacts and provides measures to mitigate any such impacts if they were to occur (see Section 10). Table 3.1 outlines the Scoping Report requirements as set out in Section 8 of the Environmental Impact Assessment Regulations that were promulgated in February 2012 in terms of the Environmental Management Act, 7 of 2007.

Table 3.1 Scoping report requirements stipulated in the EIA regulation

REQUIREMENTS FOR A SCOPING REPORT IN TERMS OF THE FEBRUARY 2012 REGULATIONS	REFERENCE IN REPORT
(a) the curriculum vitae of the EAPs who prepared the report;	Section 1.4 and Appendix A
(b) a description of the proposed activity;	Section 5 and Appendix F
(c) a description of the site on which the activity is to be undertaken and the location of the activity on the site;	Section 1 and Section 6
(d) a description of the environment that may be affected by the proposed activity and the manner in which the geographical, physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed listed activity;	Section 6, Section 7 & Section 9
(e) an identification of laws and guidelines that have been considered in the preparation of the Scoping Report;	Section 4
(f) details of the public consultation process conducted in terms of regulation 7(1) in connection with the application, including - (i) the steps that were taken to notify potentially interested and affected parties of the proposed application; (ii) proof that notice boards, advertisements and notices notifying potentially interested and affected parties of the proposed application have been displayed, placed or given; (iii) a list of all persons, organisations and organs of state that were registered in terms of regulation 22 as interested and affected parties in relation to the application; and (iv) a summary of the issues raised by interested and affected parties, the date of receipt of and the response of the EAP to those issues;	Section 7, Appendix B, Appendix C, Appendix D, & Appendix E
(g) a description of the need and desirability of the proposed listed activity and any identified alternatives to the proposed activity that are feasible and reasonable, including the advantages and disadvantages that the proposed activity or alternatives have on the environment and on the community that may be affected by the activity;	Section 1 & Section 5
(h) a description and assessment of the significance of any significant effects, including cumulative effects, that may occur as a result of the undertaking of the activity or identified alternatives or as a result of any construction, erection or decommissioning associated with the undertaking of the proposed listed activity;	Section 9
(i) terms of reference for the detailed assessment; and	Section 9
(j) a management plan, which includes - (i) information on any proposed management, mitigation, protection or remedial measures to be undertaken to address the effects on the environment that have been identified including objectives in respect of the rehabilitation of the environment and closure; (ii) as far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of the activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and (iii) a description of the manner in which the applicant intends to modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation remedy the cause of pollution or degradation and migration of pollutants.	Section 10

4 ADMINISTRATIVE, LEGAL AND POLICY REQUIREMENTS

To protect the environment and achieve sustainable development, all projects, plans, programmes and policies deemed to have adverse impacts on the environment require an EIA according to Namibian legislation. The following legislation pertaining to the Development and the proposed development governs the EIA process in Namibia.

The Republic of Namibia has five tiers of law and a number of policies relevant to waste management, treatment, handling, and disposal activities, namely:

- The Constitution
- Statutory law
- Common law
- Customary law
- International law

The Key Environmental Policies currently in force include:

- The EIA Policy (1995).
- Namibia's Environmental Assessment Policy for Sustainable Development and Environmental Conservation (1994).

As the main source of legislation, the Constitution of the Republic of Namibia (1990) makes provision for the creation and enforcement of applicable legislation. In this context and in accordance with its constitution, Namibia has passed numerous laws intended to protect the natural environment and to mitigate against adverse environmental impacts.

In the context of the proposed new Omburu-Omaruru 44kV overhead line, there are several laws and policies currently applicable. They are reflected in Table 4.1.

Table 4.1: Relevant legislation Applicable to the proposed new Omburu-Omaruru 44 kV overhead line

Legislation/Policy/Guideline	Relevant Provisions	Implications for the project
The Constitution of the Republic of Namibia (1990)	Article 91 (c) and Article 95 (i)	ERED should ensure that the proposed new powerline coexist with the natural environment and most importantly, the well-being of the Namibian citizens in terms of facilities and services.
Environmental Management Act EMA (No. 7 of 2007)	Section 58, Section 56, Section 27	The EMA and its regulations inform and guide the EA process.
Environmental Impact Assessment (EIA) Regulations of 2012 (GN 28-30)	GN 30 S21 Scoping Report (GN 30 S8) Assessment Report (GN 30 S15)	
Electricity Act, 2007 (No 4 of 2007)	ERED was established as part of the Electricity Supply Industry (ESI) and Electricity Distribution Industry (EDI) restructuring policy. ERED operates under the Electricity Act, 2007 (Act No. 4 of 2007) and	The Act makes provision for the planning & designing, construction, operation, maintenance, and decommissioning of the Omburu-Omaruru OHL, since ERED is carrying out its functions as mandated by the Act.

Legislation/Policy/Guideline	Relevant Provisions	Implications for the project
	its associated regulations.	
Labour Act 11 of 2007	Details requirements regarding minimum wage and working conditions (Section 39).	ERED should ensure that all workers involved in the construction, operations and maintenance of the proposed activity comply with this Act.
Public Health Act 36 of 1919	Section 119	
Health and Safety Regulations GN 156/1997 (GG 1617)	Details various requirements regarding health and safety of labourers.	ERED and its project operators should ensure that the safety and welfare of workers are not compromised during the construction, operation and maintenance of the new powerline structures.
Forestry Act 12 of 2001	Section 22 Section 23	The Act provides for the protection of natural vegetation. Part 4 provides for that no person shall damage or destroy vegetation in a protected area contrary to a notice published under subsection (3) or unless otherwise authorised by this Act. ERED Bay should notify the relevant authorities in order to be allowed to construct in their jurisdictions. If there are any protected species, a permit to remove them is required.
Nature Conservation Ordinance 4 of 1975	To consolidate and amend the laws relating to the conservation of nature; the establishment of game parks and nature reserves; the control of problem animals; and to provide for matters incidental thereto.	• The ordinance prohibits disturbance or destruction of protected birds without a permit. Requires a permit for picking (the definition of "picking" includes damage or destroy) protected plants without a permit. • Protected plants will have to be identified during the planning phase of the project for the invasive phase • In case there is an intention to remove protected species, then permits will be required
Atmospheric Pollution Prevention Ordinance (11 of 1976)	The control of noxious or offensive gases Dust control	ERED should adhere to the requirements of the ordinance.
National Heritage Act (Act 27 of 2004)	Section 48	All protected heritage resources (e.g., human remains, etc.) discovered, need to be reported

Legislation/Policy/Guideline	Relevant Provisions	Implications for the project
		immediately to the National Heritage Council (NHC) and require a permit from the NHC before they may be relocated.
Water Resources Management Act (No. 11 of 2013) Water Act 54 of 1956	The Water Resources Management Act 24 of 2004 does not have regulations as yet; therefore the Water Act No 54 of 1956 is enforced which: Prohibits the pollution of underground and surface water bodies (Section 23). ▪ Liability of clean-up costs after closure/ abandonment of an activity (Section 23).	The protection of ground and surface water resources should be a priority. The main threats will most likely be concrete and hydrocarbon spills during construction and hydrocarbon spills during operation and maintenance.
The Pollution Control and Waste Management Bill (in preparation)	The entire Bill	The proponent should apply emissions and management measures and acquire the necessary permits. All waste management activities generated by the construction activities are the responsibility of ERED.
Namibia's Second National Biodiversity Strategy and Action Plan (2013-2022)	Namibia's NBSAP2 covers the period 2013-2022, and its vision is for "Namibia's biodiversity to be healthy and resilient to threats, and for the conservation and sustainable use of biodiversity to be key drivers of poverty alleviation and equitable economic growth, particularly in rural areas."	The proponent should adhere to the strategy and action plan in as much as possible.
MEFT Policy on HIV/AIDS	MEFT has recently developed a policy on HIV/AIDS. In addition, it has also initiated a programme aimed at mainstreaming HIV/AIDS and gender issues into environmental impact assessments.	The proponent and its contractor must adhere to the guidelines provided to manage the aspects of HIV/AIDS. Experience with construction projects has shown that a significant risk is created when migrant construction workers interact with local

Legislation/Policy/Guideline	Relevant Provisions	Implications for the project
		communities.
Regional Authority Act No. 24 of 1992	The Local Authorities Act prescribes how a town or municipality should be managed by the Municipal Council.	
Urban and Regional Planning Act No. 5 of 2018	The Act and Regulations combine the Townships Board and Namibia Planning Advisory Board (NAMPAB) into one to be known as the Urban and Regional Planning Board and delegate the decisions on town planning applications to Local Authorities. However, an LA can only make decisions after the MURD has declared a Local Authority as an Authorised Planning Authority (APA).	Town Planning Procedures will be applied for the proposed subdivision of Omaruru Town Land on which the existing and new Omburu-Omaruru OHL lies, in order to register Omburu-Omaruru powerline servitude.
Public Health and Environmental Act No. 1 of 2015	Section 119 of this Act prohibits the existence of a nuisance on any land owned or occupied by the proponent. The term nuisance is important for this EIA, as it is specified, where relevant in Section 122.	• Nuisance such as dust, noise, bad odours, etc. should be controlled during all project phases. • Sanitary conveniences should be provided for as per the minimum requirements prescribed by the law.
Convention on Biological Diversity Post-2020 Biodiversity Framework	Namibia is a signatory to the international Convention on Biological Diversity (CBD). The CBD is the overarching multilateral environmental agreement for biodiversity, with 196 Parties comprising nearly all the world's countries (Bennun et al. 2021). The CBD's post-2020 global biodiversity framework will build on the Strategic Plan for Biodiversity 2011–2020 and sets out an ambitious plan to implement broad-based action to bring about a transformation in society's relationship with biodiversity and to	As a signatory also to the Convention to Combat Desertification Namibia is also bound to prevent excessive land degradation that may threaten livelihoods.

Legislation/Policy/Guideline	Relevant Provisions	Implications for the project
	ensure that, by 2050, the shared vision of living in harmony with nature is fulfilled.	
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (1973)	The aim of CITES is to protect certain endangered species from over-exploitation by means of a system of import-export permits. The CITES Convention includes animals and plants whether dead or alive, and any recognizable parts of derivatives thereof. Appendix I, II and III are relevant to Namibia.	As a signatory also to CITES, Namibia is bound to the protection of endangered species of wildlife and fauna to ensure continued survival of the species.
United Nations Sustainable Development Goals (SDGs) 2015	The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership.	SDGs relevant to energy and biodiversity include: • GOAL 7: Affordable and Clean Energy - Ensure access to affordable, reliable, sustainable and modern energy • GOAL 13: Climate Action - Take urgent action to combat climate change and its impacts • GOAL 15: Life on Land - Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss
United Nations Framework Convention on Climate Change (UNFCCC)	Since 1995, Namibia has been a signatory to the United Nations Framework Convention on Climate Change (UNFCCC), as a Non-Annex I party (NAI). As party to the convention, Namibia is obliged to prepare and submit National Communications (NCs) and in addition Biennial Updated Reports (BURs) (http://www.met.gov.na/services/national-communications-and-biennial-update-reports/238/).	The adoption of the Paris Climate Change Agreement (2015; under the above convention) has also brought home the need for low-carbon development based on environmentally-friendly technologies.
Convention on the Conservation of Migratory Species of Wild Animals (CMS)	The Convention on the Conservation of Migratory Species of Wild Animals (CMS 2011) is an intergovernmental treaty with	Namibia is classed as a range state for AEWA but, although guided by its principles, is not yet a contracting party to this international agreement.

Legislation/Policy/Guideline	Relevant Provisions	Implications for the project
	global remit (Bennun et al. 2021). A number of relevant agreements and memorandums under the CMS umbrella include the Agreement on the Conservation of African-Eurasian Migratory Birds (AEWA).	
Important Bird and Biodiversity Areas (IBAs)	The BirdLife International Important Bird and Biodiversity Area (IBA) Programme aims to identify, monitor and protect a global network of IBAs for the conservation of the world's birds and other wildlife (Marnewick et al. 2015).	Namibia has 19 IBAs. The nearest IBAs to the study site are: • The Namib-Naukluft Park IBA, some 140 km to the south-west (NA010); a Global IBA under criteria A1, A2 (s045, s046), A3 (A11, A12), A4i; area 4,976,800 ha. • The Etosha National Park, 240 km to the north (NA004); a Global IBA under criteria A1, A3 (A11), A4i; A4iii and also a Ramsar site; area 2,291,200 ha.
Key Biodiversity Areas (KBAs)	Key Biodiversity Areas (KBAs) are defined as sites contributing significantly to the global persistence of biodiversity, in terrestrial, freshwater and marine ecosystems.	KBAs of global significance within the greater study area include: • Namib-Naukluft Park • Etosha National Park The proposed project falls outside of the KBAs but ERED

5 PROJECT DESCRIPTION

5.1 Proposed Development

The design and construction of the new 44 kV OHL to Omaruru will be based on the Erongo RED 44 kV specifications for the H-Pole Structure (refer to Figure 5.1) below; the map of location is indicated in Figure 1.1). The aim of this project is therefore:

- To re-route the Omburu-Omaruru line such that the clearance is at least 50 m apart by constructing a new overhead line to the Omaruru Intake Station.
- Build two cross link structures across the two lines for redundancy such that if one of the lines is faulty ERED are still able to supply electricity. This will be installed on both ends of the lines as indicated in Figure 1 (one near Omburu and the other near Omaruru).

The proposed project activity will involve the supply, delivery, construction of a 44 kV H-pole power line structure (see Figure 2 & 3). This structure will consist of wooden poles arranged in an H-configuration, connected by ACSR conductors and supported with insulators. The poles will be approximately 10 m high, and erected at intervals of approximately 100 m (i.e. the span length) along the proposed route.

The H-pole intermediate structure does not have stay wires. The H-pole strain structure (used e.g. at bend points, for extra strength) includes stay wires for strength and live "jumpers" to convey the power around the bend. "Droppers" are also used, e.g. on transformer structures (see Figure 3). Both live jumpers and droppers should be insulated, to prevent bird electrocutions.

Each of the above pole structures is earthed by means of a galvanised wire running vertically from the ground to the top of the pole; the horizontal pole also has an earth wire, connected to the pole earth (Figure 2). It is considered standard practice to provide an "air space safety gap", whereby the earth wire on each pole stops 300 mm below the lowest conductor phase. The gap should be wide enough to avoid the earth from being permanently active, but close enough to allow lightning strikes to bridge it. This procedure is known as "gapping", and is a means to ensure that the pole is not permanently earthed, to avoid the electrocution of larger birds sitting on top of the pole.

All construction activities will be carried out in accordance with SANS 10280 and Specification Reference REV TRMSCAAC1 3: Transmission Line Towers and Line Construction. "Soilcrete" foundations will be constructed for each pole structure to ensure stability and durability.

The existing 22 kV Omburu-Sonskyn line (which will remain, in parallel on the eastern side of the new line) is of "wishbone" structure, slightly lower, with span length 80-90 m (see Figure 4).

Bulk services and infrastructure

Access: The site is accessible from the C33 tarred road, C36 gravel road and from existing access/ maintenance tracks to the existing powerline networks.

Water supply: Supply of water where required will be managed by the construction contractor. Small quantities are required and mobile water bowsers will be used.

Electricity reticulation: Small, mobile generators will supply power during the construction phase.

Waste disposal: Small quantities of waste will be generated during construction phase. Waste will be separated at source, stored in such a manner that there can be no discharge of contamination to the environment, and either recycled or reused where possible.

Sanitation: During construction, portable toilets with associated septic tank will be used. Septic tanks will be emptied on a regular basis.

Accommodation: The construction team will commute daily to the construction site from Omaruru.

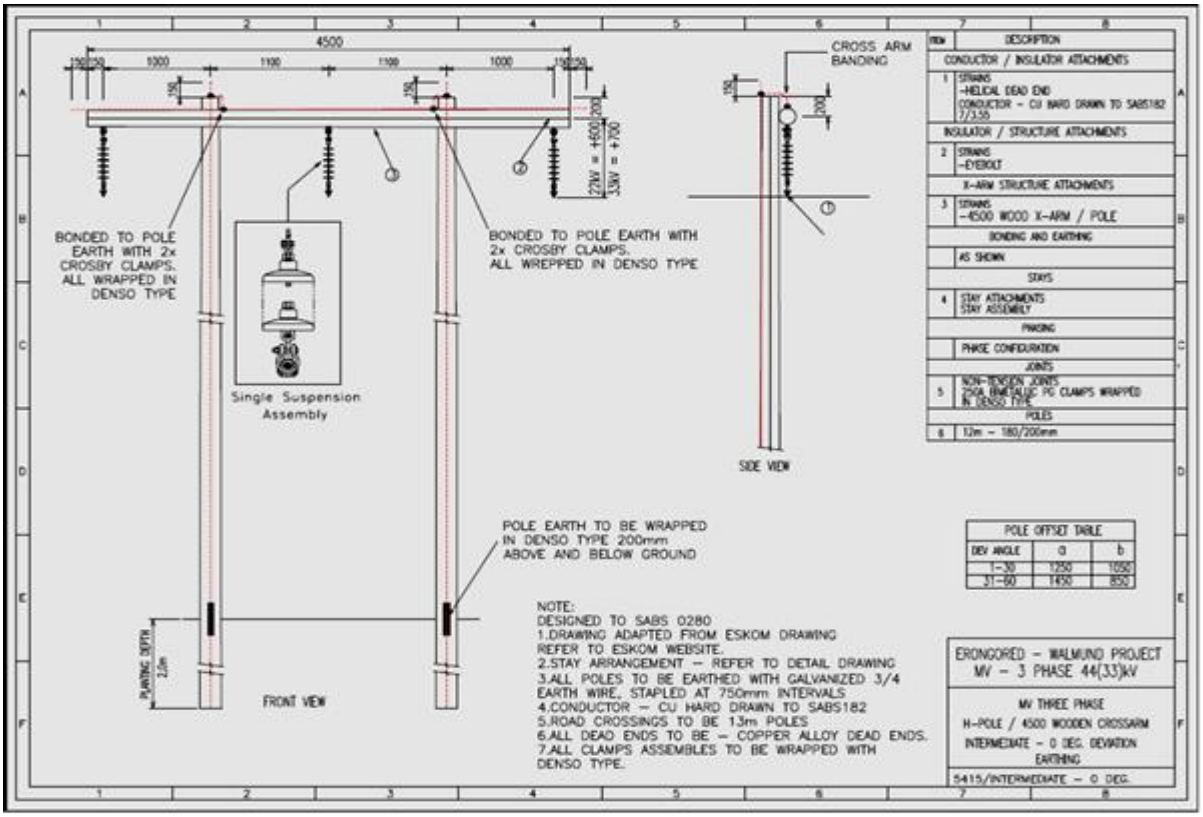


Figure 5.1. a) Structure for the intermediate pole for the proposed new Omburu-Omaruru 44 kV overhead line; b) technical diagram showing earthing system (above red) and an example of the structure in the Erongo region (below).

Figure 5.2. Typical transformer/step-down structures for low/medium voltage overhead line structures; note the higher H-pole on the left, used for extra strength (and height, e.g. at road crossings).

Figure 5.3. The "wishbone" structure of the existing Omburu Sonskyn 22 kV overhead line (right, which will remain in parallel to the new 44 kV line), and the 22 kV HLPCD distribution line which will be replaced (left).

The project development will be subdivided into phases including:

- ❖ Phase 1: Tender process and site preparations for construction of power line and temporary mobile infrastructure
- ❖ Phase 2: Construction process of the power line
- ❖ Phase 3: Removal of temporary mobile infrastructure and rehabilitation
- ❖ Phase 4: Power Supply and Maintenance (i.e. Operational phase)
- ❖ Phase 5: Decommissioning of the existing Omburu-Omaruru 44 kV OHL
- ❖ Phase 6: Decommissioning of the proposed new Omburu-Omaruru 44 kV OHL

5.3 Site Selection

The proposed new Omburu-Omaruru 44 kV OHL will be re-routed adjacent and in parallel to the existing Omburu-Omaruru 22 kV overhead line with a distance of 50 m apart as shown in Figure 1.1. The land belongs to the Municipality of Omaruru. ERED has notified the Municipality of Omaruru of the proposed project and are entering into negotiations regarding the registration of the new servitude for the new Omburu-Omaruru 44 kV OHL.

5.4 Project Development Phases

The construction and operation of the proposed new Omburu-Omaruru 44 kV OHL will be subdivided into phases and it's discussed below in more detail.

5.5.1 Phase 1: Tender process and site preparations for construction of power line and temporary mobile infrastructure

Erongo RED will advertise the tender for the construction of the proposed new Omburu-Omaruru 44 kVoverhead line. The tender shall specify to appoint experienced contractors for the construction of the powerlines.

Existing access routes and already disturbed areas will be used for access to, and construction activities associated with the new power line. Due to the length of the power line being about 10 km, to avoid travelling costs and to minimise regular activities on the access road, a temporary laydown for safe storage of equipment, fuels, lubricants, solvents, paints and construction materials will be established.

Site preparation activities for the construction of the power line will involve:

- Surveying and setting out the power line bend points and pole locations
- Drilling of holes for poles using trucks and drills
- Portable toilets will be located in close proximity to where construction activities are being undertaken to avoid long distance driving to access them. These will be serviced regularly
- Determining mobile waste collection and storage points

5.5.2 Phase 2: Construction process of the power line

Construction activities are limited to the power line installation. Holes will be excavated for the installation of the wooden poles. The design for the proposed power line structure is presented in Figure 5.2. The power line will consist of an H-pole design structure with conductors and insulators. The project design will be carried out by Erongo RED internally and it will be based on the specification -22/33/44 kV to Erongo RED standards.

The project design specifications are outlined as per below: (and design plans are attached to Appendix F: New 44 kV OHL design plans).

- All project parts will compose 33 (44) kV equipment as specified to Erongo RED's approved specifications.
- All construction activities will be in conformance to SANS 10280 / SPECIFICATION REFERENCE REVE TRMSCAAC1 3: TRANSMISSION LINE TOWERS AND LINE CONSTRUCTION published March 2001
- MV – 33 kV feeder line to be built to a minimum of 44 kV Specification
- All switching equipment (load breaks will be from McWade type only)
- All surge diverters to be the Josslyn type
- A ruling span of 100 m will be adhered to -11 / 12 / 13 m poles will be used for the line construction on the main line
- Road crossings in the region will be to 10 m clearance to allow mining equipment to be transported. Erongo RED special road crossing structures as per tender drawings
- All hardware (suspension brackets / strain brackets / stay guy grips) shall be wrapped in Denso tape
- All threaded rods and bolts shall be painted with cold galvanizing paint after final fitting and fastening of bolts
- All suspension brackets to be Malleable Cast Iron (Galvanised to SABS) suspension cradle type. No Aluminium suspension clamps will be accepted
- All strain fittings to be Malleable Cast Iron (Galvanised to SABS) with copper alloy dead ends for copper conductor. No aluminium fittings will be accepted for Copper Conductor
- 44 kV H-Pole Copper Conductor Line construction with H-pole structures

- Insulators must have a minimum creepage of 31mm/kV; based on 44 kV operating voltage. (Required minimum creepage of 1364mm for Heavily polluted conditions as per IEC 60815 classification)

- Insulators shall be equal or similar to McWade type insulators, fully type tested according to SANS/IEC standards

Existing service roads will be used to access the areas for constructing the power line. After construction process is completed Erongo RED will initiate a maintenance process for fault finding along the power line.

The construction activities relating to the power line can be outlined as per below;

- Operation and movement of construction vehicles along the proposed 33 kV power line route
- Pole dressing will include painting, grinding and welding by the team of labourers
- Conductors will be strung using trucks and vehicles to create the power line
- Installation of transformers (cable / transformer point construction)
- Use of generators
- Handling, storage and transportation of non-hazardous and hazardous waste
- Refuelling of equipment when required
- Slope stabilization and erosion control

Accommodation during construction phase

The construction team will commute daily to the construction site from Omaruru. A maximum number of ±20 labourers will be appointed for the construction activity.

Sanitation during construction

Sanitation where required will be managed by the construction contractor. Portable toilets with associated septic tanks will be used. The septic tanks will be emptied on a regular basis and the effluent disposed of at the Omaruru licensed facility off-site.

Power supply for construction activities

Supply of power where required will be managed by the construction contractor. Small, mobile generators will supply power for the construction phase.

Water supply for construction activities

Supply of water where required will be managed by the construction contractor. Small quantities are required therefore mobile water bowsers will be used for water supply purposes.

Waste Management during construction

Waste management will be managed by the construction contractor. Relatively small quantities of waste will be generated during the construction phase. Waste will be separated at source, stored in a manner that there can be no discharge of contamination to the environment and either recycled or reused where possible. The remainder will be transported off site to appropriate recycling or disposal facilities including the Omaruru disposal site or the Walvis Bay hazardous disposal facility for

hazardous waste. The only hazardous waste expected (in relatively small volumes) is possible hydrocarbon spillages and associated hydrocarbon contaminated material (i.e. soil, etc.) from construction vehicles and machinery, waste paint, etc.

5.5.3 Phase 3: Power Supply and Maintenance (Operational phase)

The operational phase includes the following processes:
- Permanently disconnect the existing Omburu-Omaruru 22 kV OHL
- Power supply
- Maintenance of new Omburu-Omaruru 44 kV OHL

Permanently disconnect existing Omburu-Omaruru powerline
The existing Omburu-Omaruru 22 kV overhead line will be disconnected permanently.

Power supply during operational phase
The use of a powerline that supplies the pump station site with electricity, independent of its length may pose a risk to the surrounding fauna in particular birds. However, the powerline at the proposed site will be buried which significantly reduces the risk to the surrounding fauna in particularly birds.

Maintenance during operational phase
The Municipality of Walvis Bay will be responsible for maintenance services of the new sewage pump station and rising main, and is required to adhere to all requirements in the EMP. The sewage pump station will be maintained on an annual basis. The annual maintenance of the sewage pump station is to extend the useful life of the pump station for as long as possible.

5.2.4 Phase 4: Decommissioning of existing Omburu-Omaruru powerline infrastructure
The phase includes:
- The safe removal of all existing infrastructure;
- Rehabilitation of environment affected by existing powerline for example closing of pole holes, etc.

5.5.5 Phase 5: Decommissioning of the new sewage pump station and rising main
In the event that the new Omburu-Omaruru 44 kV OHL has reached its useful life, the ERED must ensure that the powerline is taken down in a safe and responsible manner. The new Omburu-Omaruru powerline shall be replaced with the similar type of powerline, at least similar in function and capacity.

5.6 Alternative Assessment

The purpose of this section is to describe and assess the proposed alternatives to establish the preferred alternative. It is however important to note that the selection of a specific design for a site depends on the site conditions and in some instances it may not be technically or economically feasible to implement the preferred alternative.

No other site-specific alternatives have been investigated for the new Omburu-Omaruru 44 kV overhead line, due to the fact that the upgrades are proposed close to the existing site to enhance the

existing functionality thereof and to minimise environmental risk related to the existing site. Further, the proposal will not require any additional development to encroach beyond the boundaries of the current site, thereby limiting the development footprint.

The site is owned by the Municipality of Omaruru and therefore the process does require further negotiations with third parties for site acquisition purposes and registering of servitudes.

ERED decided on the re-route based on the safe distance between the existing Omburu-Omaruru overhead line. This safe distance improves the reliability and operation of both lines i.e. Omburu-Omaruru OHL and Omburu-Sonskyn OHL.

5.7 The "No Go" Option

The option of not implementing the new proposed Omburu-Omaruru 44 kV OHL would mean that the Erongo RED would not be able to effectively distribute electricity to cater for the increased population demand and socio-economic growth in Omaruru. Therefore, continuous electricity disruptions to residential and commercial properties and farms in the community of Omaruru will be the result of not implementing the new proposed Omburu-Omaruru powerline. Potential impacts on the environment would however be avoided with the construction and operation of the new Omburu-Omaruru powerline.

The proposed project could lead to some employment opportunities in the various regions of Namibia and contribute to both Harambee and Vision 2030 objectives for infrastructure development and community upliftment in the country. In that regard, the "no-go" alternative is not the preferred alternative as it is believed that this project could positively contribute to development in Namibia especially if the potentially negative effects of the project on the receiving environments are avoided or at least minimized.

6 THE RECEIVING ENVIRONMENT

This section has been compiled with reference to the site visit by the Environmental Team; other EIAs conducted in the regional area; avifauna assessment study and use of satellite imagery. A site visit of the proposed project area was conducted on 1 August 2025.

6.1 LOCALITY, TOPOGRAPHY AND SURROUNDING LAND USE

The study area lies some 6 km south-east of Omaruru, in the Erongo Region of Central Namibia (Figure 6.1). The study area is 140 km north-east of the Namib-Naukluft Park, a nationally protected area, and also a Global Important Bird Area (IBA; NA010) and Key Biodiversity Area (KBA; Figure 6.1). It is also 240 km south of the Etosha National Park, a Global IBA (NA004), KBA and Ramsar site.

IBAs are sites of international significance for the conservation of birds at the Global, Regional (Continental) or Sub-regional (southern African) level, selected according to a set of four criteria based on globally threatened species, restricted-range species, biome-restricted species and congregations (see Section 3, Table 2 above; Marnewick et al. 2015). Namibia has 19 IBAs.

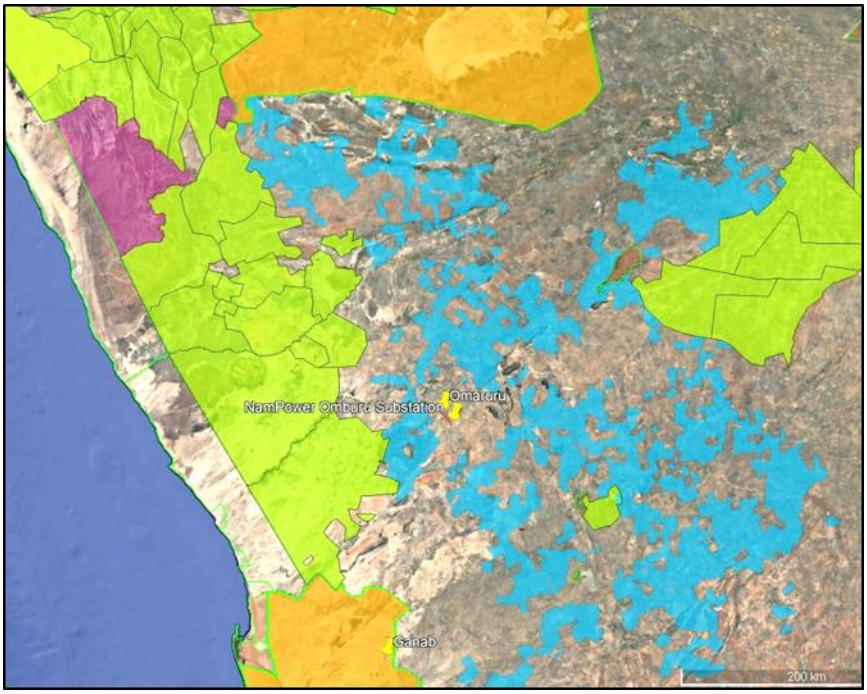


Figure 6.1. Protected areas, Important Bird Areas (IBAs) and Key Biodiversity Areas (KBAs) in relation to the study area (brown = formally protected areas; green = communal conservancies; blue = freehold conservancies; EIS 2025, based on a Google Earth map).

Key Biodiversity Areas (KBAs) are defined as sites contributing significantly to the global persistence of biodiversity, in terrestrial, freshwater and marine ecosystems. The KBA Standard establishes a consultative, science-based, globally agreed process for KBA identification (KBA

Standards and Appeals Committee 2020; www.keybiodiversityareas.org). Private conservation initiatives in the greater area include numerous freehold conservancies and communal conservancies.

The study area lies within the Central Western Plain Landscape (Atlas of Namibia Team 2022). The altitude is around 1,260 m above sea level (masl). The Central Western Plain is a broad landscape stretching east from the Coastal Plain across much of central Namibia (Atlas of Namibia Team 2022). Elevations in this landscape rise gradually from about 500 m above sea level in the west to approximately 1,000 m in the east. The plain is punctuated by many inselbergs, most of which are small granite hills, but it also encompasses the large granitic Erongo and Paresis mountains and the Brandberg and Spitzkoppe (Figure 7). Rock formations surrounding the inselbergs are mainly metamorphosed products of ocean sediments that were forced up during the formation of Gondwana. The Escarpment once extended across this area before it was eroded and smoothed away by rivers into these plains. Such erosive forces seem improbable in today's arid climate, but their power becomes evident when the sizeable Khan, Omaruru, Swakop and Ugab rivers, which drain the landscape to the west, occasionally flow. East of the Erongo Mountains most of this landscape area is divided into large farms used for livestock, wildlife and tourism. Rainfall decreases towards the west.

Figure 6.2. The Central Western Plain is a broad landscape, punctuated by many inselbergs (photo: Atlas of Namibia Team 2022, p13).

6.2 CLIMATE

Omaruru, situated in Namibia’s Erongo Region, experiences a subtropical desert climate (Köppen classification: BWh), characterized by hot, dry conditions for most of the year and highly seasonal, erratic rainfall. This climatic pattern is influenced by its inland position on the central plateau, far from the moderating effects of the coast, as well as by the broader arid to semi-arid environment typical of Namibia.

The average annual rainfall for the greater study area is moderately high, namely 300-400 mm, falling mainly during January-March (Mendelsohn *et al*. 2002; Atlas of Namibia Team 2022). Precipitation is concentrated in the summer rainy season, which generally spans from January to April, with February being the wettest month, often receiving 70–90 mm of rain. The rainfall typically occurs as short-lived thunderstorms, which can be intense but are irregular in timing and distribution. In contrast, the winter months from May to September are almost entirely dry, with little to no measurable rainfall, and the air becomes markedly less humid.

Humidity in Omaruru follows the rainfall cycle closely, reaching its peak during the late summer months when moisture from convective storms increases atmospheric dampness, and dropping to its lowest in late winter and early spring (August–September), when relative humidity can fall below 20 %. This dryness, coupled with high solar radiation, enhances the desert-like conditions of the region during the long dry season.

Temperatures in Omaruru remain relatively high year-round. Average annual temperatures are 18-20°C (range 22-26°C, but reaching 40°C and over). The hottest months are typically December through February, when daytime maximum temperatures often exceed 30 °C, reaching average highs of around 32–33 °C. During these summer months, nights are mild to warm, with average minimums of 18–20 °C. The coolest period occurs in June and July, when daytime temperatures average around 24 °C and nighttime temperatures can drop sharply to near 9–10 °C. These colder nights are the result of clear skies and low humidity, which allow for rapid heat loss after sunset.

The dominant wind direction is from the east, with average wind speeds of around 10 km per hour.

6.3 GEOLOGY AND HYDROGEOLOGY

Omaruru lies within the Central Zone of the Damara Belt, a Neoproterozoic–Cambrian orogenic belt that trends NE–SW across central Namibia. In the Omaruru area, the bedrock geology is dominated by metasedimentary rocks of the Damara Supergroup—chiefly schists of the Kuiseb Formation, marbles of the Karibib Formation, and interlayered calc-silicate units—cut by numerous granitic intrusions. A major regional structure, the Omaruru Lineament, runs NE–SW through the district and forms a first-order tectonic boundary that separates the northern and southern parts of the Central Zone; it controlled both deformation and post-orogenic magmatism during and after the Damara Orogeny (c. 560–480 Ma) (Lehtonen et al.; Brandt; see also Rb–Sr geochronology for Damara deformation phases).

The younger Erongo Igneous Complex, part of the Damaraland Alkaline Province, crops out to the west–southwest of Omaruru and comprises sub-volcanic granites, ignimbrites, and volcanics that intruded and overlie the Damara metasediments; related granites (e.g., the Erongo Granite) host pegmatites and notable Sn–W and rare-borosilicate mineralization. Locally, remnant Karoo sedimentary and volcanic rocks also occur around the Erongo Mountains, recording Permo-Triassic basin fill and later magmatism. Collectively, this litho-structural framework yields a landscape of low-permeability crystalline and metamorphic rocks dissected by lineaments and river valleys floored by younger alluvium. (Lehtonen et al., 2008).

From a hydrogeological perspective, Omaruru exemplifies Namibia's dual aquifer system: (1) fractured basement aquifers in the Damara metasediments and granites, and (2) alluvial aquifers along ephemeral river courses. The crystalline bedrock generally has low primary porosity, so groundwater occurs in fracture and fault zones—especially along regional structures such as the Omaruru Lineament—producing variable well yields that depend on fracture connectivity and weathering depth. Storage is limited, transmissivity is heterogeneous, and borehole performance improves markedly where drilling intercepts sheared or jointed zones. These conditions are typical of the Central Zone basement aquifers country-wide. (Africa Groundwater Atlas—Hydrogeology of Namibia; Christelis & Struckmeier, 2011).

In contrast, the Omaruru River corridor hosts high-value alluvial aquifers composed of coarse sands and gravels recharged episodically during flood events. The best-known example downstream is the Omdel (Omaruru Delta) aquifer in the central Namib, which underpins urban and industrial supply on the coast. Although Omdel lies far downstream of the town, it illustrates the hydraulic behavior of the system fed by Omaruru floods: recharge is event-driven, storage is distributed within laterally variable channel and floodplain deposits, and aquifer water quality reflects a balance between fresh flood recharge and brackish inflows from the surrounding desert and, toward the coast, potential marine influences. Isotope studies and numerical assessments show that Omdel extends ~35 km inland from the coast to ~230 m a.s.l., and that sustainable abstraction depends on managing withdrawals to match infrequent flood-recharge pulses. (Nawrowski, 1990; Application of Tracers in Arid Zones—Omdel isotope study; Hydrogeological characteristics of the Omdel Aquifer; Rosenberg International Forum brief; UWC thesis on Omdel management).

Upstream around Omaruru town, smaller alluvial pockets along the river and tributaries behave similarly on a local scale: they provide the most reliable targets for moderate-yield boreholes, but are sensitive to multi-year droughts and sediment clogging after floods. Where river gravels thin over bedrock, wells may tap a composite system (alluvium over fractured basement), with pumping stress transferring quickly to riverbed storage during dry seasons. Strategic siting near paleochannels, bar-and-swale deposits, and structurally thickened alluvium can significantly improve yields and water quality. Basin-level initiatives, such as the Omaruru Basin Management Committee established in 2008, aim to coordinate such conjunctive use, flood-recharge protection, and demand management across the catchment. (Africa Groundwater Atlas; Hydro-Wiki Omaruru Basin).

The structural grain of the region strongly influences groundwater occurrence. The Omaruru Lineament is a long-lived shear zone initiated before Damara times and reactivated during orogeny and later tectonomagmatic events; it subdivides metamorphic facies across the Central Zone and focuses fluid flow and mineralization. This structural control explains the localization of some productive fracture-aquifer wells and the alignment of pegmatite swarms and Sn–W occurrences along and north of the Erongo Complex. For hydrogeologists, these lineaments serve as high-priority targets when siting boreholes in otherwise tight basement rocks. (Waterberg Fault/Omaruru Lineament studies; Central Zone syntheses; Damara metallogeny)

6.4 BIODIVERSITY

The study area is fairly flat, with scattered inselbergs. A major topographical feature of the landscape is the large, ephemeral Omaruru River, which runs from north-east to south-west across the north-west part of the study area (Figure 8). The river flows only after good rains. Other surface water is limited, in the form of scattered farm dams, waterholes and irrigation schemes in the greater area.

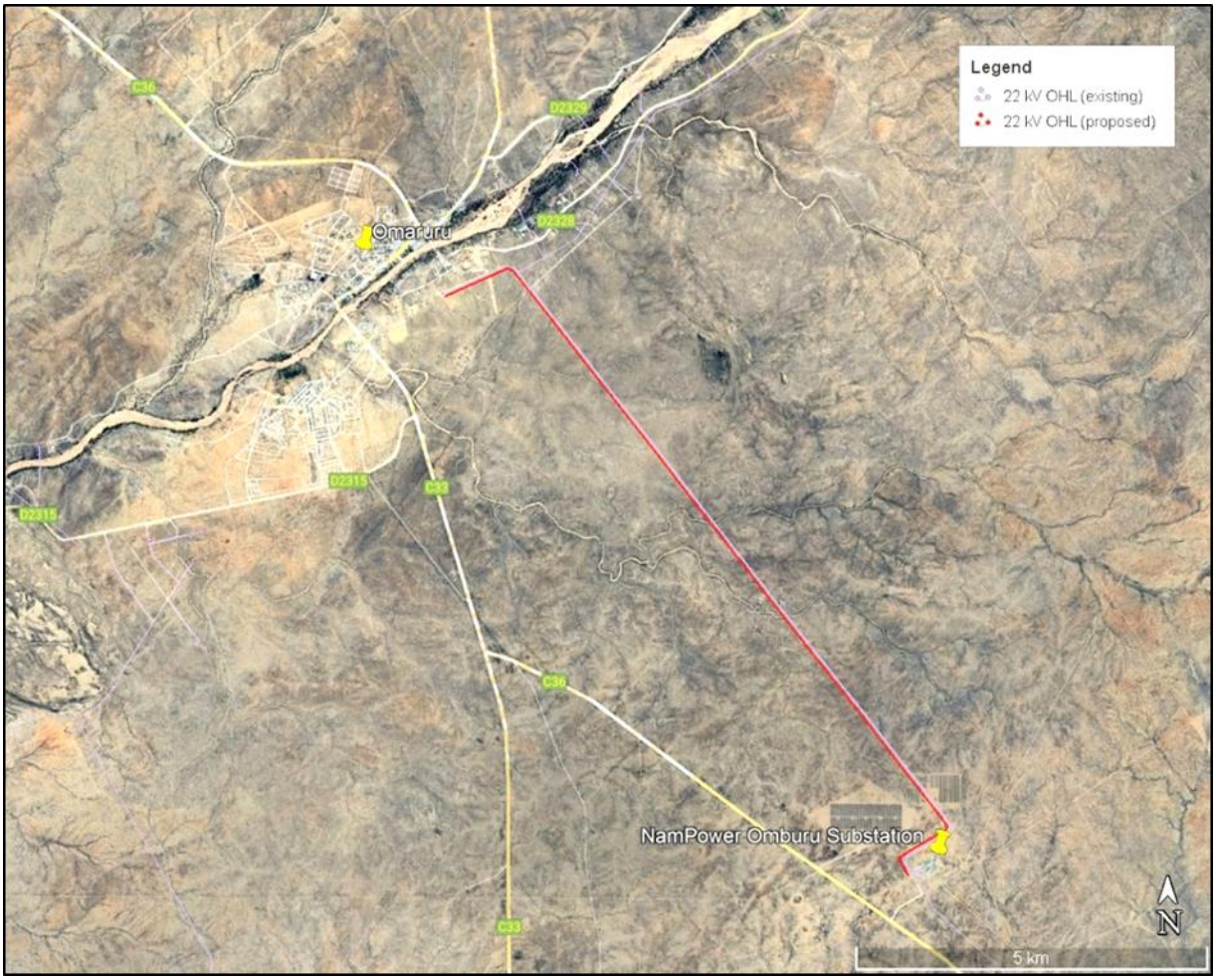


Figure 6.3. The project area showing new/replacement 44 kV Omburu-Omaruru OHL (red; approximate route) and existing 22 kV Omburu-Sonskyn OHL (purple) (based on a Google Earth map and BID 2025); arrows indicate sections where the new power line will cross major ephemeral drainage lines.

The servitude of the proposed new power line runs parallel to the Omaruru River for 1 km, at the northernmost end, and some 600 m from the river (Figure 8). The servitude also crosses a number of much-branched drainage lines. Such features provide feeding areas and movement corridors for birds in this bushy habitat.

Flora Diversity

Omaruru's flora sits at the junction of Namibia's escarpment and interior savannas, so several vegetation types interleave across the district—from mountain savanna and karstveld on rocky hills to thornbush and mixed tree–shrub savannas on plains, with riparian woodland ribboning along the ephemeral Omaruru River. Regional syntheses for Namibia map these types along a west–east

rainfall gradient, with sparser, desert-leaning shrublands toward the Erongo/escapement front and denser savannas inland; this mosaic underpins the district's high habitat variety despite an overall arid climate.

On rocky slopes and inselbergs around the Erongo Mountains—west and southwest of Omaruru—the flora is especially distinctive. Iconic succulent trees and shrubs include *Moringa ovalifolia* (African moringa), various Commiphora (myrrh relatives), tall stem-succulents such as Euphorbia spp., and scattered aloes (e.g., *Aloe littoralis*). Many of these taxa are classic escarpment specialists adapted to heat, glare and skeletal soils. The Erongo–Brandberg massif belt is also a center of plant endemism and richness within the Namibian savanna woodlands, with dozens of localized species confined to these mountains and adjacent escarpment hills.

Across open plains and lower pediments east of the escarpment, thorn-savanna elements dominate. Typical trees and large shrubs include camel thorn (*Vachellia erioloba*), sweet thorn and black thorn (Vachellia/Senegalia spp.), shepherd's tree (Boscia spp., incl. B. foetida), corkbush (Commiphora spp.), rhigozum (*Rhigozum trichotomum*), and catophractes (*Catophractes alexandri*). These communities grade westward into more open dwarf-shrub savannas as rainfall falls off toward the Namib, while remaining part of the broader Tree-and-Shrub Savanna biome that covers much of central Namibia.

The tree and shrubs species conspicuous in the area includes; Parksonia africana, Acacia mellifera, Catophractes alexandrii, Zizphus mucronata, Acacia hebeclada, and Croton grastissimus, Boscia albitrunca, Terminalia prunioides, Myrothamnus flambellifolius, Combretum imberbe (Leadwood), Acacia erioloba, Faidherbia albida (Ana tree) and Prosopis.

Fauna Diversity

Omaruru and its surrounding Erongo foothills support a rich and varied assemblage of animals shaped by the district's mix of escarpment rocklands, ephemeral-river corridors and semi-arid savanna plains. Although the wider Erongo region is better known for its botanical endemism, its fauna ranges from small, locally abundant desert specialists to larger savanna megafauna where protected reserves and private conservancies provide habitat and water. The distribution and abundance of species are strongly driven by topography (rocky inselbergs and kloofs), the presence of alluvial strips along the Omaruru River, and the episodic nature of rainfall and river flow that governs food and water availability in this arid landscape.

Mammal diversity in the Omaruru district spans small rock-dwelling taxa to ungulates and, locally, larger charismatic species on fenced reserves. Rocky outcrops and granite koppies harbour specialist small mammals such as rock hyrax (Dassie), elephant-shrews, dassie rats and various murid rodents, while valley and plain habitats support lagomorphs (hares), small antelope (including Damara dik-dik and steenbok), springbok, and larger browsers where protected areas exist. Private game reserves and conservation properties in the Omaruru area and adjacent Erongo Mountains report populations of giraffe, zebra, kudu, oryx, eland and, in some managed reserves, introduced or reintroduced megafauna such as elephant and black rhino—though these larger animals are uncommon in unprotected rangelands and their presence is largely limited to specific conservancies and lodges.

Reptiles and amphibians reflect the arid, rocky character of the district: a variety of lizards, geckos, skinks and snakes occupy granite slopes, boulder fields and desert scrub, while specialized amphibians and toads make episodic appearances associated with ephemeral pools after rains. Notably, observations and regional checklists record several species with restricted Namibian or southwestern distributions; citizen-science records from Omaruru include endemic or near-endemic amphibians such as members of the genus Poyntonophrynus and numerous desert-adapted reptiles observed in the Erongo–Omaruru landscape. These taxa are often cryptic and are most detectable following seasonal rainfall events.

Scientific name	Common name	Taxon group	IUCN / National status (summary)	Endemic / Near-endemic?	Evidence / source (occurrence & status)
Poyntonophrynus damaranus	Damara toad	Amphibia	Not globally well-assessed in some databases; treated as of conservation interest in Namibia regional lists	Namibian endemic / Damara region specialist	Observations recorded from Omaruru area (iNaturalist checklist). Regional amphibian checklists note Damara toads in central Namibia. (iNaturalist, lacerta.de)
Cordylosaurus subtessellatus	Dwarf plated lizard	Reptilia	IUCN: listed as *Vulnerable* (population limited; threats from habitat loss) per regionally focused notes	Namibian / Erongo region distribution (strongly regional)	Records and regional herpetofauna notes list this species from Erongo/Omaruru localities; online regional observations and conservation summaries report limited populations. (Facebook, lacerta.de)
Pachydactylus griffini	(Griffin's gecko)	Reptilia (gecko)	IUCN: *Least Concern* but **Namibia-endemic** (restricted national distribution) — nonetheless important as a local endemic reptile	Endemic to Namibia (national endemic)	Species account and IUCN record indicate Namibia endemism; recorded in southeastern/central Namibia checklists and regional reptile lists. (Wikipedia, lacerta.de)
Equus zebra hartmannae	Hartmann's mountain zebra (subspecies)	Mammalia	IUCN: *Vulnerable* (subspecies level concerns; regional management needed)	Near-endemic to Namibia / SW Angola montane areas	Present on Erongo private reserves and sanctuaries in the Omaruru area (reserve inventories). Conservation status documented in regional wildlife/atlas sources. (Facebook, the-eis.com)
Diceros bicornis	Black rhinoceros	Mammalia	IUCN: *Critically Endangered* (global); in Namibia present in managed populations and reintroductions	Not endemic (wider African), but red-listed globally	Reserve inventories for Erongo/Omaruru list black rhino in managed populations; IUCN and Namibia conservation actions document status and local reintroductions. (Facebook, Cheetah Conservation Fund)
Other Pachydactylus / endemic geckos (e.g., local species	Various endemic geckos	Reptilia	Many species are **Namibia endemics**; IUCN statuses vary from	Several narrowly endemic to Erongo / central	Regional reptile checklists and annotated checklists identify multiple Pachydactylus spp. with

complexes)			LC to localized concern	Namibia	restricted ranges in Erongo/Omaruru; citizen science records (Omaruru iNaturalist) document local occurrences. (lacerta.de, iNaturalist)
Selected endemic small mammals (country-level endemics)	e.g., Namib round-eared sengi species (Macrosc.)	Mammalia	Several small mammals are listed as **Namibia endemics**; conservation statuses vary	Endemic to Namibia (some species occur in western/central arid zones)	National faunal summaries and the Atlas of Namibia list 14 endemic/near-endemic mammals for Namibia (some recorded in central/Erongo localities). Local occurrence in Omaruru is possible for certain endemics recorded regionally. (the-eis.com, Ministry of Works and Transport)

BIRDS:

The main avifauna habitats in the study area are shown in Figure 9 and include (refer to Appendix G: Avifauna Specialist Study):

- In the north-western part of the study area, the large ephemeral Omaruru River and associated denser riverine vegetation, including taller trees.
- Several ephemeral drainage lines/watercourses that cross the servitude of the new power line. Such lines provide feeding and breeding areas and movement corridors for birds in this bushy habitat.
- Rocky plains with dense bush vegetation.

A total of 181 bird species has been recorded for the study area (SABAP2 data, and other sources: see above; Appendix 1). The area is well atlased, and the list is considered representative of the species likely to occur in the area.

The above total represents 27% of the 676 species currently recorded in Namibia (Brown *et al*. 2017), a richness that is classed as moderate-high (rank 6 on a scale of 8; Atlas of Namibia Team; EIS 2025). According to the avifauna baseline and scoping of sites and species, the study area is potentially sensitive in terms of birds and their habitats (refer to Appendix G: Avifuana Specialist Study).

Figure 6.4. Avifauna habitats and existing energy infrastructure in the study area include:

Top: In the south-east, the large NamPower Omburu Substation (left) and solar photovoltaic development (right; note the bushy habitat).

Centre: The existing HLPCD distribution line (left), to be removed, and the existing 22 kV "wishbone" distribution line (right) which will remain, 50 m to the east of the new 44 kV line.

Bottom: Several ephemeral drainage lines/watercourses cross the servitude of the new power line; such features provide feeding and breeding areas and movement corridors for birds in this bushy habitat.

(*Photographs: Gea Source Investment cc*)

A relatively moderate-high bird species richness has been recorded in the study area and surrounds, with a total of 181 species, or 27% of the 676 species currently recorded in Namibia. The area is well atlased.

The checklist for the study area includes eight species (4%) that are threatened in Namibia. This represents 11% of the 71 species that are on the Namibian Red Data List. Five of these species are also Globally Threatened. The greater study area has a relatively high level of endemicity, with 10-12 near-endemic species (with at least 90% of the populations occurring within the country). The list includes one intra-African migrant.

Risk assessment and mitigation efforts are directed towards priority species, namely those that have a high biological significance, i.e. primarily Red Data species (including those with migrant status) and/or endemic or near-endemic species.

Due to the high number of species on the checklist, 27 priority bird species were short-listed from a total of 41 species, as a focal group considered at higher risk to potential impacts resulting from the proposed project. This short-listing takes into account the probability of the species occurring in the study area and surrounds, and hence their vulnerability to impacts in the area.

Details of priority species

The above total of 21 short-listed priority bird species include the following groups:

- 4 Red Data species (1 Critically Endangered, 3 Endangered; 3 species also Globally Endangered; 1 species partial migrant)
- 1 species near-endemic to Namibia

The above species also fall into the following groups:

- 14 raptor species (3 Red Data; 11 other non-Red Data priority raptor species)
- 7 large terrestrial bird species (one Red Data; one Namibian near-endemic; 5 other terrestrial species)

In addition: 3 other (non-priority) species with the potential to cause impacts on infrastructure (not included in the above totals).

The 21 short-listed priority species are indicated in bold, as follows (see Table 3 in the main text for explanation of codes):

Common name(s)		Sensitivity	Prob.	Impact
A. Red Data species and migrant raptors (9)				
Vulture	**White-backed**	CR, G CR, raptor	L-M	D H C E
Eagle	**Martial**	EN, G EN, raptor	M	D H C E
Vulture	**Lappet-faced**	EN, G EN, raptor	L-M	D H C E
Eagle	Tawny	EN, G VU, raptor	L	D H C E
Wood Hoopoe	**Violet**	EN; NamNE >90%; cavity breeder	M	D H C E
Parrot	**Rüppell's**	NT; NamNE >90%; large terrestrial bird; cavity breeder	M	D H C E
Bustard	**Kori**	NT, G NT; large terrestrial bird	L-M	D H C
Stork	Marabou	NT; large terrestrial bird	L	D C E
Kite	**Yellow-billed**	Intra-African migrant; raptor	M	D H C E

B. Namibian near-endemic species (6)				
Wood Hoopoe	**Violet**	EN; NamNE >90%; cavity breeder	M	D H C E
Parrot	**Rüppell's**	NT; NamNE >90%; large terrestrial bird, cavity breeder	M	D H C E
Hornbill	**Damara Red-billed**	NamNE >90%; large terrestrial bird; cavity breeder	H	D H C E
Hornbill	**Monteiro's**	NamNE >90%; large terrestrial bird; cavity breeder	M-H	D H C E
Shrike	**White-tailed**	NamNE >90%	M	D H C
Rockrunner		NamNE >90%	L	D H C
C. Other power line-prone raptors (16)				
Owlet	**Pearl-spotted**	Raptor, nocturnal	H	D H C E
Scops Owl	**African**	Raptor, nocturnal	M-H	D H C E
Eagle-Owl	Spotted	Raptor, nocturnal	L	D H C E
Eagle-Owl	Verreaux's	Raptor, nocturnal	L	D H C E
Owl	Southern White-faced	Raptor, nocturnal	L	D H C E
Owl	Western Barn	Raptor, nocturnal	L	D H C E
Goshawk	**Pale Chanting**	Raptor	H	D H C E
Goshawk	**Gabar**	Raptor	M-H	D H C E
Kestrel	**Rock**	Raptor	M	D C E
Kite	**Black-winged**	Raptor	M	D H C E
Snake Eagle	**Black-chested**	Raptor	L-M	D H C E
Harrier-Hawk	African	Raptor	L	D H C E
Hawk-Eagle	African	Raptor	L	D H C E
Shikra		Raptor	L	D H C E
Snake Eagle	Brown	Raptor	L	D H C E
Sparrowhawk	Little	Raptor	L	D H C E
D. Other power line-sensitive species (12)				
Hornbill	**African Grey**	Large terrestrial bird; cavity breeder	H	D H C E
Hornbill	**Southern Yellow-billed**	Large terrestrial bird; cavity breeder	M	D H C E
Hornbill	Southern Red-billed	Large terrestrial bird; cavity breeder	L	D H C E
Parrot	**Meyer's**	Large terrestrial bird; cavity breeder	M	D H C E
Spurfowl	**Red-billed**	Large terrestrial bird	H	D H C E
Guineafowl	**Helmeted**	Large terrestrial bird	M-H	C E
Spurfowl	**Swainson's**	Large terrestrial bird	M	D H C E
Korhaan	**Northern Black**	Large terrestrial bird	M	D H C
Korhaan	**Red-crested**	Large terrestrial bird	M	D H C
Sandgrouse	**Double-banded**	Large terrestrial bird	M	D H C
Sandgrouse	**Namaqua**	Large terrestrial bird	L-M	D H C
Goose	**Egyptian**	Aquatic/terrestrial species	M	C E
E. Species that could impact on power line infrastructure due to nesting and other activities (3)				
Crow	**Pied**	Nesting; large terrestrial bird	H	N E
Weaver	**Red-billed Buffalo**	Nesting	M-H	N
Weaver	Sociable	Nesting	L	N

Sensitivity to power line interactions

Bird species may be sensitive, in varying degrees, to power line impacts such as collision, electrocution and/or disturbance and habitat destruction.

Examples of some of the power line-sensitive species in the study area are shown below (Figure 11-16), together with more recent SABAP2 distribution data.

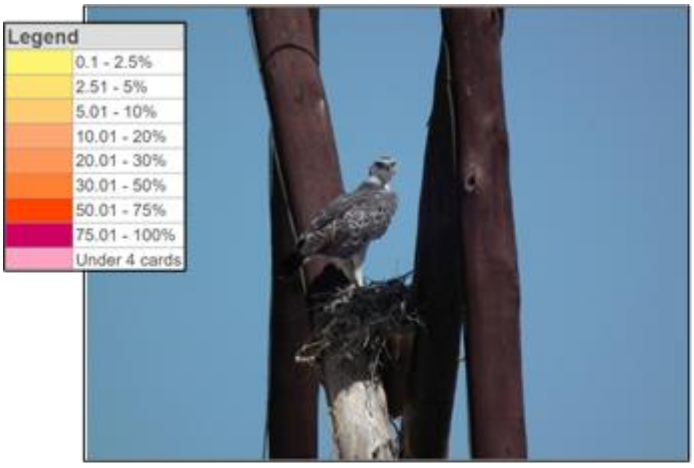
The NamPower/Namibia Nature Foundation Strategic Partnership (a former project of Namibia Nature Foundation, http://www.nnf.org.na) has documented wildlife and power line incidents from 2009 onwards, involving some 847 animals up to 2020, mostly birds and mostly collisions, but also electrocutions (EIS 2025). Due to the difficulty of obtaining records in bush-encroached areas (especially in the northern parts of the country, including in the study area), low reporting rates and the high scavenging rates in general, it is likely that the incidents observed are an under-estimate.

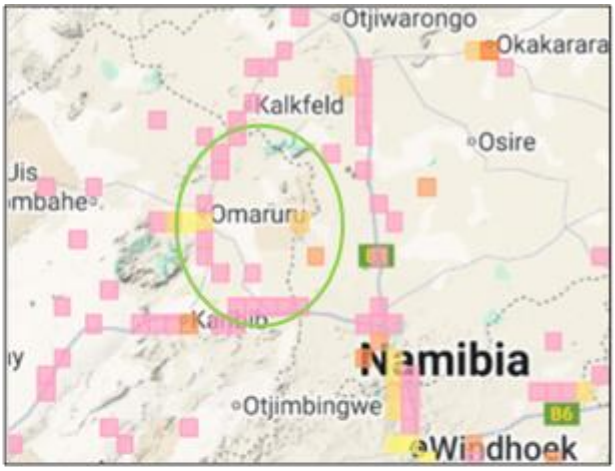
Most of the incidents throughout the country have involved flamingos (39%) and bustards/korhaans (27%). A further 11% have involved raptors, mainly vultures as well as eagles, snake-eagles and owls; and 11% have involved other waterbirds. Most of the incidents involving Lappet-faced Vulture and White-backed Vulture (33 individuals) have comprised electrocution on low-voltage distribution structures; however, collisions are also an ongoing concern. No power line survey data are available for the specific study area.

High mobility of bird species, e.g. among ephemeral resources, may render them prone to power line interactions. Bustards are susceptible to collisions due to their nomadic habits, a large body size with low manoeuvrability, and a visual "blind spot" when flying forwards (Martin & Shaw 2010, Martin 2011). This proneness to collision has also been demonstrated in vultures, storks, snake-eagles and other groups.

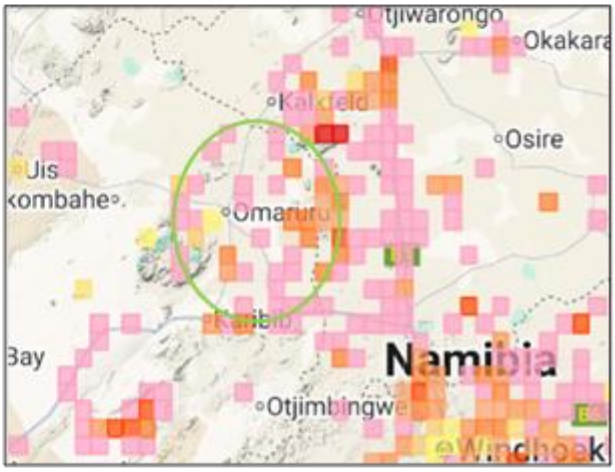
Power line incidents on record for the greater study area in Central Namibia, 2009-2025 are mapped in Figure 6.5 (NamPower/NNF Strategic Partnership data; EIS 2025). Incidents include Kori Bustard, Lappet-faced Vulture, White-backed Vulture, Western Barn Owl and Damara Red-billed Hornbill.

Examples of the above recorded power line incidents in the greater study area are shown in Figure 18.

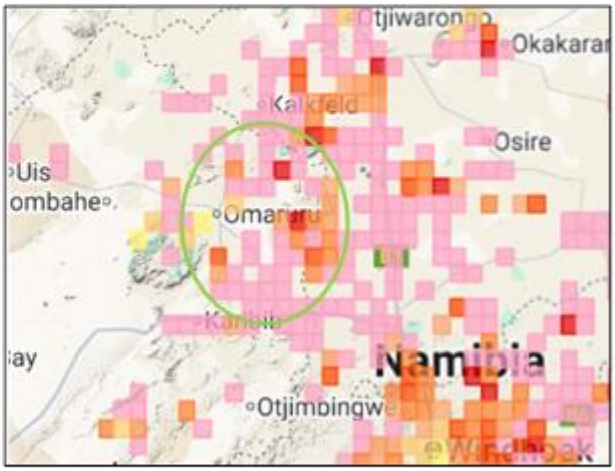




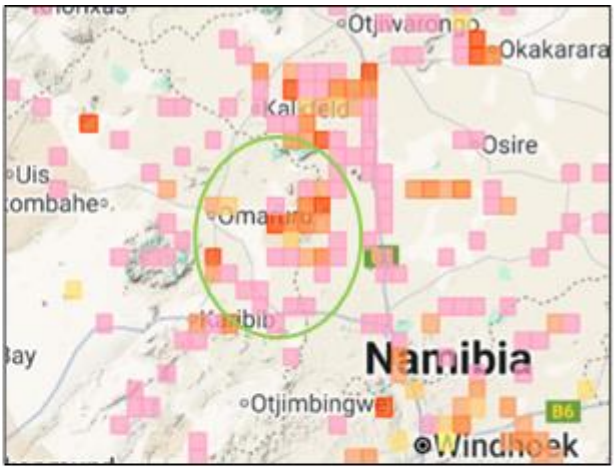
Picture 1: Martial Eagle (Namibian Endangered and Globally Endangered; juvenile on nest) and reporting rates for the greater study area SABAP2 2025).



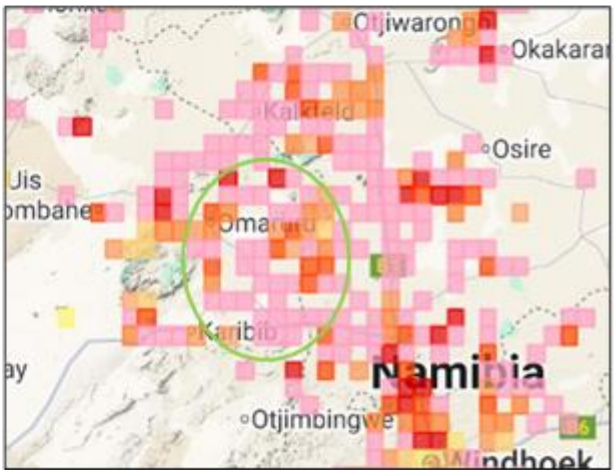
Picture 2: Lappet-faced Vulture (Namibian Endangered and Globally Endangered) and reporting rates for the greater study area SABAP2 2025).



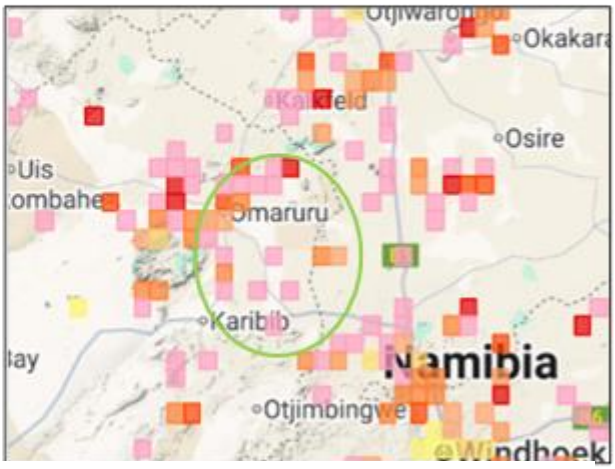
Picture 3: White-backed Vultures (Namibian Critically Endangered and Globally Critially Endangered) and reporting rates for the greater study area SABAP2 2025).



Picture 4: Kori Bustard (Namibian Near Threatened and Globally Near Threatened) and reporting rates for the greater study area SABAP2 2025).



Picture 5: Damara Red-billed Hornbill (near-endemic to Namibia) and reporting rates for the greater study area SABAP2 2025).



Picture 6: Rüppell's Parrot (Namibian Near Threatened and near-endemic to Namibia) and reporting rates for the greater study area SABAP2 2025).

Figure 6.5. Power line incidents on record for the greater study are in Central Namibia, 2009-2025 (NamPower/NNF Strategic Partnership data; EIS 2025).

6.6 VISUAL BASELINE

The visual landscape is determined by considering: landscape character, sense of place, aesthetic value, sensitivity of the visual resource and sensitive views. In this regard, the study area is considered to have an already disturbed visual landscape because of the existing overhead lines and other NamPower powerlines running from the NamPower Omburu station. Moreover, the proposed new 44 kV overhead line are not visible from the major access roads (C33 and C36). Further, proposed new 44 kV overhead line will not require any additional development to encroach beyond the boundaries of the current site, thereby limiting the development footprint. The proposed project activity will involve the construction of a new sewage pump station which will be an upgrade to the existing facility to enhance the existing functionality thereof and to minimise environmental risk related to the existing site.

6.7 SURFACE WATER AND GROUNDWATER

Omaruru's surface-water regime is dominated by the ephemeral Omaruru River, a west-flowing stream that originates on the central highlands and drains toward the Namib coastal plains. Like other western Namib rivers, the Omaruru is dry most of the year and carries flow only in response to discrete rainfall events on the plateau; runoff is highly episodic and shows strong inter-annual variability. Monitoring at runoff stations in the basin records years with practically no flow and years with large but short-lived floods, so the river behaves as a pulse system that transmits runoff rapidly from upland granite and high-runoff catchments to lower alluvial plains.

Because floods are infrequent but sometimes intense, surface water functions primarily as a recharge driver for alluvial aquifers and as a temporary ecological and socio-economic resource (supporting ephemeral wetlands, riparian vegetation and grazing). Flood pulses deposit and rework channel and floodplain sediments, create temporary pools and mobilise sediments and nutrients — processes that sustain riparian vegetation and invertebrate/vertebrate life after rains. The spatial pattern of runoff generation is heterogeneous: granite and shallow soils in the upper catchment produce proportionally high unit runoff, whereas the lower basin shows low runoff coefficients and more infiltration where alluvium is thick.

The most consequential surface-water → groundwater linkage in the Omaruru system is the Omaruru Delta (Omdel) alluvial aquifer on the coastal plain. This downstream alluvial system comprises multiple palaeochannels (Main Channel, Northern Channel, Northern Elevated Channel, Southern Elevated Channel) formed by the Omaruru River and stores significant volumes of groundwater in layered sand and gravel deposits. The Omdel aquifer extends inland for tens of kilometres and, despite the hyper-arid coastal rainfall, receives the majority of its recharge episodically from river floods originating far inland. The thickness of productive sand layers varies along the delta (tens of metres), producing locally high storage and transmissivity where continuous sand bodies occur.

Groundwater in the Omaruru district occurs in two broad aquifer types that together determine water supply options and vulnerability: (1) alluvial aquifers associated with the Omaruru River and its palaeochannels**,** and (2) fractured-basement and weathered-zone aquifers hosted in Damara metasediments, granites and related rocks in the uplands. The alluvial aquifers are generally the highest-yielding and most reliable local sources where channel sands and gravels are thick; they are the backbone of bulk water schemes and provide water for domestic, agricultural and industrial users. In contrast, groundwater in the fractured basement is stored and transmitted through weathering profiles, joints and faults; yields are highly variable and typically modest unless drilling intersects well-developed shear zones or thick weathering mantles.

In summary, the Omaruru district's water profile is one of event-driven surface water and high-value alluvial groundwater sitting above a variable fractured-bedrock aquifer. The Omaruru River provides episodic but crucial recharge pulses that sustain downstream alluvial aquifers (most notably the Omdel), which are the mainstay of bulk supply. Fractured basement aquifers supply more local and uncertain yields that depend on structural controls. Sustainable management therefore hinges on matching abstraction to episodic recharge, protecting flood-recharge areas, monitoring quality and quantity, and applying conjunctive use and targeted recharge enhancement where feasible.

6.8 DEMOGRAPHIC CHARACTERISTICS

Omaruru's demographic and socio-economic profile reflects its position as a small but growing service town and agricultural hub on the central Namibian plateau, embedded within the wider Erongo Region's mixed economy of farming, mining and tourism. Historically the Omaruru constituency recorded modest population levels: the 2011 census counted roughly 8,500 people for the constituency, while municipal and private estimates place Omaruru town itself at about 7,000–7,500 inhabitants in the latter 2010s as it expanded with peri-urban settlement and service-sector growth. These figures point to steady, if not rapid, urbanisation in the district over the last decade

Population structure and households.

Like much of Namibia, Omaruru exhibits a youthful age structure and small household sizes in urban localities. Regional census publications show that average household sizes in Erongo fell between the 2001 and 2011 censuses (reflecting national urban trends), and Omaruru's local growth was driven primarily by in-migration from surrounding rural farms and smaller settlements seeking services and employment in town. These demographic dynamics increase demand for housing, water and basic services in Omaruru and its peri-urban settlements.

Economic base and livelihoods.

The Omaruru district economy is a mixed rural–urban economy dominated by livestock farming and smallholder agriculture, supplemented by service activities, small-scale commerce, tourism (game lodges, rock-climbing and Erongo massif attractions) and pockets of mining activity in the wider Erongo region. Agriculture—largely extensive cattle and smallstock ranching—remains an important livelihood for rural households, while the town provides trading, education, health and government services. Mining and tourism in the Erongo hills and nearby conservancies contribute seasonal and formal employment, but opportunities are spatially concentrated and often not accessible to the most vulnerable rural residents.

Employment, poverty and vulnerability.

Erongo-level analyses and poverty mapping identify material deprivation and unemployment as tangible challenges for constituencies like Omaruru. Regional reports estimated relatively high unemployment and underemployment rates in parts of Erongo (with caution advised on measurement methods), and earlier poverty assessments indicated that around one-third of households in the Omaruru constituency experienced material deprivation at the turn of the century—patterns that have persisted in many rural constituencies where access to diversified livelihoods is limited. These socio-economic vulnerabilities are compounded by recurrent drought, livestock losses, and variability in informal income sources.

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Education and social services. Omaruru town acts as a local service centre: it hosts primary and secondary schools, health clinics and municipal services that serve both town residents and surrounding rural communities. Improvements in educational access have been gradual, but school attainment and completion rates in rural constituencies generally lag national urban averages—affecting youth employment prospects and perpetuating skill gaps that constrain transitions into formal sector jobs or entrepreneurial activities. Health and sanitation services in the district have

expanded through municipal programmes and development projects, though infrastructure strain rises with population gains and peri-urban settlement.

Infrastructure, water and municipal services. Omaruru's municipal infrastructure must manage both a growing urban population and semi-arid resource constraints. Town water supply relies on groundwater abstraction and managed schemes; recent environmental assessments and municipal planning documents note investments and proposals for wastewater treatment, groundwater protection and abstractions plans to meet rising demand. Road and communications access are relatively good—Omaruru lies on the main Swakopmund–Otjiwarongo corridor—supporting trade and tourism linkages to regional economic centres.

Governance, land use and local development. Local governance is delivered through the Omaruru municipal authority (and constituency structures) and is supported by regional planning from the Erongo Regional Council. Land use in the district is a mosaic of town, communal grazing, commercial farms and protected or tourism-oriented land (conservancies and private reserves). Development planning emphasises balancing agricultural livelihoods with water-sensitive urban expansion, natural-resource protection (notably for the Erongo massif), and leveraging tourism and mining to create local employment—while recognising the need for targeted poverty-reduction and skills programmes.

References: Namibia 2011 Population and Housing Census – Erongo regional profile (NSA); Omaruru town economic profile (First Capital Namibia); Erongo Regional Council demographic and sectoral summaries; UNDP/NPC poverty mapping and regional socio-economic studies; municipal EIA and service-planning documents for Omaruru.

7 STAKEHOLDER CONSULTATION

7.1 Public Participation Process

Consultation with the public forms an integral component of an EIA investigation and enables I&APs e.g. neighbouring landowners, local authorities, environmental groups, civic associations and communities, to comment on the potential environmental impacts associated with the proposed development and to identify additional issues, which they feel should be addressed in the EIA.

Included below is a summary of the stakeholders consulted, the process that was followed, and the issues that were identified.

The public participation notices for the public meeting were advertised twice in the national newspapers: The Namibian (25 July & 1 August 2025) and The Confidente (25 July & 1 August 2025). Notices were also placed at strategic locations in the and around Omaruru town and townships. The background information document (BID) were emailed to the neighbouring land users on the 6 August 2025 and the list of the stakeholders and I&APs who received the BID is included in Appendix D and their comments in Appendix E. The BID was emailed to stakeholders and registered I&APs (refer to Table 7.1).

A public meeting was organised with the Municipality of Omaruru stakeholders on 1 April 2025 at 15H00. Views, comments and opinions expressed by I&APs were noted and incorporated into this report but are also included into Appendix D and Appendix E. A list of stakeholders and I&APs who attended the meetings is also presented in Appendix C and the minutes of the meetings are presented in Appendix E.

7.2 Erongo RED Stakeholders

The following table (Table 7.1) provides a broad list of stakeholders that were informed about the project development and were requested to register as Interested and Affected Parties (I&APs) should they be interested and/or affected.

Table 7.1: Relevant Stakeholders

Stakeholder Groups	Organisation
Government Ministries and Parastatals	Erongo RED Municipality of Omaruru Erongo Regional Council Omaruru Basin Support Officer: Ministry of Agriculture, Fisheries, Water and Land Reform NamPower
Other interested and affected parties	Neighbouring land users

The full stakeholder database for the EIA is included in Appendix C of the report.

7.3 Consultation Process

Table 7.2 sets out the steps that were followed as part of the consultation process:

Table 7.2: The Consultation Process

TASK	**DESCRIPTION**	**DATE**
Notification – regulatory authorities and IAPs		
Application/Notification to MET	GEA Source Investment submit the Application	August 2025
I&AP identification	A project specific stakeholder database was developed. This database is updated as and when required. A copy of the IAP database is attached in Appendix C.	July 2025
Site Notices	Notices were placed at the public areas (Municipality of Omaruru; Ministry of Agriculture, Fisheries, Water and Land Reform Omaruru Basin Support Office and Spar shopping centre) where visible for residents or interested parties in Omaruru since the site is outside of town. Photos of the notices are attached in Appendix B.	24-25 July 2025
Newspaper Advertisements	Block advertisements were placed as follows: • The Namibian (25 July & 1 August 2025) • Confidente (25 July & 1 August 2025) Copies of the advertisements are attached in Appendix B	July/August 2025
TASK	**DESCRIPTION**	**DATE**
Public meeting, Focus Group Meetings and Submission of comments		
Public meeting, Focus group meetings, Consultations	Several consultations were made with the IAPs. This includes meetings, telephonic conversations and emails in correspondence to the IAPs. Focus group meetings were held with key stakeholders and interested and affected as follows: • Municipality of Omaruru stakeholders on 1 August 2025 at 15H00 • A public meeting was held at the Omaruru Community Hall on 1 August 2025 at 14H00	August 2025

	to inform I&APs of the EIA process The same project information was presented/shared at all discussions. A site visit of the proposed project area was conducted on the 1 August 2025 at 10H00 accompanied by the specialist team of ERED.	
Comments and Responses	Minutes of the meetings and all comments received during the meetings, by email are attached in Appendix E. A Summary of issues and response report is attached in Appendix D.	August 2025
Review of draft Scoping Report		
I&APs and authorities (excluding MET) review of Scoping Report and EMP	Copies of the main Scoping Report (excluding appendices were sent via email to all parties who registered or showed an interest in this EIA process. Authorities and IAPs had 7 days to review the Scoping Report and Submit comments in writing GEA Source Investment. The closing date for comments was 15 August 2025. There were no comments raised during the review period.	August 2025
MET review of the Scoping Report and EMP	A copy of the final Scoping Report and EMP was delivered to MET on completion of the public review process.	August 2025

7.4 Summary of Issues Raised

All issues that have been raised to date by authorities and I&APs are provided in Appendix D to the Scoping Report. Issues raised pertain to:

- Current power infrastructure of Erongo RED
- Involvement in EIA process and dissemination of EIA information
- Contingency measures to ensure uninterrupted service delivery

7.5 Responses to Issues Raised

Response to the issues and comments received from the IAPs are provided for in Table 7.3 and in Appendix D.

Date	**Who raised the issue**	**Issues/Comments/Questions**	**Response**
01 August 2025 During Public meeting in Omaruru Community Hall	Mr. Bernhardt Harasseb Omaruru Basin Support Officer	We take note of the project, The Omaruru Basin office is always ready to get involved in EIA projects and help disseminate information to the entire community.	Appreciated and encouraged to email the electronic copy of the background information document. Five hard copies of the BID were given for further distribution
01 August 2025 During Focus Group meeting at Omaruru Municipality	Mr. Sindongo Valentinus Chief Executive Officer Omaruru Municipality	• This intersection will significantly ensure the efficiency and effectiveness of electrical service delivery particularly for large power user clients. The re-routing strategy not only strengthens the reliability of supply but also serve as a strategic solution to re-occurrent power interruptions, there by supplying electricity for economic activities. • The re-routing of the medium voltage line demonstrates forward thinking infrastructure planning • Which contingency measures are in place to ensure service continuity during the re- routing phase particularly for large power users and critical public facilities?	• The comments are noted and appreciated. • There is no anticipated power interruption during the re-routing phase, as the current 22kv line will remain operation up until a switch over to the new line. • Any power interruption will be communicated and may be for a period of not more than 30 minutes.
16 August 2025 Written input submitted via a WhatsApp message	Mrs. Patricia Craven Farm Kristal 208	I missed the deadline, but I have nothing to comment except the control of the construction crew, like no hunting, no fires etc., no approaching out fence. We have a lot of poachers coming from the west and patrol. Any strange are followed and it will be a waste of our time it it's just the crew.	• Thank you, your input is valuable to us. We include your comment in the report and also make those mitigation measures in the construction managements plan. • The issue of poaching is addressing in Table 9.10 and Table 11.2 of the EMP • The issue no fires and no approaching of fences is addressed in Table 11.2 of the EMP

9 ASSESSMENT OF IMPACTS

The purpose of this section is to assess and identify the most pertinent environmental impacts by describing certain quantifiable aspects of these impacts and to provide possible mitigation measures to minimise the magnitude of the impacts that would be expected from the construction, operations and decommissioning of the proposed new Omburu-Omaruru 44 kV overhead line.

The mitigation hierarchy can be applied throughout a project's life cycle, from early planning and design, through to construction, operations and eventual decommissioning and repowering.

The mitigation hierarchy comprises the following steps:

- **Avoidance** is based on measures to anticipate and prevent the creation of impacts. Biodiversity risks need to be identified early in the project planning stages. Effective avoidance can occur through site selection (to ensure projects are not located in areas of high risk), project design (to locate infrastructure and select designs that avoid impacts) and scheduling (to ensure the timing of project activities is favourable for biodiversity).
- **Minimisation** refers to measures taken to reduce the duration, intensity and/or extent of impacts that cannot be completely avoided, as far as is practically feasible. Potential minimisation measures can be identified during early planning, and when developing design alternatives to be considered. Measures to minimise impacts can be applied throughout the project cycle. Minimisation actions fall into three broad categories:
  - **Physical controls:** adapting the physical design of project infrastructure to reduce potential impacts such as reducing habitat fragmentation through the installation of culverts or installing bird flight diverters on power lines.
  - **Operational controls:** measures taken to manage and regulate the actions of people, including project staff and contractors, such as restricting access to sensitive sites within the project area.
  - **Abatement controls:** steps taken to reduce levels of pollutants (e.g. light, noise, gases or liquids) that could have negative biodiversity impacts.
- **Restoration** refers to measures that aim to repair specific biodiversity features or ecosystem services damaged by project impacts that could not be completely avoided or minimised. Restoration is typically undertaken either during construction, or towards the end of a project as part of decommissioning and/or repowering.
- **Offsets** are measures to compensate for significant adverse residual impacts that cannot be avoided, minimised or restored. Offsets involve positive conservation interventions to generate biodiversity gains either through **avoided loss** (addressing threats to prevent predicted biodiversity loss) or **restoration** (for example, improving the quality of degraded habitat). Offsets can be complex and expensive to implement. Fortunately, most projects can usually avoid the need for offsets through careful siting and effective minimisation measures that reduce residual impacts to negligible levels.

The following potential impacts on the environment during construction, operation and decommissioning activities have been identified for this project and grouped as below. The numerous aspects of each will be discussed under each impact.

- General Socio-Economic impacts
- Electricity Supply
- Biodiversity (Physical/human disturbance of birds, including road mortalities and poaching)
- Biodiversity (Direct and indirect modification/loss/destruction of bird habitat)
- Biodiversity (Bird collisions on power line infrastructure)
- Biodiversity (Bird electrocutions on power line infrastructure)
- Biodiversity (Impacts on the power supply due to bird nesting and/or other activities)
- Biodiversity (Physical/human disturbance of fauna, including road mortalities and poaching)
- Fire and Explosion
- Health, Safety and Security
- Air Quality
- Noise Pollution
- Dust
- Waste Management
- Traffic Impact
- Soil Pollution
- Surface Water and Groundwater Pollution
- Heritage Impacts (Archaeology)
- Visual Impacts

Table 9.1 Criteria for Impact Evaluation

Risk Event	**Description of the risk that may lead to an impact**
Nature of Impact	Reviews the type of effect that the Development have on the relevant component of the environment and includes **"what is affected and how?"**
Status (+ or -)	**Positive** – environment overall will benefit from the impact **Negative** – environment will be adversely affected by the impact **Neutral** – environment overall will not be affected
Extent	**Site specific** (on site) **Sub-local** (limited to within 1 km of the site) **Local** (limited to within 15 km of the site) **Regional** (limited to within the borders of Erongo Region) **National** (limited to within the borders of Namibia) **International** (extending beyond Namibia's borders)
Duration	**Very Short** (days, < 3 days) **Short** (days, 3 days to less than a year) **Medium** (months, 1 – 5 year) **Long** (years, 5 -20 years) **Permanent** (>20 years – life of the development)

Intensity	**No lasting effect** (No environmental functions and processes are affected) **Minor effects** (The environmental functions, but in modified manner) **Moderate effects** (Environmental functions and processes are altered to such extent that they temporarily cease) **Serious effects** (where environmental functions and processes are altered such that they permanently cease and/or exceed legal standards/requirements)
Probability	Refers to the probability that a specific impact will happen following a risk event. **Improbable** (low likelihood) **Probable** (distinct possibility) **Highly probable** (most likely) **Definite** (impact will occur regardless of prevention measures)
Prevention	Measures to reduce the probability of an impact occurring
Significance (no mitigation	**None** (A concern or potential impact that, upon evaluation, is found to have no significant impact at all.) **Low** (Any magnitude, impacts will be localised and temporary. Accordingly, the impact is not expected to require amendment to the project design.) **Medium** (Impacts of moderate magnitude locally to regionally in the short term. Accordingly, the impact is expected to require modification of the project design or alternative mitigation.) **High** (Impacts of high magnitude locally and in the long term and/or regionally and beyond. Accordingly the impact could have a 'no go' implication for the project unless mitigation or re-design is practically achievable.)
Mitigation	Description of possible mitigation measures
Significance (with mitigation)	**None** (A concern or potential impact that, upon evaluation, is found to have no significant impact at all.) **Low** (Any magnitude, impacts will be localised and temporary. Accordingly, the impact is not expected to require amendment to the project design.) **Medium** (Impact of moderate magnitude locally to regionally in the short term. Accordingly, the impact is expected to require modification of the project design or alternative mitigation.) **High** (Impacts of high magnitude locally and in the long term and/or regionally and beyond. Accordingly, the impact could have a 'no go' implication for the project unless mitigation or re-design is practically achievable.)
Confidence Level	The degree of confidence in the predictions, based on the availability of information and specialist knowledge. **Low** (based on the availability of specialist knowledge and other

	information) **Medium** (based on the availability of specialist knowledge and other information) **High** (based on the availability of specialist knowledge and other information)

9.1 CONSTRUCTION IMPACT ASSESSMENT

Potential effects on the environment during the installation activities of the proposed power line are expected to be low. Some dust might be generated during the process. Increased noise levels can be expected. Some solid waste will be generated during the construction and its removal will be the responsibility of the contractor. The most significant potential impact identified in the construction phase is the physical destruction and general disturbance of habitat/biodiversity However, these potential impacts must be mitigated through very strict work protocols. Duration of these impacts will be short lived. Potential impacts on the environment and their mitigation measures during these activities of the proposed new Omburu-Omaruru 44 kV overhead line are found in Table 10.2 to Table 10.11

Table 9.2 Construction Phase – Socio-Economic (Skills, Technology and Development)

Risk Event	**Enhanced skills and technology transfer to Omaruru and subsequent promotion of economic development.**
Nature of Impact	People need skills to perform their jobs. The technology to do something is often not found locally. Development of people and technology are key to economic development.
Status (+ or -)	**Positive**
Extent	**Local** (Skills upliftment limited to developing Omaruru); **National** (Technology to benefit whole country in the long term)
Duration	Duration of construction phase is **short** but learnt skills and development are **permanent**
Intensity	**Minor effects**
Probability	**Probable** skills and technology transfer. Economic development is **highly probable**.

Table 9.3 Construction Phase – Socio-Economic (Employment)

Risk Event	**Employment**
Nature of Impact	The construction of the proposed new Omburu-Omaruru 44 kV overhead line requires contractors who in turn provides employment.
Status (+ or -)	**Positive**
Extent	**Local** (Skills upliftment limited to developing Omaruru);

	National (Technology to benefit whole country in the long term)
Duration	Duration of construction phase is **short** but learnt skills and development are **permanent**
Intensity	**Moderate Effects** In a positive sense, development will improve the quality of life of the people benefiting directly (employees) and indirectly (end users).
Probability	**Definite** skills and technology transfer. Economic development is **definite**. Employment is **highly probable** if the project goes ahead.

Table 9.4 Construction Phase – Socio-Economic (HIV/AIDS, In-migration, Informal Settlements and Property Prices)

Risk Event	**Increased spread of HIV/AIDS; Increased influx to Omaruru; Increased informal settlement and associated problems.**
Nature of Impact	Developments attract people who seek work. This in turn can increase the extent of informal settlements and its associated problems. It is expected that an existing local/regional contractor would be used for the construction phase. A limited impact of this nature is therefore expected.
Status (+ or -)	**Negative**
Extent	HIV/AIDS, in-migration and informal settlement affects the local and national community. Reduced property prices affect individual properties and the extent is local.
Duration	Duration of construction phase is **short** but impacts may range from **long** to **permanent**
Intensity	**Minor effects**
Probability	**Improbable**
Prevention	Appointing reputable contractors who implement educational program on HIV/AIDS for all the staff is imperative. Restricted employment for local people only should be practiced. Deviations from this practice should be justified appropriately. Training of local people should be considered from the start. These measures will reduce the influx of newcomers to the town and thereby reduce growth in the informal settlement and maintain property prices.
Significance (no mitigation)	**Low**
Mitigation	Prevention as discussed above is the best mitigation.
Significance (with mitigation)	**Low**
Confidence Level	**High**

Table 9.5 Construction Phase - Physical/human disturbance of birds, including road mortalities and poaching

Risk Event	**Physical/human disturbance of birds, including road mortalities and poaching**
Nature of Impact	Physical/human disturbance can impact potentially on birds during both the construction and operational phases, thereby affecting the presence and/or foraging and breeding success of key species (Jenkins et al. 2017). During the construction phase, vehicle and human activity on the site is at a peak, with high levels of disturbance. Birds may be disturbed while going about their daily activities such as feeding, roosting and, in particular, breeding. There is a potential for road mortalities, and for poaching of birds (including chicks) and eggs. Once operational, the amount of disturbance should decrease. Construction noise is not considered to cause long-term impacts since it is temporary, and daily construction activities will be limited to daytime hours. The results of disturbance may be indirect or direct, and are likely to be cumulative. These could include: • Potential impacts of noise caused by construction activities on foraging or breeding birds • Displacement of birds from areas suitable for them before development, either temporarily or permanently; possible barrier effects to normal movements • A reduction in bird breeding success due to displacement (including of any territorial bird species, such as raptors) • Unnatural mortalities or injuries of birds (adults and chicks), caused by road collisions or poaching • Indirectly, mortalities of adults could also lead to the mortalities of dependent chicks
Status (+ or -)	**Negative**
Extent	**Sub-local**
Duration	**Short**
Intensity	**Minor effects**
Probability	**Probable**
Prevention	Measures to reduce the probability of an impact occurring: • Proactively reduce the chances of disturbance of birds, especially breeding birds; deter poaching; enforce safe driving and speed limits; promote environmental awareness.
Significance (no mitigation)	**Low**
Mitigation	Much of the noise and other disturbance associated with construction is

	unavoidable. Impacts can, however, be kept to a minimum through responsible construction practices. Avoidance: • Before construction starts, the proposed power line route should be inspected for any signs of bird breeding/nesting activity. In particular, breeding activity of cavity-nesters in larger trees (including dead trees) should be noted. • Disturbance of nesting/chick-rearing birds should be avoided (breeding season for raptors is mainly spring). Minimisation: • Abatement controls to reduce noise disturbance created during construction. • Operational controls to manage and regulate contractor activity, such as: - A speed limit should be strictly enforced. - The construction activity should be restricted to the actual construction site and no unnecessary movement of vehicles or people should be allowed outside the construction zone. All vehicles should be fitted with silencers. - Exclusion fencing should be erected around identified sensitive areas, if required (e.g. pre-identified active nesting sites). - Anti-poaching measures should be strictly enforced, with zero tolerance, and this should be emphasised during induction to contractors; offenders should be prosecuted. • Ongoing awareness should be promoted about the value of biodiversity and the negative impacts of disturbance, especially to breeding birds, and of poaching and road mortality.
Significance (with mitigation)	**Low**
Confidence Level	**Medium**

Table 9.6 Construction Phase – Direct and indirect modification/loss/destruction of bird habitat

Risk Event	**Direct and indirect modification/loss/destruction of bird habitat**
Nature of Impact	Any removal or disturbance/modification of natural vegetation will result in a change to the habitat available to the birds in the area, potentially impacting on their ability to breed, forage and roost in the vicinity. The vegetated drainage lines in the study area are particularly vulnerable to habitat destruction. These habitats are important in terms of providing space to birds for feeding, shelter and nesting. The larger trees are an important resource for birds, including larger raptors, in terms of nesting, roosting and other activities. Both live and dead trees are particularly important to cavity nesters, and should not be damaged or destroyed unnecessarily**.**

	Habitat modification/loss/destruction is known to impact on bird species in different ways, both direct and indirect, resulting in displacement that may be either temporary or permanent. The impacts could include: • Displacement of birds from areas suitable for them before development, either temporarily or permanently; barrier effects to normal movements/ activities • A reduction in bird breeding success due to displacement (including of territorial bird species) • Permanent modification/destruction of sensitive habitats, already subject to cumulative impacts • Loss of habitat could reduce breeding and feeding opportunities and result in stress/displacement for territorial species, including raptors.
Status (+ or -)	**Negative**
Extent	**Sub-local**
Duration	**Medium**
Intensity	**Minor effects**
Probability	**Probable**
Prevention	• Reduce the amount of habitat destruction to a minimum; • Restore disturbed habitats after construction.
Significance (no mitigation)	**Medium**
Mitigation	<u>Avoidance and minimisation:</u> • Where possible, the unnecessary destruction of habitat or degradation of the environment should be avoided, with special attention to water courses and drainage lines. • Large trees should not be damaged or destroyed unnecessarily. Before construction starts, the proposed power line route should be inspected for any signs of bird nesting activity; this includes cavity nesters in both live and dead trees. • The Omaruru River habitats are particularly sensitive, especially with regard to the destruction of taller trees and shrubs. <u>Restoration and rehabilitation:</u> • Repair of degradation or damage to biodiversity features and ecosystem services from project-related impacts that cannot be completely avoided and/or minimised, should this be necessary. Minimisation: • Abatement controls to reduce emissions and pollutants (erosion, dust, waste) created during construction. • Operational controls to manage and regulate contractor activity, such as exclusion fencing around sensitive areas (e.g. pre-identified active nest sites), designated machinery and lay-down areas, minimisation of vegetation loss and disturbance to soil. •On-going awareness should be promoted about the value of biodiversity and the negative impacts of habitat destruction.

Significance (with mitigation)	**Low**
Confidence Level	**Medium**

Table 9.7 Construction Phase – Bird collisions on power line infrastructure

Risk Event	**Bird collisions on power line infrastructure**
Nature of Impact	A collision occurs when a bird in mid-flight does not see the overhead cables or structures (including conductors) until it is too late to take evasive action. These impacts could take place on any sections of the power line, but are more likely in areas where the line crosses flight paths/corridors or flyways, such as water courses/drainage lines or ridges. Collisions may also take place on stay wires (which are usually present on strain poles/bend points), for instance when a bird is flushed from its position on the ground, and on other associated structures. Environmental conditions, including topography, vegetation and climatic factors (e.g. strong winds, dust, rain, fog), may strongly affect both exposure to collision risk, and susceptibility to collision (Jenkins et al. 2010). Collisions may take place even during the construction phase, once the conductors have been strung although not yet energised, but occur mainly during the operational phase. Collisions may occur when birds cross power lines in their local, daily movements between breeding/ nesting or roosting sites, and foraging areas (or between foraging areas); often such regular flights may take place at dawn and/or dusk (Bernardino et al. 2018). The most susceptible groups to collision mortality on power lines are large, long-lived and slow-reproducing birds, often habitat specialists with hazardous behavioural traits (especially flight height and flocking flight), with high spatial exposure to collision risk with power lines, and with unfavourable conservation status (Jenkins et al. 2010; Bernardino et al. 2018 and authors cited therein; D'Amico et al. 2019). The collision risk is believed to be increased by avian factors that include a large wingspan and low manoeuvrability, nomadic/ migrant habits, flying in groups, flying in low light, territorial or courtship behaviour (e.g. raptors), juvenile inexperience and predation. Gregarious species (such as vultures) are generally thought to be more vulnerable than species with solitary habits (Bernardino et al. 2018). A further contributory factor to bird collisions is the occurrence of a visual "blind spot" when flying forwards, which has been demonstrated in some groups of birds, including bustards and korhaans, vultures, snake-eagles and storks (Martin & Shaw 2010; Martin 2011). The collision risk is likely to be higher where two or more power line structures run in parallel, with a potential cumulative impact resulting from several cables

	of differing heights across the bird flight path. The present case involves an existing 22 kV "wishbone" structure and a new 44 kV H-pole structure, with differing heights and span lengths. Although this would, in theory, help to increase visibility, in effect the two lines together would also increase the size of the physical barrier, and hence the collision risk. The results of collisions may be indirect or direct, and could include: • As a direct impact, collisions could potentially result in bird injuries and/or mortalities. • Indirect impacts are also possible, e.g. loss of adults to chicks.
Status (+ or -)	**Negative**
Extent	**Site specific** (on site) (*Note: the impact on the bird is site specific; however, the impact on the population could be global, depending on endemism of the species and threatened status.)
Duration	**Permanent** (>20 years – life of the development; bird mortality is permanent)
Intensity	**Moderate effects**
Probability	**Highly probable**
Prevention	• The primary mitigation is the choice of route options and alternatives for a power line; if possible, avoid areas where bird collisions are likely to take place • Burying the power line could be considered as an option in some cases • Marking of more sensitive sections of power line to increase visibility and prevent collisions
Significance (no mitigation)	**Medium-High**
Mitigation	The marking of wires is currently regarded as the most widespread and recommended measure for reducing bird collisions on power line infrastructure (Barrientos 2011, 2012; Bernardino *et al.* 2019; Shaw *et al*. 2021; Silva *et al*. 2022). Overall, wire-marking has been shown to reduce bird collisions with power lines by half (Bernardino *et al.* 2019); and by 51% for all large birds, testing two types of markers in South Africa (Shaw *et al.* 2021); and as high as 94% during the testing of three types of in Slovakia (Gális, Ševčík 2019. Mitigation marking of power lines is carried out by power utilities in Namibia as standard practice under EIA regulations and recommendations. The following mitigation and management measure are recommended, using a precautionary approach, based on ongoing monitoring and adaptive management. **<u>Project design phase</u>** <u>Avoidance & minimisation:</u> • The power line route will run along an existing servitude, rather than in new areas. No changes to the final proposed routing of the power line are recommended. • Due to the length of the power line and the costs involved, burying of the

power line is not considered technically or economically feasible.

- No sections of the power line are identified as "no-go" areas, to be avoided at all costs; however, some sections are regarded as being more sensitive to collision impacts (see below).

Construction phase

Avoidance & minimisation:

- To address the collision risk on the proposed 44 kV distribution line, the marking of the more sensitive sections of the line to increase visibility is recommended, with the minimum for each section as follows (A-B and C-D; Table 9.7.1; also see Figure 9.1 below for marking sections).
- Should monitoring results indicate a need, further sections of the line should be retro-marked after construction, using an adaptive management approach.

Table 9.7.1 Recommended (minimum) sections of power line to be marked (see Figure 9.1 below for map)

Marking section	Distance (km)	Coordinates: start	Coordinates: end
A-B	5.4 km	A. 21.484366S 16.027027E	B. 21.446074S 15.994538E
C-D	1.4 km	C. 21.439675S 15.989898E	D. 21.430357S 15.981165E
TOTAL	**6.8 km**		

- The two outer (horizontally aligned) conductors should be marked, for the full length of each span, and alternating between the two lines in the design below.
- Examples of appropriate marking devices (Figure 9.2) include the following, both made in South Africa: BIRD-FLIGHT Diverter (BFD); and RAPTOR-CLAMP Diverter (also known as the Viper Live Bird Flapper ["Viper"]).
- The marking distance between devices on each line should be 10 m, with at least 4-5 BFDs on each span and alternating with the Vipers; the colours should be offset where possible (e.g. black and white/yellow).
- At this stage, no nocturnally visible marking is recommended, but it should become mandatory should monitoring results indicate the necessity (e.g. repeat collisions of any nocturnal fliers such as owls on power lines), using an adaptive management approach.

Significance (with mitigation)	**Medium-Low**
Confidence Level	**High**

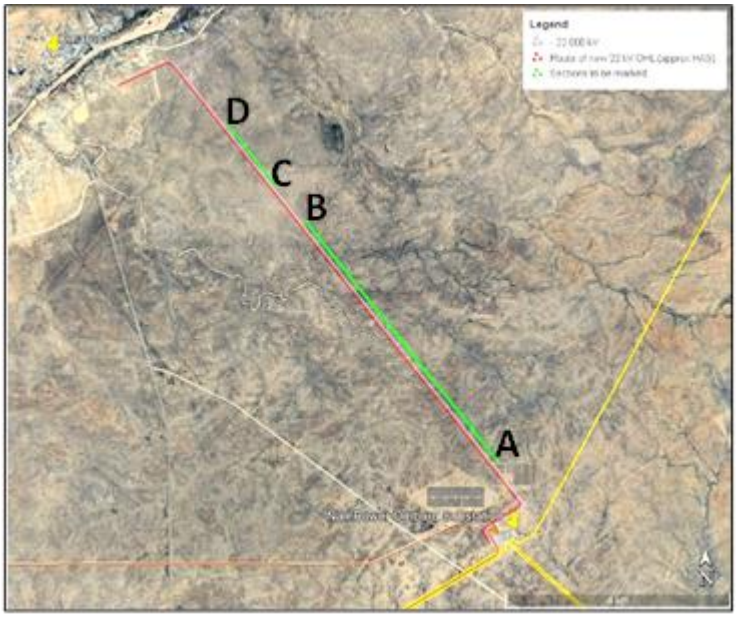

Figure 9.1. Marking design for the new 44 kV Omburu-Omaruru power line (A-B and C-D, see Table 9.7.1).

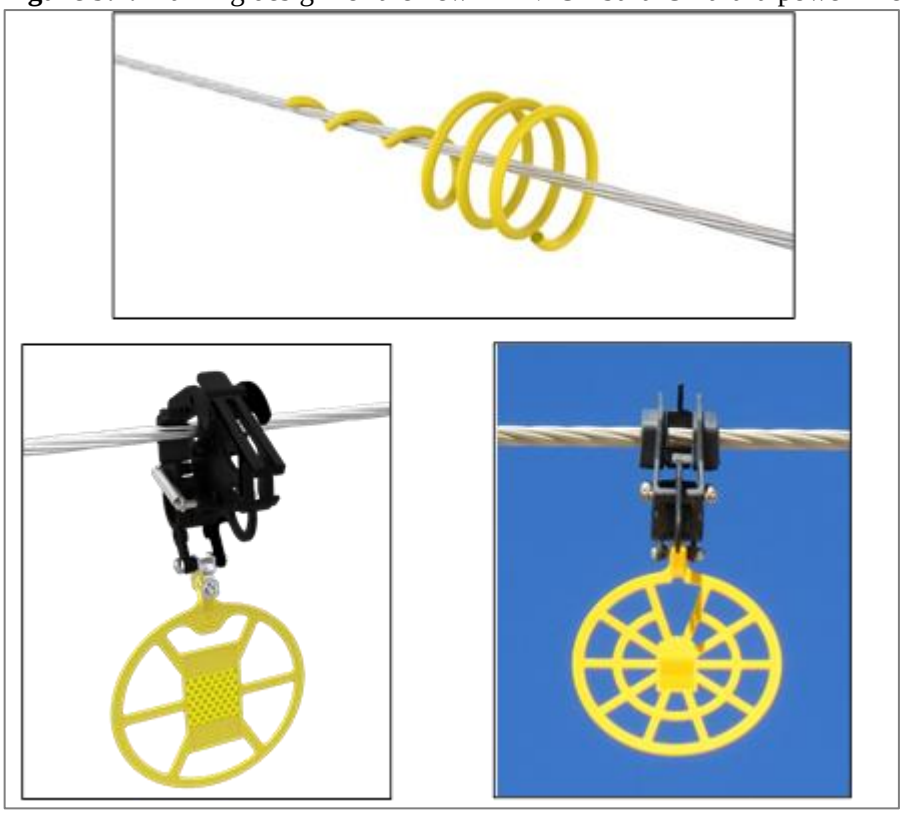

Figure 9.2. Examples of appropriate power line marking devices used as a mitigation for bird collisions: a) Bird-Flight Diverter (BFD; top); b) Raptor-Clamp Diverter (or Viper Live Bird Flapper [“Viper”] bottom left.

Table 9.8 Construction Phase – Bird electrocutions on power line infrastructure

Risk Event	**Bird electrocutions on power line infrastructure**

Nature of Impact	An electrocution occurs when a bird is perched or attempts to perch on an electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components. An electrocution could also be caused should a large bird perch on top of a horizontal pole and send down a "streamer" of excrement that could hit a conductor, thereby bridging the gap between an earthed and a live component.
	
	The use of power line pole structures as perches by raptors and other larger birds in the area is possible, for example as hunting perches at the cleared servitudes. This could attract birds to potentially unsafe sections of the structures (also see Section 5.2.5 below). The wingspan of a Lappet-faced Vulture is 2.8 m, and of a White-backed Vulture 2.0 m. The World Bank EHS Guidelines for Electric Power Transmission and Distribution (World Bank 2007a) recommend maintaining 1.5 m spacing between energised components and grounded hardware or, where spacing is not feasible, covering energised parts and hardware. The proposed H-pole structure has fairly large clearances, which helps reduce the likelihood of electrocutions on these structures. The horizontal clearance between conductors is 2.1 m. The vertical clearance between conductors and the (earthed) horizontal cross-pole is +700 mm, which is cause for concern. This structure has an earth wire is fitted vertically along the pole; the risk of electrocution is thus increased, unless an air space safety gap is provided at the top of the pole (see mitigation measures below). The risk is also greater if the structure or bird is wet or damp (e.g. from precipitation, or bathing), or when groups of birds (such as vultures) interact.
	
	The electrocution risk is likely to be higher on step-down/transformer structures, where clearances between live components are smaller. A large bird sitting on an earthed transformer or switchgear pole would be at risk to electrocution if it touches two or more live components (or a live and an earthed component) simultaneously, especially if the structure and/or bird is wet or damp.
	
	The results of electrocutions may be indirect or direct, and could include:
	• As a direct impact, electrocutions could potentially result in
	  • Bird injuries and/or mortalities
	  • Outages/disruptions to the power supply
	• Indirect impacts are also possible, e.g. loss of adults to chicks

Status (+ or -)	**Negative**
Extent	**Site specific** (on site) (*Note: the impact on the bird is site specific; however, the impact on the population could be global, depending on endemism of the species and threatened status)

Duration	**Permanent**
Intensity	**Minor effects**
Probability	**Probable**
Prevention	• "Gapping" of pole earth wires to reduce contact of the wire with the ground, except during lightning strikes • Insulation of selected live components on transformer/switchgear pole structures
Significance (no mitigation	**Medium**
Mitigation	Minimisation: • A standard mitigation for electrocutions on wooden power line poles is to "gap" the earth wire near the top of the pole, i.e. the earth wire on each power line pole should stop at least 300 mm below the lowest phase to provide an air space safety gap, in order to reduce the electrocution risk (Figure 9.3). • Transformer/switchgear structures should be designed in such a way that they are not attractive as bird perches/nesting sites; selected /all live components should be insulated (e.g. using PVC piping or LDPE pipe; Figure 9.4). • On strain structures where "jumper" wires are used, at least the centre jumper (but preferably all three jumpers) should be insulated, using PVC piping or LPDE pipe. Jumpers should be offset where possible, to reduce the clearance between these wires. • The stay wires should also be "gapped" by the use of an insulator.
Significance (with mitigation)	**Low**
Confidence Level	**Medium**

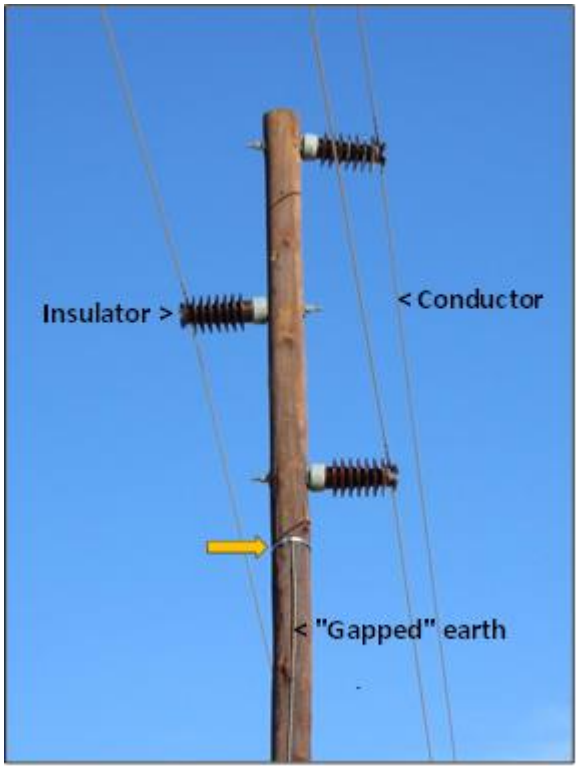

Figure 9.3. Example of gapping of a pole earth wire to provide an air space safety gap, in order to reduce the electrocution risk; the arrow indicates the upper limit of the earth wire.

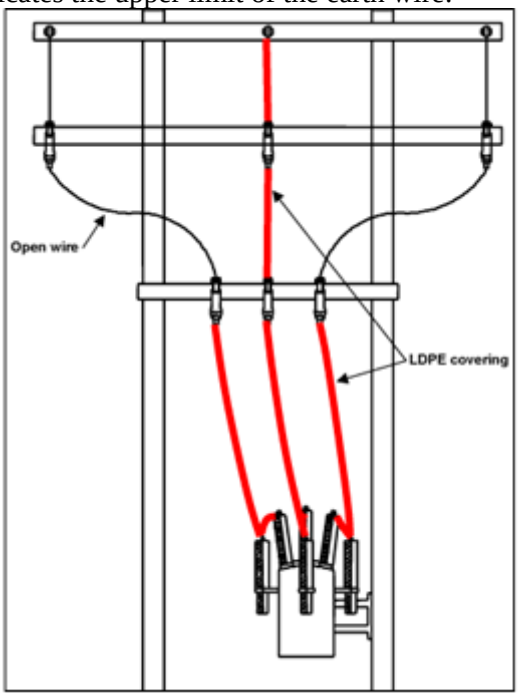

Figure 9.4. Example of use of Low Density Polyethylene (LDPE) pipe on jumpers to insulate selected live components of transformers and switch gears.

Table 9.9 Construction Phase - Impacts on the power supply due to bird nesting and/or other activities

Risk Event	**Impacts on the power supply due to bird nesting and/or other activities**
Nature of Impact	The construction of power lines and related infrastructure has the potential to attract bird species to novel habitats, by providing perching, nesting or foraging sites. This could result in negative impacts on birds. The provision of artificial habitats/resources such as power line poles, transformers and other structures could also result in negative impacts on the power supply (i.e. flash-overs) caused by bird activities. Distribution lines are more at risk to such impacts, given the smaller clearances. Crow nests on power line structures may contain pieces of wire, which could cause outages. Pied Crow has been recorded in the study area in relatively high numbers; Cape Crow is also likely. Crows are attracted to food sources in areas with human activity and may similarly be attracted to new food sources, e.g. food waste associated with construction workers. Numbers of Pied Crow may easily increase in this way. Sociable Weavers nest readily on power line infrastructure. These nesting activities are known to cause disruptions to the power supply in Namibia, especially during the rainy season. This species has been recorded in the study site, in low numbers. Red-billed Buffalo-weaver has also been recorded; this species is more likely to nest inside lattice structures/towers. The attraction of birds to novel habitats through the artificial provision of scarce resources may impact on bird species in different ways that may be potentially positive or negative, with direct and indirect impacts. The impact is related to other impacts (e.g. electrocution, collisions; see above). • The impact could be positive for birds, in terms of providing nesting and other opportunities. • The impact could also be negative, in that bird nesting and other activities may cause short circuits and power supply outages on power line structures.
Status (+ or -)	**Negative**
Extent	**Site specific**
Duration	**Permanent**
Intensity	**No lasting effect**
Probability	**Probable**
Prevention	Measures to reduce the probability of an impact occurring • Insulate live components that could be bridged by nesting activities • Discourage bird nesting activities as soon as they start

Significance (no mitigation	**Medium**
Mitigation	Avoidance: • Insulate live components that could be bridged (see Table 9.8 above for mitigations for electrocution). • Ensure strict and effective waste management (including of food) during construction activities, to discourage an unnatural increase in scavenging species such as Pied Crow. • Avoid creating new habitats with open water, e.g. accumulations of storm water or pipe leakages/open water/run-off, that may attract birds.
Significance (with mitigation)	**Low**
Confidence Level	**Medium**

Table 9.10 Construction Phase - Physical/human disturbance of fauna and flora, including road mortalities and poaching

Risk Event	**Physical/human disturbance of fauna and flora, including road mortalities and poaching**
Nature of Impact	During the construction phase, the highest levels of human presence and vehicle activity will occur, resulting in elevated disturbance to fauna and flora. Terrestrial fauna may be displaced from their natural habitats or disturbed in their daily activities, with potential risks of road mortalities from construction vehicles. The increased human presence may also heighten the risk of opportunistic poaching of small and medium-sized fauna. Vegetation clearance will be required for the establishment of the new 44 kV overhead line and associated access roads. This may result in the loss of natural vegetation cover and potential damage to sensitive or slow-growing species. The removal of protected or endemic flora should be strictly avoided where possible; if unavoidable, replanting or suitable mitigation in close proximity to the site should be undertaken. Noise and vibration generated during construction are expected to cause only temporary disturbance and are not anticipated to result in long-term impacts, as activities will be limited to daytime hours. Once operational, the intensity of disturbance will significantly reduce, limited mainly to occasional maintenance activities along the servitude and access road.
Status (+ or -)	**Negative**
Extent	**Site specific**
Duration	**Short**
Intensity	**Minor effects**

Probability	**Definite**
Prevention	Minimise habitat disturbance: Restrict construction activities to the designated servitude and approved access routes to avoid unnecessary trampling and disturbance of surrounding vegetation and fauna habitats. Vegetation management: • Clearly demarcate "no-go" areas, especially those containing endemic, protected, or ecologically sensitive plant species. • Avoid removal of endemic/protected trees wherever possible. Where removal cannot be avoided, replant or relocate within the project area under the guidance of an ecologist. • Implement erosion control and rehabilitation measures, including reseeding or replanting disturbed areas with indigenous species after construction. Fauna protection: • Conduct pre-construction walk-through surveys to identify and relocate fauna (e.g., reptiles, small mammals) that may be at risk. • Prohibit hunting, poaching, or collecting of any fauna by workers; enforce this through induction training and regular monitoring. • Install speed limits and warning signage on construction and maintenance access roads to reduce the risk of road mortalities. • Noise and activity control: Limit construction activities to daylight hours to reduce disturbance to nocturnal fauna. • Contractor awareness: Provide environmental awareness training to all contractors and workers, emphasising the importance of protecting flora and fauna, as well as strict adherence to no-poaching policies. Monitoring and enforcement: • Appoint an Environmental Control Officer (ECO) to monitor compliance with environmental requirements and report any incidents. • Conduct regular site inspections to ensure that mitigation measures are properly implemented and effective.
Significance (no mitigation)	**Low**
Mitigation	Controlled site footprint: • Limit construction activities strictly to the approved servitude and access routes to minimise unnecessary habitat loss and fragmentation. Vegetation clearance and rehabilitation: • Carefully clear only the minimum vegetation required for the powerline and access roads. • Rehabilitate disturbed areas after construction by reseeding or planting indigenous species adapted to the local environment. • Replace endemic or protected tree species if removal is unavoidable, planting them in suitable nearby areas under the guidance of an ecologist. Protection of fauna: • Relocate small mammals, reptiles, and other vulnerable species found within the construction area before clearing begins. • Enforce a strict prohibition on poaching, hunting, or capturing of fauna by construction personnel. • Provide adequate waste management to avoid attracting opportunistic species or scavengers that could alter the ecological balance.

	• Traffic and access management: • Enforce speed limits on access and construction roads. • Install signage in areas where fauna movement is expected to reduce the likelihood of road mortalities. • Restrict off-road driving by construction vehicles. <u>Noise and vibration management:</u> • Restrict noisy activities to daytime hours and ensure machinery is well maintained to minimise unnecessary noise. <u>Awareness and supervision:</u> • Train construction workers on environmental protection requirements, focusing on flora conservation, anti-poaching rules, and fauna safety. • Appoint an Environmental Control Officer (ECO) to oversee compliance and enforce corrective actions where required. <u>Post-construction management:</u> • Maintain vegetation control along the servitude using environmentally sensitive methods (manual or selective clearing instead of herbicide use). • Ensure access roads are maintained to reduce erosion and habitat degradation. • Monitor fauna and flora conditions during the operational phase, with adaptive management if unexpected impacts are detected.
Significance (with mitigation)	**Low**
Confidence Level	**High**

Table 9.11 Construction Phase - Traffic Impact

Risk Event	**Traffic Impact**
Nature of Impact	Construction of the proposed new 44 kV power line will be parallel to the existing Omburu-Omaruru overhead line. To access the new 44 kV powerline the construction team will travel either from C33 (tarred road), turn into C36 (gravel road) and turn onto the maintenance tracks on the powerline servitude or the other way around starting from the maintenance tracks. The construction activities will have no impact on the C33 and C36 road traffic. However, the movement of traffic to the site when construction material and equipment must be transported to the site may temporarily disrupt traffic flow on the C33 and C36 road. However, the project is of relatively small scale, i.e. it will not require a lot of construction vehicles (maximum 10 vehicles).
Status (+ or -)	**Negative**
Extent	**Site specific**
Duration	**Short**
Intensity	**Minor effects**
Probability	**Probable**
Prevention	The impact cannot be prevented and mitigation is recommended
Significance (no mitigation)	**Low**

Mitigation	Furthermore, the maintenance tracks/road must be used whenever possible as it has the least traffic impact. Speed limits must be enforced on the C33 and C36 roads between the new powerline and Omaruru at all times.
Significance (with mitigation)	**Low**
Confidence Level	**High**

Table 9.12 Construction Phase – Fire and Explosion

Risk Event	**Fire and Explosion**
Nature of Impact	During construction and operation, fire hazards may arise from welding, grinding, smoking, campfires, faulty machinery, fuel storage, or accidental sparks. In the Omaruru district, where dry wooded veld and grasslands are highly combustible, fires could spread rapidly, causing destruction of natural habitats, loss of biodiversity, soil degradation, and potential property damage. Uncontrolled fires also pose risks to human health and safety, with possible injuries, fatalities, or displacement of local communities. Although the risk of explosion is low, the storage and handling of fuels and chemicals at construction sites represent a potential hazard.
Status (+ or -)	**Negative**
Extent	**Local**
Duration	**Medium**
Intensity	**Moderate effects**
Probability	**Probable**
Prevention	• Develop and implement a Fire Management Plan as part of the EMP. • Prohibit open fires, burning of waste, or uncontrolled cooking activities on-site. • Designate smoking areas away from vegetation, with fireproof containers for cigarette disposal. • Maintain firefighting equipment (e.g., extinguishers, beaters, water tanks) at all construction sites, camps, and fuel storage areas. • Store fuels, oils, and chemicals in clearly marked, bunded, and fire-resistant areas, away from ignition sources. • Ensure vehicles and machinery are regularly maintained to prevent sparks or fuel leaks. • Train all workers in fire prevention, firefighting techniques, and emergency response procedures. • Coordinate with the Omaruru Municipality and local fire brigade on fire preparedness and response.
Significance (no mitigation	**Medium**

Mitigation	In the event of a fire: • Immediately alert all personnel and activate emergency response procedures. • Use on-site firefighting equipment to contain small fires; for larger fires, contact the local fire brigade and relevant authorities. • Evacuate personnel if the fire cannot be controlled, prioritising human safety. • Contain the affected area by creating firebreaks to prevent further spread. • Rehabilitate fire-damaged areas through reseeding or replanting with indigenous vegetation to prevent erosion and promote ecosystem recovery. • Conduct incident reporting and root-cause analysis to prevent recurrence.
Significance (with mitigation)	**Low**
Confidence Level	**High**

Table 9.13 Construction Phase - Health, Safety and Security

Risk Event	**Health, Safety and Security**
Nature of Impact	During construction phase, construction workers and heavy equipment will be onsite. Heavy machinery, electricity and working at height, increases the risk of injuries. However, due to the relatively small scale of the project, the risk can be well managed. A temporary laydown site will be established for safe storage of equipment, fuels, solvents, paints and construction materials.
Status (+ or -)	**Negative**
Extent	**Site specific**
Duration	**Short**
Intensity	**Minor effects**
Probability	**Probable**
Prevention	All Health and Safety standards specified in the Labour Act should be complied with. The responsible contractor must ensure that all staff members are briefed about the potential risks of injuries on site. The Contractor should be obliged to adhere to the following: • Adhere to Health and Safety Regulations pertaining to personal protective clothing, first aid kits being available on site, warning signs, etc. • Equipment that will be locked away on site must be placed in a way that does not encourage criminal activities • Ensure suitable personal protective equipment is in place for workers as well as permit to work systems

Significance (no mitigation	**Low**
Mitigation	The contractor must ensure that adequate emergency facilities, including first aid kits are available on site. Selected personnel should be trained in first aid. The numbers of all emergency services must be readily available
Significance (with mitigation)	**Low**
Confidence Level	**High**

Table 9.14 Construction Phase - Noise Pollution

Risk Event	**Noise Pollution from construction activities to third parties**
Nature of Impact	Noise pollution will exist due to heavy vehicles accessing the sites with building materials. Cement mixing, drilling and excavating will be some additional noise producing activities. There may be an increase in the ambient noise levels because of large traffic volumes on the C33 and C36 roads and other smaller roads that are creating noise. But this is not expected to be significant due to the smallscale of the project. The closest receptors are the residents in farmers which is more than 5 km from the proposed power line.
Status (+ or -)	**Negative**
Extent	**Site specific**
Duration	**Short**
Intensity	**Minor effects**
Probability	**Probable**
Prevention	There will be minor increases in the ambient noise level and it will be limited to the site. Nevertheless, noise will occur and therefore mitigation measures must be recommended.
Significance (no mitigation	**Low**
Mitigation	The Municipality of Omaruru has no regulations with regard to noise levels. The Development is situated in an industrial area so there is no restriction on the times of operation. The World Health Organization (WHO) guideline on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment can be followed during the construction phase. This limits noise levels to an average of 70 db over a 24 hour period with maximum noise levels not exceeding 110 db during the period. It is recommended that any complaints regarding noise be registered.
Significance (with mitigation)	**Low**
Confidence Level	**High**

Table 9.15 Construction Phase - Dust Pollution

Risk Event	**Dust Pollution from construction activities**

Nature of Impact	The movement of construction vehicles on the existing maintenance roads/tracks will create dust. The drilling of holes for the H-wooden poles will create some dust. However, the limited nature of the construction activities will not result in significant dust generation.
Status (+ or -)	**Negative**
Extent	**Site specific**
Duration	**Short**
Intensity	**Low effects**
Probability	**Improbable** (low likelihood)
Prevention	Dust Pollution from construction activities is improbable even with the closest neighbours to the project area are at least 5 km away. However, mitigation measures must be recommended.
Significance (no mitigation	**Low**
Mitigation	➢ Vehicles and machinery will be maintained in good working order ➢ There will be a new track created to access the new powerline the is 50 m distance from the existing powerline and existing maintenance track. However, construction team must avoid creating new tracks where possible. ➢ Speed limits on gravel roads will be limited to a maximum speed consistent with the minimisation of dust generation. Nominal speed limit of 40 km/h applies on the C36 gravel road ➢ Vehicle speeds will be limited to 30km/h on site ➢ Complaints regarding dust to be registered in the complaints register and to be investigated and managed in accordance with an incident reporting procedure
Significance (with mitigation)	**Low**
Confidence Level	**High**

Table 9.16 Construction Phase - Waste Production and Ablution Facilities

Risk Event	**Waste Production and Ablution facilities during construction**
Nature of Impact	The ability of products and building rubble to act as a waste which must be cleaned up or removed off-site. Ablution facilities must be made available to construction personnel.
Status (+ or -)	**Negative**
Extent	**Site specific**
Duration	**Short**
Intensity	**Low effects**
Probability	**Definite**
Prevention	Waste Management: • Implement a site-specific Waste Management Plan (WMP) aligned with

	national regulations and best practice. • Provide clearly marked, covered waste receptacles for general waste, recyclables, and hazardous waste at designated collection points. • Prohibit the burning or burying of waste on-site. • Arrange for regular removal of waste to a licensed disposal facility. • Reuse and recycle materials (e.g., scrap metal, packaging, timber off-cuts) where feasible to reduce waste volumes. <u>Hazardous Waste Handling:</u> • Store hazardous materials (e.g., oils, lubricants, paints) in sealed, bunded, and clearly labelled containers to prevent leaks or spills. • Provide spill kits on-site and ensure personnel are trained in their use. • Dispose of hazardous waste through approved and licensed waste contractors only. <u>Ablution Facilities:</u> • Provide sufficient, hygienic, and well-maintained ablution facilities (toilets and washing stations) for the workforce at construction camps and active work sites. • Position ablution facilities at least 50 m away from watercourses or drainage lines to prevent contamination. • Ensure regular servicing and emptying of chemical toilets by a licensed service provider. <u>Worker Awareness:</u> • Include waste management and ablution facility protocols in the environmental induction programme for all contractors and workers. • Enforce a "leave no waste" policy, where workers are required to use designated facilities at all times. <u>Monitoring and Supervision:</u> • Appoint the Environmental Control Officer (ECO) to conduct routine inspections of waste storage areas and ablution facilities. • Keep records of waste quantities generated, collected, and disposed of, to demonstrate compliance.
Significance (no mitigation	**Low**
Mitigation	<u>Waste Management:</u> • In the event of waste being illegally dumped, immediately remove and transport it to a licensed disposal facility, followed by site clean-up and rehabilitation of the affected area. • If waste containers overflow, arrange for urgent collection and increase the frequency of removal to prevent recurrence. • Implement corrective training and stricter supervision for workers found not complying with waste management requirements. <u>Hazardous Waste and Spill Response:</u> • In the event of a hazardous substance spill (e.g., oils, fuels, chemicals), contain the spill immediately using spill kits and absorbent material. • Remove and dispose of contaminated soil and materials at an approved hazardous waste facility. • Repair or replace any leaking containers, tanks, or bunds. • Conduct incident reporting and root-cause analysis to prevent recurrence. <u>Ablution Facilities:</u>

	• If chemical toilets or septic systems fail, immediately decommission and replace with functional units to prevent contamination. • In case of accidental leakage or overflow, contain and clean the affected area with disinfectants, and dispose of contaminated soil at a licensed facility. • Relocate facilities if found to be too close to watercourses or sensitive habitats. • Increase the servicing frequency if overuse or odour problems are identified. <u>Worker Conduct:</u> • Apply disciplinary action for repeated non-compliance with waste disposal or ablution protocols (e.g., littering, open defecation). • Reinforce awareness training sessions to prevent recurrence of poor waste and sanitation practices. <u>Monitoring and Reporting:</u> • The Environmental Control Officer (ECO) must record incidents of non-compliance and ensure corrective actions are implemented promptly. • Regularly review waste handling and sanitation procedures to identify gaps and strengthen controls.
Significance (with mitigation)	**Low**
Confidence Level	**High**

Table 9.17 Construction Phase - Soil, Groundwater and Surface water Contamination

Risk Event	**Soil, groundwater and surface water contamination**
Nature of Impact	Porous surface substrate can allow unwanted hazardous and ecologically detrimental substances to seep down to the water table either at the site of spill or after being washed away by surface flow. Leakages from construction vehicles, accidental spills of fuel, paints and other chemicals might occur. Groundwater might spread pollutants to neighbouring receptors and may create an impact on underground infrastructure. However, due to the small scale of the project and the scarcity of surface water and groundwater in the area, the risk of hazardous spills can be effectively managed.
Status (+ or -)	**Negative**
Extent	**Site specific**
Duration	**Short**
Intensity	**Minor effects**
Probability	**Probable**
Prevention	Appointing qualified and reputable contractors is essential. Proper training of construction personnel would reduce the possibility of the impact occurring. All vehicles and machinery to be used on site should be inspected regularly for oil leaks.
Significance (no mitigation	**Low**

Mitigation	Mitigation measures for handling and storage of hydrocarbon and hazardous materials onsite and offsite. Should any spills occur, contaminated soil is to be removed and rehabilitated or replaced with uncontaminated soil and a spill report form must be completed by the contractor. The spill report form must include the nature, extent and location of the hazardous spill and actions taken to contain it.
Significance (with mitigation)	**None**
Confidence Level	**High**

Table 9.18 Construction Phase - Heritage Impact

Risk Event	**The discovery of archaeologically or culturally important sites**
Nature of Impact	Sites with archaeologically or culturally important significance might be uncovered during the construction phase. These can include graves, stone walls or cultural artefacts. .
Status (+ or -)	**Negative**
Extent	**Site specific**
Duration	**Short**
Intensity	**Minor effects**
Probability	**Improbable**
Prevention	**N/A**
Significance (no mitigation	**Low**
Mitigation	If such a site is found during the construction activities the construction process must be halted and the relevant authorities must be informed. Construction may only continue at that location once permission has been given. Firstly, the Namibian Police must be informed. Secondly, the National Monuments Council dealing with heritage should be informed.
Significance (with mitigation)	**Low**
Confidence Level	**High** (based on the availability of specialist knowledge and other information)

10.2 OPERATIONAL PHASE IMPACT ASSESSMENT

During the operational phase of the proposed new Omburu-Omaruru 44 kV OHL electricity will be supplied via transmission and distribution to existing customers at Omaruru town. The most significant potential impacts during the operational phase are the collision of birds and electrocution of birds. Specific impacts identified, associated with the operational phase, are summarised in Table 9.19 to Table 9.23.

Table 9.19 Operational Phases – Electricity Supply

Risk Event	**Electricity supply**
Nature of Impact	The proposed power line will aid in securing electricity supply to the community. The upgrade is required due to increased electricity demand and the replacement of ageing infrastructure which has reached the end of its operational lifespan. The relevant communities will benefit from improved electricity supply
Status (+ or -)	**Positive** – environment overall will benefit from the impact
Extent	**Regional** (limited to within the borders of Erongo Region)
Duration	**Long** (years, 5 -20 years)
Intensity	**Moderate effects** - In a positive sense, the project will improve the quality of life of the people benefiting directly (community) as they have access to secure electricity supply.
Probability	**Definite** (A definite secure in electricity will ensue).

Table 9.20 Operational Phase – Bird electrocutions on power line infrastructure

Risk Event	**Bird electrocutions on power line infrastructure**
Nature of Impact	Bird mortalities/injuries as a result of the electrocution. The proposed H-pole structure has large clearances, which reduces the likelihood of electrocutions on these structures. The results of electrocutions may be indirect or direct, and could include: • As a direct impact, electrocutions could potentially result in - Bird injuries and/or mortalities - Outages/disruptions to the power supply • Indirect impacts are also possible, e.g. loss of adults to chicks.
Status (+ or -)	**Negative**
Extent	**Site specific**
Duration	**Permanent**
Intensity	**Minor effects**
Probability	**Probable**
Prevention	• "Gapping" of pole earth wires to reduce contact of the wire with the ground, except during lightning strikes • Insulation of selected live components on transformer/switchgear pole structures
Significance (no mitigation	**Medium**

Mitigation	Minimisation: • Monitoring is essential (see also Section 5.5 below). The need for reporting power line incidents should be stressed, and reporting procedures clarified. • Should monitoring results indicate any sections that subsequently still prove to be problematic in terms of electrocutions, mitigation should be retro-mitigated, by way of adaptive management. • Should electrocutions prove to be problematic on a specific structure, a steel perching bar for birds is proposed as a mitigation for electrocutions (Figure 9.5). • This horizontal bar should be >500 mm long, and fitted onto the top of each pole, 220 mm above the pole top or any related structure. *NamPower may be consulted for details on electrocution mitigation.
Significance (with mitigation)	**Low**
Confidence Level	**Medium**

Figure 9.5. Example of a Brown Snake Eagle making use of a perching structure fitted to the top of a 66 kV steel monopole.

Table 9.21 Operational Phase – Bird collisions on power line infrastructure

Risk Event	**Bird collisions on power line infrastructure**
Nature of Impact	A collision occurs when a bird in mid-flight does not see the overhead cables or structures (including conductors) until it is too late to take evasive action. These impacts could take place on any sections of the power line, but are more likely in areas where the line crosses flight paths/corridors or flyways, such as water courses/drainage lines or ridges. Collisions may also take place on stay wires (which are usually present on strain poles/bend points), for instance when a bird is flushed from its position on the ground, and on other associated structures. Environmental conditions, including topography, vegetation and climatic factors (e.g. strong winds, dust, rain, fog), may strongly affect both exposure to collision risk, and susceptibility to collision (Jenkins et al. 2010). Collisions may take place even during the construction phase, once the conductors have been strung although not yet energised, but occur mainly during the operational phase. Collisions may occur when birds cross power lines in their local, daily movements

	between breeding/ nesting or roosting sites, and foraging areas (or between foraging areas); often such regular flights may take place at dawn and/or dusk (Bernardino et al. 2018). The most susceptible groups to collision mortality on power lines are large, long-lived and slow-reproducing birds, often habitat specialists with hazardous behavioural traits (especially flight height and flocking flight), with high spatial exposure to collision risk with power lines, and with unfavourable conservation status (Jenkins et al. 2010; Bernardino et al. 2018 and authors cited therein; D'Amico et al. 2019). The collision risk is believed to be increased by avian factors that include a large wingspan and low manoeuvrability, nomadic/ migrant habits, flying in groups, flying in low light, territorial or courtship behaviour (e.g. raptors), juvenile inexperience and predation. Gregarious species (such as vultures) are generally thought to be more vulnerable than species with solitary habits (Bernardino et al. 2018). A further contributory factor to bird collisions is the occurrence of a visual "blind spot" when flying forwards, which has been demonstrated in some groups of birds, including bustards and korhaans, vultures, snake-eagles and storks (Martin & Shaw 2010; Martin 2011). The collision risk is likely to be higher where two or more power line structures run in parallel, with a potential cumulative impact resulting from several cables of differing heights across the bird flight path. The present case involves an existing 22 kV "wishbone" structure and a new 44 kV H-pole structure, with differing heights and span lengths. Although this would, in theory, help to increase visibility, in effect the two lines together would also increase the size of the physical barrier, and hence the collision risk. The results of collisions may be indirect or direct, and could include: • As a direct impact, collisions could potentially result in bird injuries and/or mortalities. • Indirect impacts are also possible, e.g. loss of adults to chicks.
Status (+ or -)	**Negative**
Extent	**Site specific**
Duration	**Permanent**
Intensity	**Moderate effects**
Probability	**Highly probable**
Prevention	The primary mitigation is the choice of route options and alternatives for a power line; if possible, avoid areas where bird collisions are likely to take place Burying the power line could be considered as an option in some cases Marking of more sensitive sections of power line to increase visibility and prevent collisions
Significance (no mitigation)	**Low**
Mitigation	<u>Minimisation</u>: • Monitoring is essential; the need for reporting power line incidents should be stressed. Set up a reporting channel, and clarify monitoring and reporting procedures to all partners (see below). • Should monitoring results indicate that collisions are still taking place despite the above marking, further sections of the line should be (retro-marked), using an adaptive management approach. • The need for retro-fitting any mitigation for collisions on stay wires (e.g.

	marking with vibration dampers or other markers) should also be based on monitoring results, using an adaptive management approach. <u>Monitoring:</u> • The new 44 kV power line should be monitored according to existing protocols for power line surveys (see ECC 2019). If possible, the power line surveys should include the new 44 kV line as well as the existing 22 kV line, for possible cumulative impacts. The surveys should also include the step-down/transformer structures. Ideally, regular, dedicated patrols specifically to monitor for power line incidents should be carried out once a month for at least the first year after construction, and thereafter at least once per quarter. • Record all bird mortalities on a standardised form, with the GPS coordinates and power line structure and other details, and photographs of the carcass (especially the head of the bird), power line structure and general habitat. Both mortalities and live birds should be monitored; these would include any new species that appear to be attracted to the area. Monitor perching activities of live birds on power line structures, especially larger groups such as raptors. If there is a need, camera traps could be used to document the occurrence of sensitive species, such as terrestrial birds and/or raptors. • The need for reporting any incidents should be stressed, and reporting procedures should be clarified. All bird mortalities should be recorded on a standardised form, with the GPS coordinates (or pole number, if present) and structure involved and other details, and photographs of the carcass (including head and beak), structure and point of impact if possible. • Monitoring results should be reviewed on a quarterly basis, or more frequently if required, to direct further adaptive management. • Monitor the effectiveness of mitigation measures; should repeat collision or electrocution incidents involving raptors/vultures, bustards, korhaans or any other group of birds, occur, consider the retro-fitting of further mitigation; replace mitigation devices as and when necessary.
Significance (with mitigation)	**Low**
Confidence Level	**High**

Table 9.22 Operational Phase – Disruptions to power supply caused by bird nesting activity

Risk Event	**Disruptions to power supply caused by bird nesting activity**
Nature of Impact	The construction of power lines and related infrastructure has the potential to attract bird species to novel habitats, by providing perching, nesting or foraging sites. This could result in negative impacts on birds. The provision of artificial habitats/resources such as power line poles, transformers and other structures could also result in negative impacts on the power supply (i.e. flash-overs) caused by bird activities. Distribution lines are more at risk to such impacts, given the smaller clearances. Crow nests on power line structures may contain pieces of wire, which could cause outages. Pied Crow has been recorded in the study area in relatively high numbers; Cape Crow is also likely. Crows are attracted to food sources in areas with human activity and may similarly be attracted to new food sources, e.g. food waste associated with construction workers. Numbers of Pied Crow may easily increase in this way.

	Sociable Weavers nest readily on power line infrastructure. These nesting activities are known to cause disruptions to the power supply in Namibia, especially during the rainy season. This species has been recorded in the study site, in low numbers. Red-billed Buffalo-weaver has also been recorded; this species is more likely to nest inside lattice structures/towers. The attraction of birds to novel habitats through the artificial provision of scarce resources may impact on bird species in different ways that may be potentially positive or negative, with direct and indirect impacts. The impact is related to other impacts (e.g. electrocution, collisions; see above). • The impact could be positive for birds, in terms of providing nesting and other opportunities. • The impact could also be negative, in that bird nesting and other activities may cause short circuits and power supply outages on power line structures..

Status (+ or -)	**Negative**
Extent	**Site specific**
Duration	**Permanent**
Intensity	**No lasting effect**
Probability	**Probable**
Prevention	• Insulate live components that could be bridged by nesting activities • Discourage bird nesting activities as soon as they start
Significance (no mitigation	**Medium**
Mitigation	• <u>Minimisation:</u> • Monitoring is essential to identify (potential) problem areas any movement of hitherto unrecorded species onto power line infrastructure should be monitored; and any resulting negative impacts (e.g. electrocutions or power outages), should be addressed accordingly. • Bird nesting activities on power line infrastructure should be discouraged early in the cycle, before any eggs are laid; the Ministry of Environment, Forestry and Tourism (MEFT) should be contacted for specific guidelines for dealing with such problems. • Should any nesting or other activity by crows or Sociable Weavers on power supply structures cause disruptions of the power supply, consult with the MEFT for appropriate measures to discourage and manage such activities, e.g. by removing nests at a stage when this is acceptable. • During operations to remove large Sociable Weaver nests from power line structures, special care should be taken not to destroy any active Pygmy Falcon nests, which breed within these structures (breeding season August-March, mainly October-November). • Anti-perch devices could be investigated in problem areas; or supply a perch higher than the PL structure
Significance (with mitigation)	**Low**
Confidence Level	**Medium**

Table 9.23 Operation Phase – Visual Impact

Risk Event	**Visual Impact of power line on tourism and recreation**
Nature of Impact	There is existing infrastructure (several NamPower powerlines) in the vicinity of the proposed power line. The proposed power line and the existing infrastructure contribute to the visual impact of the area. When considering the potential change to the visual landscape, the key issues are: visual exposure, visual intrusion, and sensitivity of receptors. The potential visual impacts associated with proposed power line and associated infrastructures are linked to both the construction and operations phase of the project.
Status (+ or -)	**Negative**
Extent	**Sub-local**
Duration	**Permanent**
Intensity	**Minor effects**
Probability	**Improbable**
Prevention	**N/A**
Significance (no mitigation	**Low**
Mitigation	Wooded pylons should be used as they reflect natural colours of the surrounding landscape. The power line and substations should be positioned in such a way to limit any visual impact as far as practically possible. Rehabilitation of areas is to be done as soon as possible after the temporary and permanent infrastructure is no longer in use.
Significance (with mitigation)	**Low**
Confidence Level	**High**

10.3 DECOMMISSIONING PHASE IMPACT ASSESSMENT

The impacts associated with this phase will include noise, dust, waste production, soil pollution and health, safety and security. Guidelines for sewage pump station and rising main removal must be followed to reduce the risk of health and safety. Rubble and scrap waste will be created as structures are dismantled. These should be contained and disposed of at an approved waste facility and not dumped in the surrounding areas. The Environmental Management Plan for this phase will have to be reviewed at the time of decommissioning to cater for changes made to the Development.

11 CONCLUSION AND RECOMMENDATION

Electricity supply is one of the most critical infrastructure components and a key enabler of economic development in Namibia. To enhance the secure and reliable provision of electricity to residents of Omaruru, it has become necessary to replace the existing 22 kV overhead line with a new Omburu-Omaruru 44 kV overhead line capable of meeting the town's increasing electricity demand.

The impact assessment has demonstrated that all potential negative environmental impacts associated with the proposed development can be mitigated to acceptable levels. The most significant potential impacts identified include:

- Impacts on biodiversity (fauna and flora), particularly the destruction or disturbance of habitats;
- Bird collisions with the power line structures;
- Bird electrocutions on the power line; and
- Impacts on the power supply due to bird nesting activity or other activities.

An Environmental Management Plan (EMP) has been developed to guide the construction, operation, and eventual decommissioning of the project. The EMP serves as a practical on-site reference to ensure that environmental risks are effectively managed. All parties found to be in contravention of the EMP should be held accountable for rehabilitation measures, where necessary. Furthermore, the development and implementation of a Health, Safety, Security, and Environmental (HSSE) Management System, used in conjunction with the EMP, will further demonstrate the Applicant's commitment to responsible and sustainable operating practices. Operators and responsible personnel will be required to undergo training on the contents of these documents to ensure full compliance.

It is further recommended that continuous monitoring of the power line structures for bird incidents be undertaken, with additional mitigation implemented where required. The precautionary principle should guide management of collision risks. Specifically, proactive marking of power line sections intersecting the large drainage system in the western part of the study area—where collision risk is elevated—should be undertaken as a preventative measure.

Provided that the recommended mitigation measures are effectively implemented, there are no environmental grounds to withhold the issuance of an Environmental Clearance Certificate for the proposed power line upgrade and associated substation development

GEA Source Investment cc
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