A scoping report on the Environmental Impact Assessment for the 100 MW Solar Power Plant at Witputz Energy (Pty) Ltd, //Karas Region

Report Compiled for:

Witputz Energy (Pty) Ltd

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Project Details :

A scoping report on the Environmental Impact Assessment for the 100MW solar power plant at Witputz in //Karas Region

Environmental Management Practitioners

Name of representative of the EAP	*Education Qualifications*
Kaukurauee Ismael Kangueehi	*PhD, MSc, and BSc in Environmental Geochemistry*

Client

Name	*Position/Role*	*Address*
Witputz Energy (Pty) Ltd	*Witputz Energy (Pty) Ltd (Proponent)*	*P O Box 87099 Eros, Windhoek*

List of Abbreviations

TERM	DEFINITION
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
EPL	Exploration Prospecting Licence
GPS	Global Positioning System
HSE	Health, Safety and Environmental
MAWLR	Ministry of Agriculture, Water and Land Reform
MEFT	Ministry of Environment, Forestry and Tourism
MME	Ministry of Mines and Energy
NHC	National Heritage Council
PPE	Personal Protective Equipment
SOPs	Standard Operating Procedures
ToRs	Terms of Reference

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Overview

The proponent, Witputz Energy (Proprietary) Limited, was provisionally granted land some 4 kilometers from Witputz. The allocated area is located 40 kilometers north of Rosh Pinah or some 110 kilometers southeast of Aus, at the local village of Witputz in the Karas region. The proposed solar plant site is accessible along the C13 tarred road and while the remaining 4 kilometers can be accessed via a gravel road. The proponent intends to construct a 100 MW solar power plant. Augite Environmental Consulting was appointed by the proponent to undertake an Environmental Assessment (EA) and Environmental Management Plan (EMP) for the mineral exploration project.

Location

The allocated area is located 40 kilometers north of Rosh Pinah or some 110 kilometers southeast of Aus, at the local village of Witputz in the Karas region. The proposed solar plant site is accessible along the C13 tarred road and while the remaining 4 kilometers can be accessed via a gravel road. The coordinates for the centre of the allocated plot are -27.616722°, 16.661133°.

Environmental Assessment Requirements

The Environmental Regulations procedure (GN 30 of 2012) stipulates that no agricultural or plantation activities may be undertaken without an environmental clearance certificate. As such, an environmental clearance certificate must be applied for in accordance with regulation 6 of the 2012 environmental regulations. It is imperative that the environmental proponent must conduct a public consultation process in accordance with regulation 21 of the 2012 environmental procedure, produce an environmental scoping report and submit an Environmental Management Plan for the proposed solar power plant.

Project Alternatives

An alternative to the proposed solar power plant activity would be to allocate the land-usage to other income generating activities such as agricultural activities. The proposed project will strictly employ locals from nearby towns and settlements.

Introduction

Project Background

The proponent, Witputz Energy (Proprietary) Limited, was provisionally granted land some 4 kilometers from the village Witputz and farm Witputs South. The allocated land that is planned for this project is measures a size of 500 ha for the solar power plant project. An outline of the area is shown in the image below.

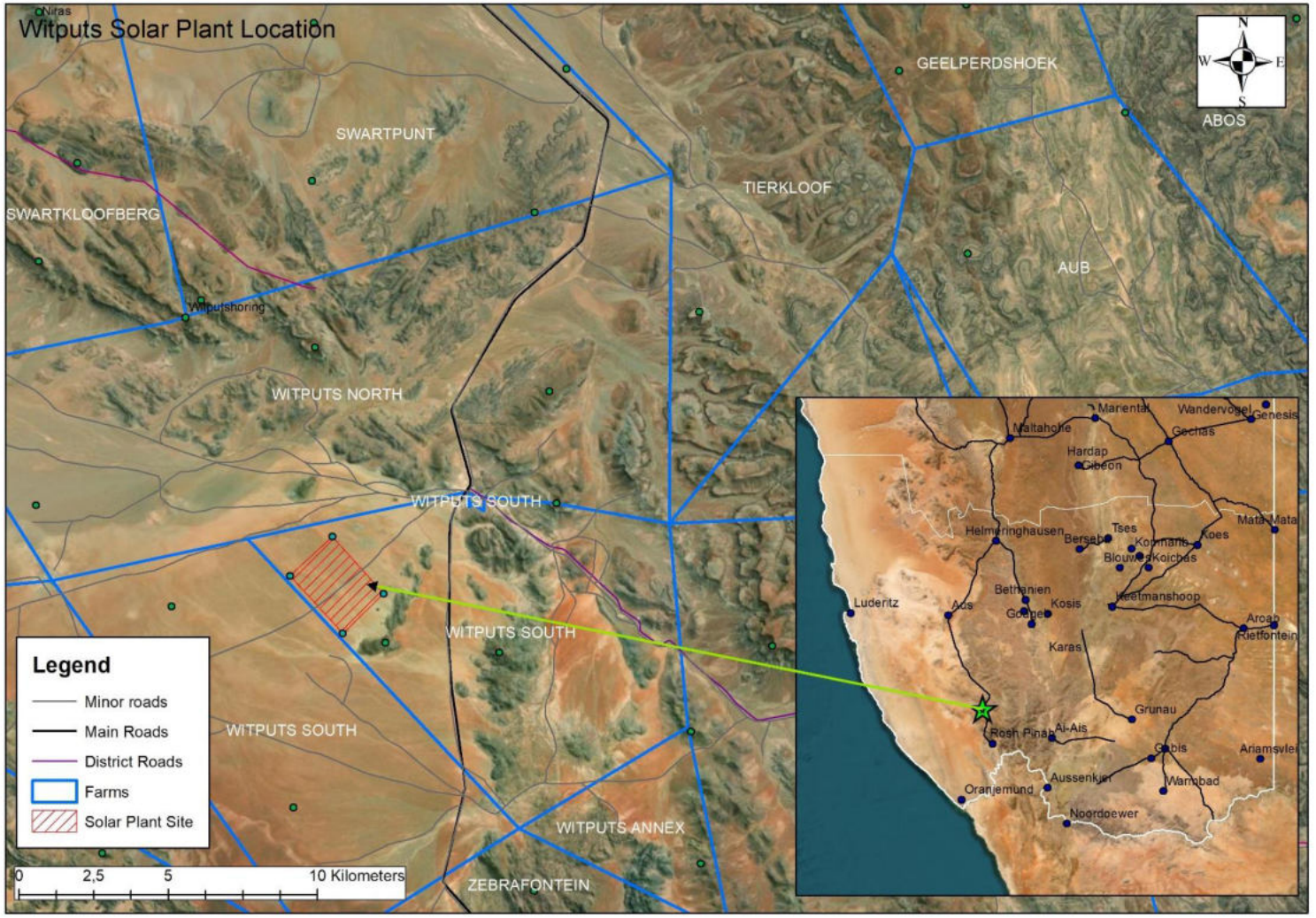


Figure 1.The surrounding roads that connect of the project area to the nearest town which is Rosh Pinah.

Solar Power Plant Tenure

The allocated land has been allocated by the private land owner of the farm Witputs South, who privately owns the lands. The allocated solar power plant area is provisionally issued to Witputz Energy (Proprietary) Limited. The size of the allocated solar power plant area is **500 Hectares**. It is granted for renewable energy supplying purposes where a 100 MW solar power plant will be constructed.

Environmental Consultant

Augite Environmental Consulting cc was appointed by the proponent to undertake an Environmental Assessment (EA) and Environmental Management Plan (EMP) for the mineral exploration project. Augite does not have any interest, be it business, financial, personal or other, in the proposed activity, application or appeal, other than fair remuneration for work performed on this project. The public participation process and report writing was overseen by Dr Kaukurauee Kangueehi as the EAP. CV`s of various role players are annexed to the appendix section of this report.

Proponent of the Proposed Project

The allocated 100 MW solar power plant belongs to Witputz Energy (Proprietary) Limited.

Land Holder	Postal Address	Email Address	Contact
Witputz Energy (Proprietary) Limited			+264 811 272537

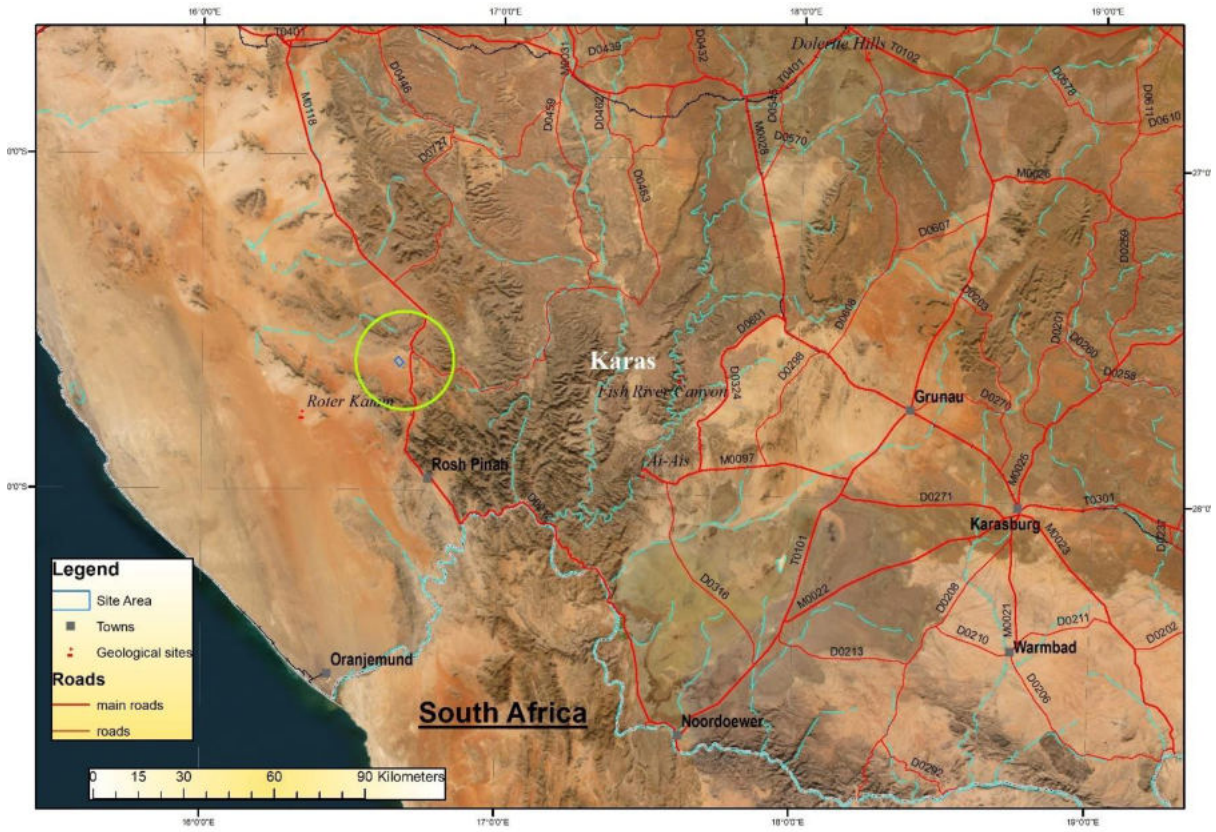


Figure 2. Map showing the surrounding towns.

Project Location

The allocated area is located 40 kilometers north of Rosh Pinah or some 110 kilometers southeast of Aus, at the local village of Witputz in the Karas region. The proposed solar plant site is accessible along the C13 tarred road and while the remaining 4 kilometers can be accessed via a gravel road. The coordinates for the centre of the allocated plot are -27.616722°, 16.661133°.

Figure 3. Agricultural area in proportion to where it is located in Namibia.

Infrastructure and Services

Electricity

At this stage, electricity requirements for the project are minimal. The bulk of the power supply to the solar power plant site will be sourced from the proponents own station since the activities at site will be to supply power. The power requirements for the proposed project will increase during the different construction phases of the solar power plant as power will only be required for the following activities:

- Emergency lighting.
- Powering small machinery during the construction phases of the solar power plant.
- Power supply for temporary office block or container if necessary.

Water supply

The water requirements for the project will be sourced from the Witputs South farm which is less than 3 kilometres from the solar power plant site. Water containers will be brought on site and utilised whenever necessary. The water will mostly be used for general consumption and cleaning. The water used for watering the crops will be sourced from boreholes on Witputs South farm.

Refuse and Waste Removal

The proponent will negotiate directly will all suppliers of consumables such as grease, oil etc. to remove these materials for disposal once they have been used and need to be discarded. The proponent will provide adequate temporary sanitary facilities and such facilities must be maintained in a hygienic condition. Sewerage will be disposed of in a manner not polluting the environment. The proponent will remove all refuse pertaining to the proponent's activities, domestic or otherwise, from the property. The proponent will undertake environmental rehabilitation, both during and at the conclusion of the agricultural activity operations.

IT systems and Communication

Once the construction has commenced, provision will be made for two-way radios to enable the heavy machinery workers the on-site staff to communicate effectively.

Security and Fencing

Provision has been made for fencing although strict access to and from the solar power plant site will be facilitated by personnel.

Buildings

At this stage, no agricultural camps will be set up and so provision will be made for prefabricated containers.

Roads

Access to the solar power plant site is limited as there are currently no convenient roads, except for 4x4 tracks.

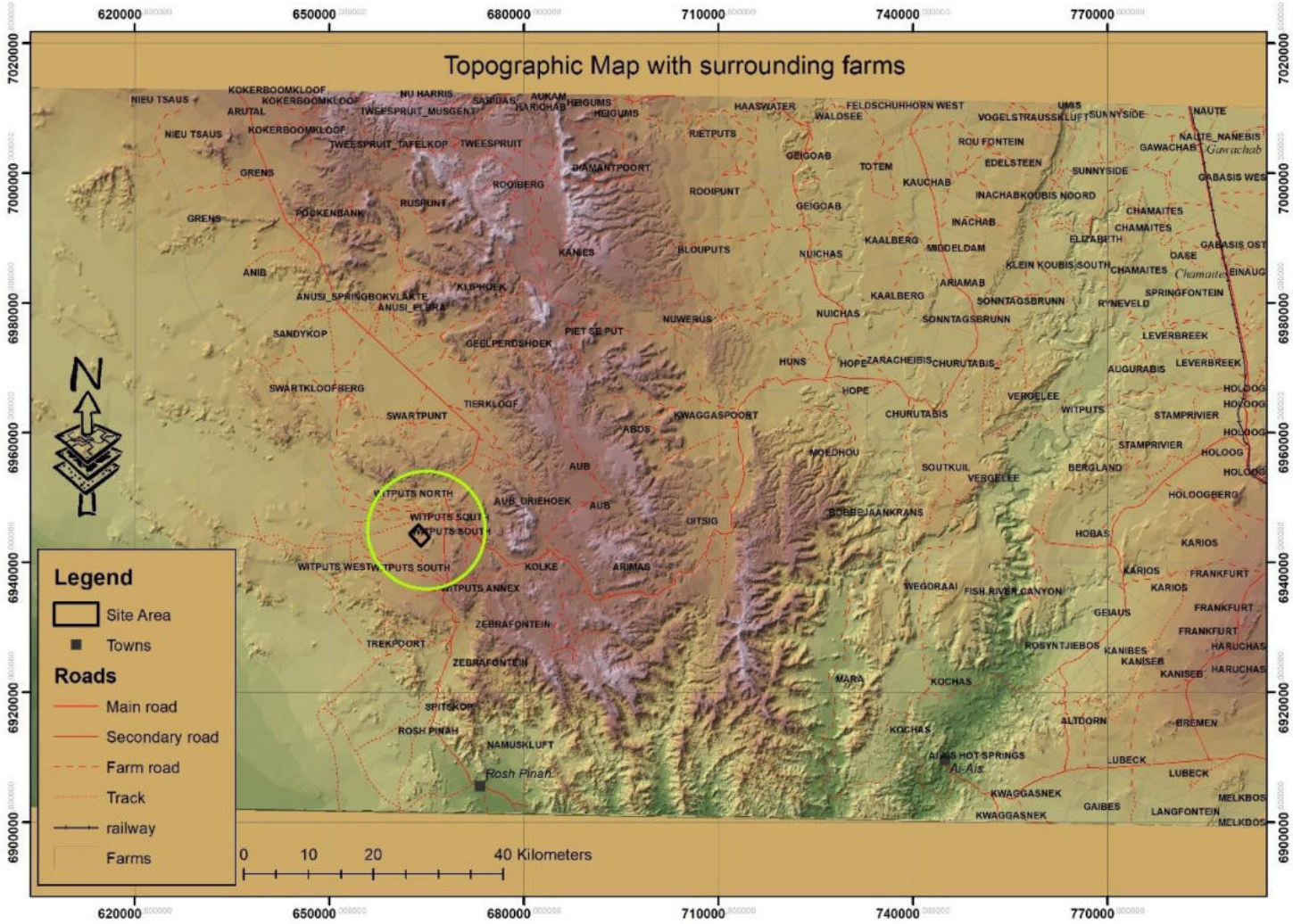


Figure 4. Topographic map showing the existing road network within the proposed solar plant area.

Mobile equipment

The proponent's vehicle fleet will be optimised during the next project phase. Provision will be made 4x4 vehicles and a heavy-duty trucks that will be used for the construction of solar power plant activities.

Fuel Distribution, storage, and supply

During the construction phase of the solar power plant activities phase, diesel will be delivered to the by road transport and offloaded into the vehicles by offloading pumps.

Storage of Lubrication and Consumables

During the construction of the solar power plant phase, consumables and lubricants will be stored in a designated area within a container. These substances will only be used for mechanical purposes and are assumed to be non-hazardous.

Fire Fighting Provision

Portable fire-extinguishers will be fitted, as required, in vehicles and mobile containers where possible.

Environmental Impact Assessment Requirements

The **Environmental Regulations procedure (GN 30 of 2012**) stipulates that no construction or a solar power plant generating farm may be undertaken without an environmental clearance certificate. As such, an environmental clearance certificate must be applied for in accordance with regulation 6 of the 2012 environmental regulations. It is imperative that the environmental proponent must conduct a public consultation process in accordance with regulation 21 of the 2012 environmental procedure, produce an environmental scoping report and submit an Environmental Management Plan for the proposed 100 MW solar power plant that will generate and supply electricity to the bigger part of Namibia.

Purpose of the Scoping Report

The scoping report is prepared for the Environmental Impact Assessment for the proposed 100 MW solar power plant farm that will be constructed 40 kilometers north of Rosh Pinah or some 110 kilometers southeast of Aus, at the local village of Witputz in the Karas region. The

proposed solar plant site is accessible along the C13 tarred road and while the remaining 4 kilometers can be accessed via a gravel road. Environmental scoping is a critical step in the preparation of an EIA for the proposed 100 MW solar power plant project. The scoping process identifies the issues that are likely to be most important during the EIA and eliminates those that are of little concern. The scoping process shall be concluded with the establishment of terms of reference for the preparation of an EIA, as set out by the Ministry of Environment and Tourism. The purpose of this scoping report is to:

- Identify any important environmental issues to be considered before commencing with 100 MW solar power plant project activities on the project site.
- To identify appropriate time and space boundaries of the EIA study.
- To identify information required for decision-making.

As such, the key objectives of this scoping study are to:

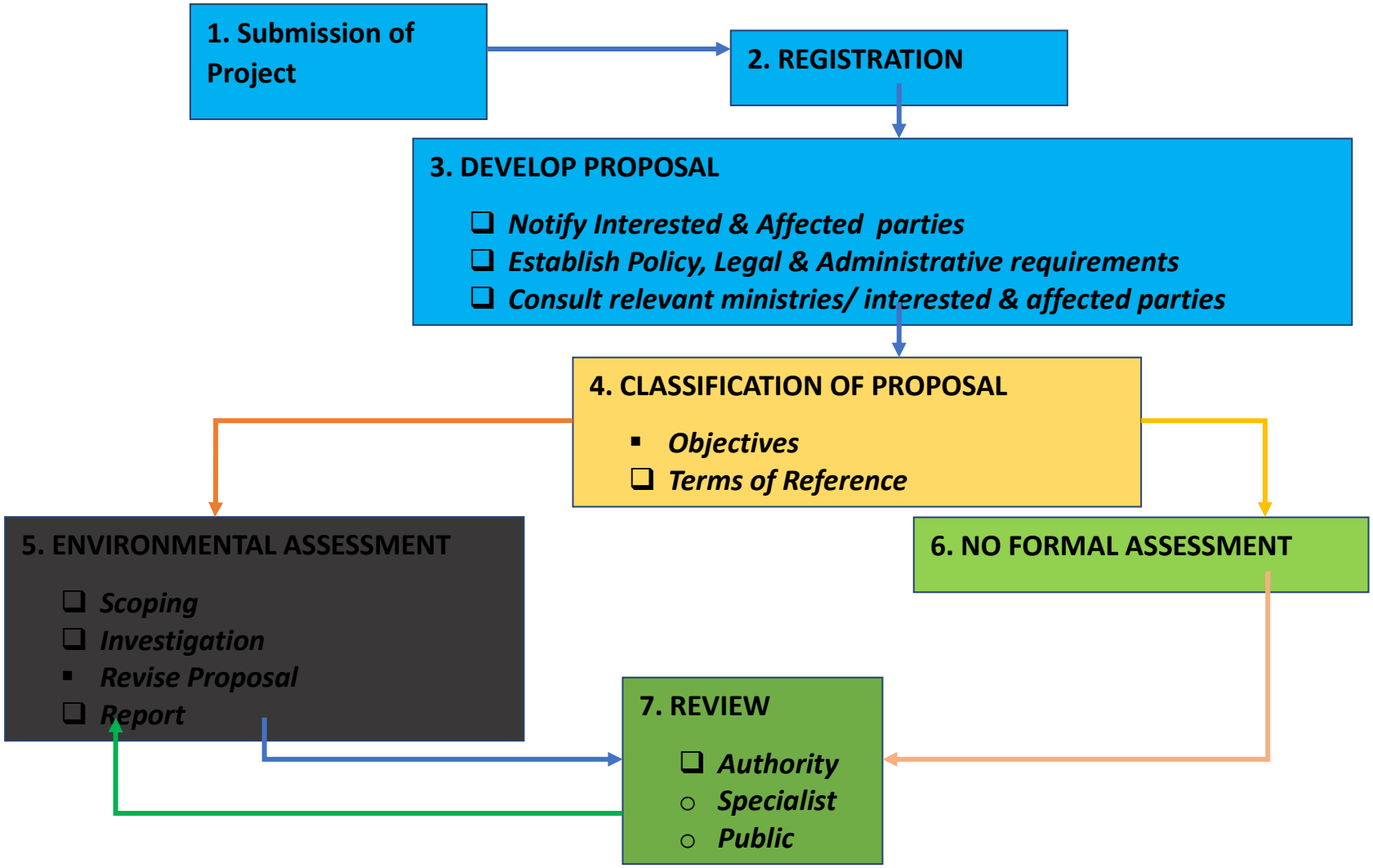
- Inform the public about the proposed 100 MW solar power plant project and activities.
- Identify the main stakeholders, their comments and concerns.
- Define reasonable and practical alternatives to the proposal.
- To establish the terms of reference for an EIA study.

Terms of Reference

The approach and methodology taken was guided by the Environmental Regulations of 2012 and the Terms of Reference (ToR) which were provided by the proponent:

- Identify all legislation and guidelines that have reference to the proposed project.
- Identify existing environmental (both bio-physical and socio-economic) conditions of the area to determine their environmental sensitivity.
- Inform Interested and Affected Parties (I&APs) and relevant authorities of the details of the proposed development and provide them with a reasonable opportunity to participate during the process.
- Consider the potential environmental and social impacts of the development and assess the significance of the identified impacts.

- Compile a Scoping Report detailing all identified issues and possible impacts, stipulating the way forward and identifying specialist investigations, if required.
- Outline management and mitigation measures in an Environmental Management Plan (EMP) to minimize and/or mitigate potentially negative impacts.
- Submit the final scoping report to the competent authority and the Environmental Commissioner.


1. Submission of Project
2. REGISTRATION
3. DEVELOP PROPOSAL
Notify Interested & Affected parties
Establish Policy, Legal & Administrative requirements
Consult relevant ministries/ interested & affected parties
4. CLASSIFICATION OF PROPOSAL
Objectives
Terms of Reference
5. ENVIRONMENTAL ASSESSMENT
Scoping
Investigation
Revise Proposal
Report
6. NO FORMAL ASSESSMENT
7. REVIEW
Authority
Specialist
Public

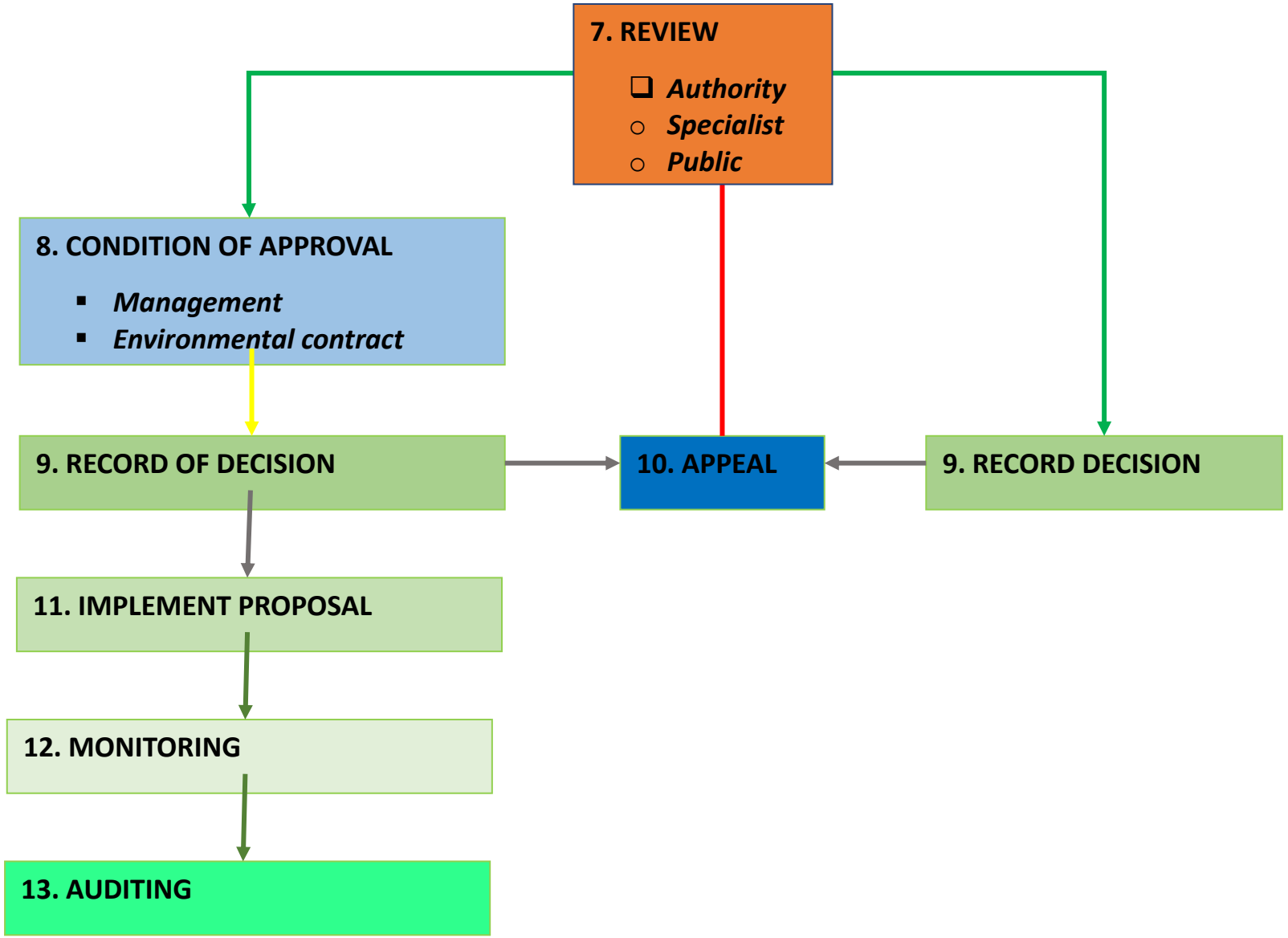


Figure 5. Flowchart of the Environmental Impact Assessment process followed in Namibia.

Environmental Assessment Approach and Methodology

Environmental assessment process in Namibia is governed by the Environmental Impact Assessment (EIA) Regulations No. 30 of 2012 gazetted under the Environmental Management Act, (EMA), 2007, (Act No. 7 of 2007) and in line with the provisions of the Cabinet approved Environmental Assessment Policy for Sustainable Development and Environmental Conservation of 1995.

This report has taken into consideration all the requirements for preparation of all the supporting documents and application for an Environmental Clearance Certificate and lodgement of such application to the Environmental Commissioner (EC), Department of Environmental Affairs (DEA) in the Ministry of Environment and Tourism (MET).

The purpose of the Scoping Phase was to communicate the scope of the proposed project to Interested and Affected Parties (I&APs), to consider project alternatives, to identify the environmental (and social) aspects and potential impacts for further investigation and assessment, and to develop the terms of reference for specialist studies to be conducted in the Impact Assessment Phase if necessary. The steps undertaken during the Scoping Phase are summarised below.

Project Initiation and Screening

The project registered on the online ECC portal (eia.met.gov.na) to provide notification of the commencement of the EIA process and to obtain clarity on the process to be followed.

Initial Scoping Public Participation Process

The objective of the public scoping process was to ensure that interested and affected parties (I&APs) were notified about the proposed project, given a reasonable opportunity to register on the project database and to provide initial comments. Steps that were undertaken during this phase are summarised below:

- **I&AP identification:** A preliminary I&AP database was compiled using the farmers contact details that were obtained from the Ministry of Lands and contact details of other interested and affected parties that were provided by the proponent. Additional

I&APs were added to the database based on responses to the advertisements and notification letters, as well as attendees to the various meetings.

- **Notification letter and Background Information Document (BID):** A notification letter and Background Information Document was distributed for review and comment for a period of 3-4 weeks after commencement of the project.
- **Advertisements and site notice:** Advertisements announcing the proposed project, the availability of the BID, public meetings and the I&AP registration / comment period were placed in two widely distributed newspapers for two consecutive weeks. Site notices were placed on the boundaries of farm fences and on the notice boards of the Regional Council. Over and above the issues raised were incorporated into the scoping report. These submissions were collated and responded to as indicated in the public participation section of the scoping report.

Compilation and Review of Draft Scoping Report (DSR)

The DSR was prepared in compliance with Section 8 of the EIA Regulations of 2012 and incorporated with comments received during the initial Public Participation Process. The DSR was distributed for a 14-day review and comment period.

Final Scoping Report and Completion of the Scoping Phase

The Final Scoping Report (FSR) summarises the following: the legal and policy framework; approach to the EIA and process methodology; the project's need and desirability; proposed project activities; key characteristics of the receiving environment; and key issues of concern that will be further investigated and assessed in the next phase of the EIA. The FSR complies with Section 8 of the EIA Regulations 2012. All written submissions received during the DSR review and comment period will be collated and responded to. The FSR was submitted to the competent authority. In terms of Section 32 of the Environmental Management Act, 2007 (No. 7 of 2007), the competent authority is then required to make a recommendation on the acceptance or rejection of the report to Ministry of Environment and Tourism (MET): Department of Environmental Affairs (DEA), who will make the final decision.

List of Specialist Studies Undertaken

Section 9 (a) of the Environmental Regulations of 2012 requires a disclosure of all the tasks to be undertaken as part of the assessment process, including any specialist to be included if necessary.

The 100MW solar power plant project has not commenced yet. This means that the proponent has not conducted any surface disturbance on the ground (i.e., clearing of land, erecting fences, and making of new roads) to start with the construction of the project. As such, no field specific specialist studies were commissioned by the proponent as no specific target area has been delineated yet. Although specialist studies were deemed unnecessary for this environmental impact assessment due to low intensity and extent of the exploration activities at this stage, a heritage impact assessment study was undertaken for this project. Specialist studies conducted in the area, in previous years, have been reviewed as part of the scoping and assessment process of this project.

Need and Desirability

Need of the Solar Energy Supply Project

Electricity plays an important role in the development of a country and an important sector. Namibia is heavily reliant on neighbouring countries such as South Africa and Zambia for electricity. Currently, the country imports up to 60% of the total electrical energy requirements. The country demands for electricity stands at approximately 600MW per year, while Namibia can potentially generate up to 487 MW. Hence, there is still a deficit of up to 200MW of power.

Currently, the major electrical power suppliers are the Ruacana Hydropower Station, Van Eck Coal Power Station, Paratus Diesel Power Station and Anixas Power Station. One of the major objectives of the Harambee Prosperity Plan Goals is to increase the local electricity generating capacity of the country from 400 to 600MW. The primary goal of Witputz Energy (Pty) Ltd goal is to assists the country in achieving this goal.

The solar power plant project may assist in helping Namibia attain some of the goals set out in National Development Plans such as the National Development Plans (NDPs) and Vision 2030 strategy. During the development phase, the project will provide employment to at least 20 people from the surrounding towns and settlements. During the agricultural production phase, the produced crops can significantly contribute to social-economic development around the surrounding community.

Alternatives

During the application of the lease of land for the solar power plant, no alternative sites were considered. The proposed allocated site has shown the potential to be near the isolated from major towns and can receive maximum sunlight for the majority part of the year.

Solar Power Plant Method Alternatives

The area is poorly vegetated with open grassland and minimal heavy machinery needed to create the solar power plant farm required. Excavators, backhoes, bulldozer, grader, and a loader will be the majors equipment used in the early stages to create the necessary land. This method is more modern, effective, and environmentally friendly method.

No-Go Alternatives

The no-go alternative will mean that the current land activities such as farming and important vegetation species will not be disturbed, that is, there will not be disturbance of the flora and fauna. However, the no go alternative is not considered since it will lead to negative socio-economic impacts.

Summary of applicable legislation

All energy supply services, related to renewable energy activities such as solar power plants in Namibia, are regulated by the Ministry of Mines and Energy whereas the environmental regulations are regulated by the Ministry of Environment and Tourism. The acts that affect the implementation, operation, and management of agronomy and agricultural activities in Namibia are shown below.

Environmental Management Act of 2007

Line Ministry: Ministry of Environment and Tourism

The regulations that accompany this act lists several activities that may not be undertaken without an environmental clearance certificate issued in terms of the Act. The act further states that any clearance certificate issued before the commencement of the act (6 February 2012) remains in force for one year. If a person wishes to continue with activities covered by the act, he or she must apply for a new certificate in terms of the Environmental Management Act.

Forest Act, No. 12 of 2001

Line Ministry/Body: Ministry of Agriculture, Water and Forestry

The act regulates the cutting down of trees and reads as follows "To provide for the establishment of a Forestry Council and the appointment of certain officials; to consolidate the laws relating to the management and use of forests and forest produce; to provide for the protection of the environment and control and management of forest trees; to repeal the preservation of Bees and Honey proclamation 1923, preservation of Trees and Forests Ordinance, 1952 and the Forest Act, 1968; and to deal with incidental matters". The constitution defines the function of the Ombudsman and commits the government to sustainable utilization of Namibia's natural resources for the benefit of all Namibians and describes the duty to investigate complaints concerning the over-utilization of living natural resources for the benefit of all Namibians and describes the duties to investigate complaints concerning the over-utilization of living natural resources, the irrational exploitation of non-renewable resources, the degradation and the destruction of ecosystem and failure to protect the beauty and character of Namibia. Article 95 states that *"the state shall actively promote and maintain the welfare of the people by adopting; inter alia policies aimed at maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of natural resources on a sustainable basis for the benefit of all Namibians both present and future".*

Agricultural (Commercial) Land Reform Act 6 of 1995

Line Ministry/Body: Ministry of Lands, Resettlement and Rehabilitation

To provide for the acquisition of agricultural land by the State for the purposes of land reform and for the allocation of such land to Namibian citizens who do not own or otherwise have the use of any or of adequate agricultural land, and foremost to those Namibian citizens who have been socially, economically or educationally disadvantaged by past discriminatory laws or practices; to vest in the State a preferent right to purchase agricultural land for the purposes of the Act; to provide for the compulsory acquisition of certain agricultural land by the State for the purposes of the Act; to regulate the acquisition of agricultural land by foreign nationals; to establish a Lands Tribunal and determine its jurisdiction; and to provide for matters connected therewith.

Petroleum Products and Energy Act No. 13 of 1990

Line Ministry/Body: Ministry of Mines and Energy

The act regulates the importation and usage of petroleum products. The act reads as "To provide measures for the saving of petroleum products and an economy in the cost of the

distribution thereof, and for the maintenance of a price thereof; for control of the furnishing of certain information regarding petroleum products; and for the rendering of services of a particular kind, or services of a particular standard; in connection with motor vehicles; for the establishment of the National Energy Fund and for the utilization thereof; for the establishment of the National Energy Council and the functions thereof; for the imposition of levies on fuel; and to provide for matters incidental thereof'.

Water Resources Management Act of 2004

Line Ministry: Ministry of Agriculture, Water and Forestry

The act provides for the management, protection, development, usage, and conservation of water resources; to provide for the regulation and monitoring of water resources and to provide for incidental matters.

Nature conservation ordinance, ordinance No. 4 of 1975

Line Ministry: Ministry of Environment and Tourism

The Nature Ordinance 4 of 1975 covers game parks and nature reserves, the hunting and protection of wild animals (including reptiles and wild birds), problem animals, fish, and the protection of indigenous plants. It also establishes a nature conservation board. The basic set of regulations under the ordinance is contained in GN 240/1976 (OG 3556). The topics covered in the regulations include tariffs (game parks), regulations relating to game parks, swimming baths, use of boats in game parks, inland fisheries, keeping game and other wild animals in capturing. In addition, the ordinance also regulates game dealers, game skins, protected plants, birds kept in cages, trophy hunting of hunt-able game, hunting at night, export of game and game meat, sea birds, private game parks, nature reserves, regulations of wildlife associations and registers for coyote getters.

National Heritage Act, 2004 (Act No. 27 of 2004)

Line Ministry/Body: National Heritage Council

The National Heritage Act provides for the protection and conservation of places and objects of heritage significance and the registration of such places and objects; to establish a National Heritage Council; to establish a National Heritage Register; and to provide for incidental matters.

Atmospheric Pollution Prevention Ordinance 11 of 1976

Line Ministry/Body: Ministry of Health and Social Services

This ordinance provides for the prevention of air pollution and is affected by the Health Act 21 of 1988. Under this ordinance, the entire area of Namibia, except for East Caprivi, is proclaimed as a controlled area for the purposes of section 4(1) (a) of the ordinance.

Hazardous Substance Ordinance, No. 14 of 1974

Line Ministry/Body: Ministry of Safety and Security

The ordinance provides for the control of toxic substances. It covers manufacture, sale, use, disposal and dumping as well as import and export. Although the environmental aspects are not explicitly stated, the ordinance provides for the importing, storage and handling.

Namibian Water Corporation (Act 12 of 1997)

Line Ministry/Body: Namibian Water Corporation

The act caters for water rehabilitation of prospecting and mineral exploration areas, environmental impact assessments and for minimising or preventing pollution.

Public and Environmental Health Act, 2015

Line Ministry/Body: Ministry of Health and Social Services provide a framework for a structured uniform public and environmental health system in Namibia; and to provide for incidental matters.

Description of Proposed Solar Power Plant Project

Introduction

Witputz Energy Pty Ltd is a wholly black owned entity which is legally organized as a proprietary limited within requisite parameters of the Companies Act 28 of 2004 of the Republic of Namibia. Whilst supplying solar power energy takes centre stage the concept is openly positioned to flexibly evolve with a diversified portfolio in energy business.

It's an exciting state-of-the-art investment which would be one of a few in the southern part of Namibia with a focus on produce renewable energy marketed and exported local Namibian energy needs and demands.

Although Namibia is a semi-arid country, one of its biggest goals is to add between 300-500 MW of solar capacity to meet the expected the domestic demand for energy. The ultimate goal will be to make Namibia a net energy exporter, the country needs to increase its solar capacity to up to 3-5 gigawatts (GW) by 2030. Witputz Energy (Pty) Ltd aims to add value and supply energy to Namibia, in order for the country to meet some of these goals.

Witputz Energy (Pty) Ltd project is dedicated to establish a sustainable, profitable and unique solar power energy business that will offer considerable amount of employment opportunities to skilled, semi-skilled, ordinarily employable youth of the Karas Region on a permanent and temporary basis.

Techniques for Solar Power Plant Project

Identification of Suitable Land

The identified land suitable for solar power plant involved certain stages, such as **searching areas with sufficient sunlight and low cloud cover supplies, remote sensing, consultation with the various farm owners to acquire land needed for a solar power plant**. Various areas in the country were investigated for this project, ranging from the south (some towns were considered), northeast (high rainfall conditions and low sunlight in comparison to other regions was an obstacle) and the north west. After numerous consultations, the farm Witputz in the /Karas Region was chosen as the most suitable location for this project. One of the main reasons for choosing the area was to create employment opportunities in an area where there is high unemployment and secondly because of the proximity of the allocated land to the main electrical lines. In addition, the acceptance and encouragement of the community also played a crucial role in identifying this area as most suitable in comparison to other surveyed sites.

3.2.1.2 Remote Sensing

Remote Sensing is the collection of information about an object or area without being in physical contact with it. Data gathering systems used in remote sensing are photographs obtained from manned space flights or airborne cameras, and electronic scanner or sensors such as multispectral scanners in satellites or airplanes and TV cameras, all of which record data digitally. Aerial photography and satellites allow people to work with modern techniques. Aerial photography was used to narrow down the most suitable area for this

horticulture project. The proponent team collects information such as tracks, roads, fences, and habitation, as well as maps of outcrops, regolith, and vegetation cover across a region.

3.3 Labour Requirements

The proponent intends to employ about 50-150 personnel, including 10 management staff for the first phase of the project. The employees will be sourced from the local community including people from Witputz village. All employees will undergo a safety induction, first aid training course and wildlife awareness program. The Labour Act of 2007 will always be adhered to.

Description of the Current Environment

4.1 Introduction

This section aims to document the present state of the environment, the likely impact of changes being planned and the regular monitoring to attempt to detect changes in the environment. As such, this area represents a high fauna diversity. Namibia has four very large and arid regions which set them apart in various ways from the rest of the country; Kunene and Erongo region in the west and Karas and Erongo in the south (Mendelsohn, et al., 2002). Kunene Region occupies the northwest corner of Namibia.

The Skeleton Coast Park forms its entire western boundary with the Atlantic Ocean. The Kunene River with its Epupa Falls forms an international boundary with Angola to the north. Nationally, Kunene is bordered by Omusati Region and the western boundary of Etosha National Park. In the south it forms the southern boundary of most of Etosha National Park and borders Erongo and Erongo regions.

The Karas region is home to the Namib-Naukluft National Park, /Ai/Ais-Richtersveld Transfronteir Park and many conservancies. The Karas Region encompasses a range of biomes or landscapes neatly arranged parallel to one another. On the west is the forbidding Namib-Naukluft National Park Coast - a region of rocks, fog, shipwrecks and desolation, washed by the waters of the Benguela current, which brings Antarctic cold to desert heat. The region's administrative capital is Keetmanshoop. The Karas Region covers an area of 161,514 km^2 of the total Namibian land. This figure shows a population density of 0.42 persons per km^2. Karas Region is the largest region in Namibia.

4.2 Climatic Conditions

4.2.1 Temperature

In the proposed area, the hot season lasts for half a year, from October to March, with an average daily high temperature above 24.05°C. The hottest month of the year in Witputs is December, with an average high of 36°C and low of 0.41% lower than Namibia's averages. The cool season lasts for 2.3 months, from May 25 to August 1, with an average daily high temperature below 21°C. The coldest month of the year in Witputs is June, with an average low of 7°C and high of 21.6°C.

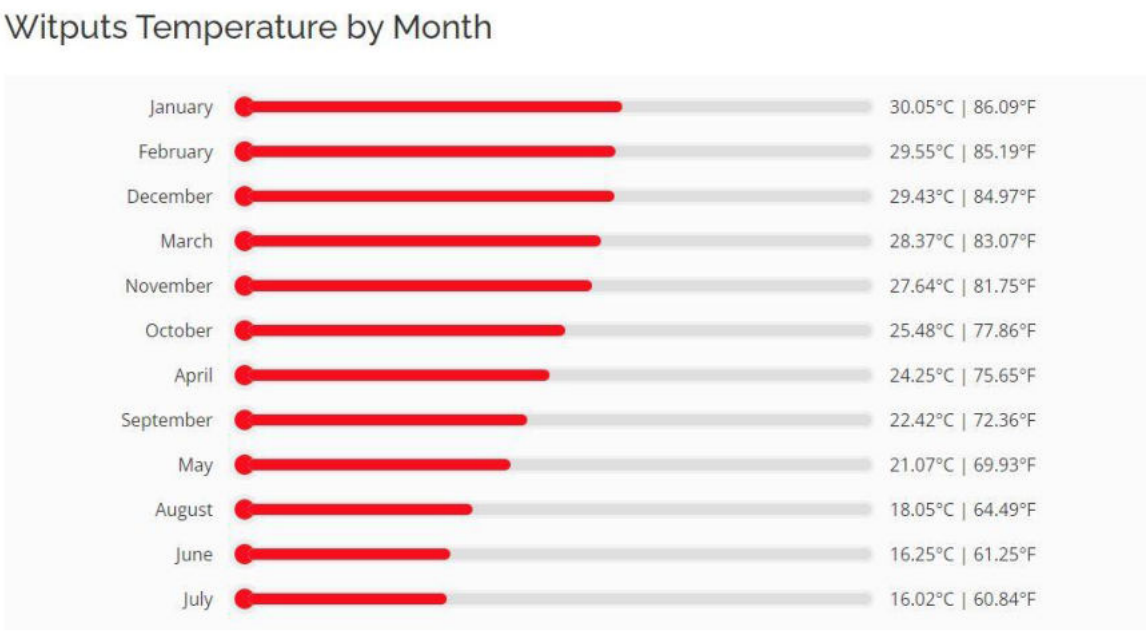


Figure 6.Average temperature for a period from 2010 to 2022 (source: https://weatherandclimate.com/namibia/karas/witputs#:~:text=Witputs%20Climate%20Summary&text=The%20district's%20yearly%20temperature%20is,%25%20of%20the%20time)%20annually).

4.2.2 Precipitation

In the proposed area, the lowest amount of precipitation in the winter months recording a mere 0 mm. Witputs typically receives about 17.9 millimeters of rain and only has about less than 10% rainy days annually. The graph below shows the rainfall patterns in the area.

Figure 7. Average precipitation, temperature and precipitation for Witputs (https://en.climate-data.org/africa/namibia/kunene-region/epupa-896579/#climate-graph).

Wind

Historically, the wind in Witputs during August blows at an average speed of 26.68 kmh (16.58 mph). There are a couple of gust winds with maximum speeds of 32.6 kmh, with an average wind speed of 20.42 kmh. The wind rose for Witputs shows how many hours per year the wind blows from the indicated direction. Example SW: Wind is blowing from South-West (SW) to North-East (NE). The diagram for Witputs shows the days per month, during which the wind reaches a certain speed.

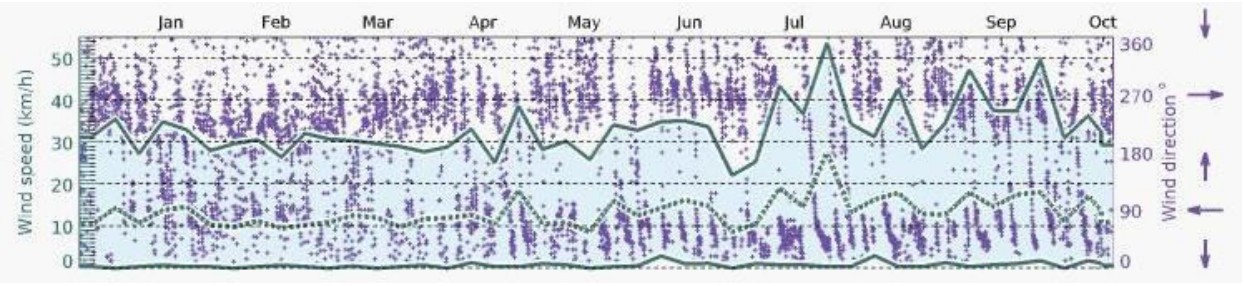


Figure 8. Average wind and maximum speed for the town of Witputs.

Air Quality

Activities around the agricultural area mainly consist of tourism and small-scale livestock farming. Besides tourism, there are no other industries or operating mines in the area. Probable sources of air pollution in the area are emissions and dust from vehicles travelling on gravel roads, dust generated by cattle grazing and wind erosion from the exposed areas. PM_{10} describes all particulate matter in the atmosphere with a diameter equal to or less than 10 µm and are generally emitted from motor vehicles (diesel engines) and burning of wood. $PM_{2.5}$ describes all particulate matter in the atmosphere with a diameter equal to or less than 2.5 µm and are mostly related to combustion. NO_2 and nitric oxide (NO) are formed simultaneously in combustion processes and other high temperature operations such as blast furnaces. Sources of SO_2 include fossil fuel combustion from industry and power plants. SO_2 is emitted when coal or other biomass fuels are burnt for energy.

Data from accuweather.com shows that the air quality in the area is generally excellent with an air quality index of 15 AQI. The ground-level ozone (O_3) is about 15 µg/m³ which is excellent. The fine particle matter levels ($PM_{2.5}$) are about 9 µg/m. The particle matter (PM_{10}) is about 9 µg/m³. The nitrogen dioxide (NO_2), carbon monoxide (CO), and sulphur dioxide (SO_2) levels in the area are recorded to be 0 µg/m³.

4.3 Geology

4.3.1 Geological setting

The allocated area is mostly covered by sand found in a fairly flat valley area with sparsely dispersed vegetation. Hence, the geology is primarily surficial sand, although, the a section of the Gariep belt extents through Witputs comprised of sequence of clastic and chemical sediments. These sediments have been previously identified as being part of the Late Neoproterozoic global or near global near ice age event. Locally, there are diamictites found in the area, which are homogenous and can be interpreted as debris flow or palaeo-valley infill sediments that have been deposited in an oxic environment with no glaciogenic evidence. Regionally, late Neoproterozoic volcanic activity has been known in the area as well.

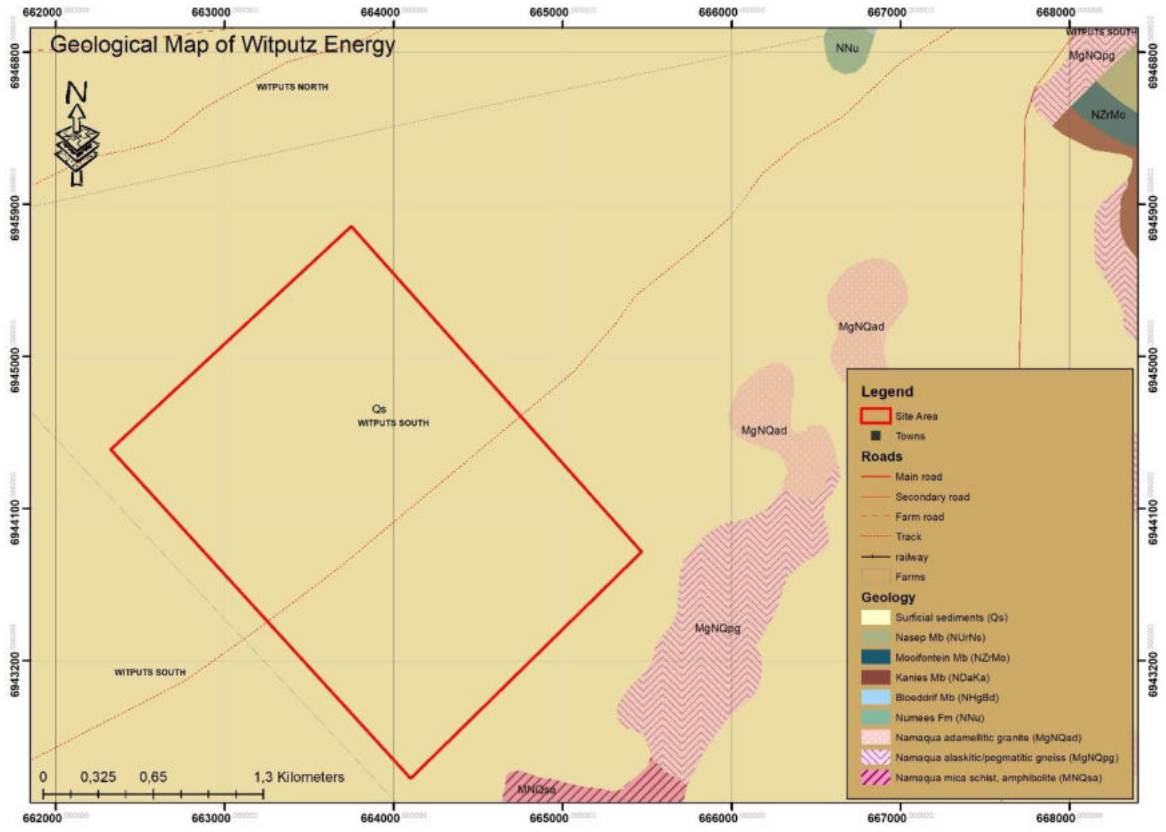
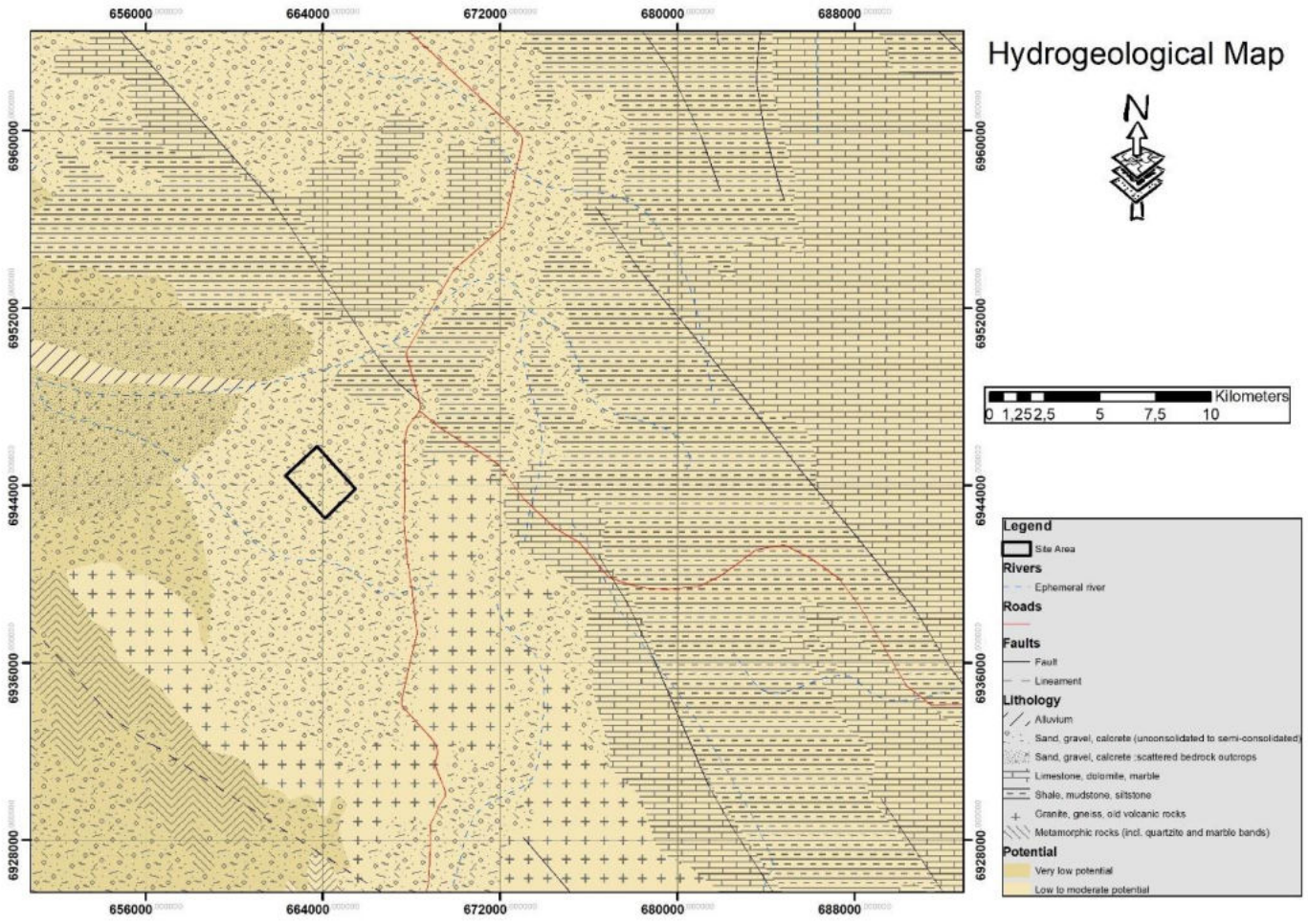


Figure 9. The various geological complexes that can be found in the area surrounding EPL8703

Hydrogeology and Water Resources

The area is underlain by rocks with little groundwater potential and aquifers with moderate groundwater potential.


Hydrogeological Map
N
656000
664000
672000
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6952000
6944000
6936000
6928000
0 1,252,5 5 7,5 10 Kilometers
Legend
Site Area
Rivers
Ephemeral river
Roads
Faults
Fault
Lineament
Lithology
Alluvium
Sand, gravel, calcrete (unconsolidated to semi-consolidated)
Sand, gravel, calcrete ;scattered bedrock outcrops
Limestone, dolomite, marble
Shale, mudstone, siltstone
Granite, gneiss, old volcanic rocks
Metamorphic rocks (incl. quartzite and marble bands)
Potential
Very low potential
Low to moderate potential

4.5 Flora

The Witputs area forms part of the Ai-Ais / Richtersveld Trans frontier Park towards the east and the Spergebiet National Park towards the west. Two biomes extents through the area, namely the Nama Karoo and the Succulent Karoo as well as the transition zone between the two biomes. The area is also covered by exceptionally environmentally sensitive sites and the utilization of existing road tracks and paths is highly encouraged. The succulent Karoo ecosystem is one of the most diverse desert systems globally. There are important plant specimens, with untouched habitats and a dense biodiversity that needs to be conserved.

Fauna

4.6.1 Introduction

The information is based on a detailed literature review and a site visit which was carried out. The purpose of the Fauna literature review is to identify all potential amphibians, reptiles, and mammals expected on the project area and the surrounding farms in the vicinity of the Witputs area. The proposed solar plant area supports numerous faunal species but there are no species that are exclusive to the study area.

Larger types of animals such as zebras, dessert wild horses, oryx, kudu, springbok and ostriches to name a few are found in this area. There are no species which are exclusively endemic to the agricultural area. Based on literature review, development of an agricultural project in the area will not have a negative impact on any of the species in the project area.

4.6.2 Amphibians

Based on the literature review, there are generally 50 types of amphibian species that occur in project area. The area supports a large variety of lizards (35 species) and snakes (16 species). Griffin (1998) highlighted that amphibian species are declining throughout the world due to various factors such as climate change and habitat destruction. There are approximately 4000 species of amphibians worldwide of which over 200 species are present in Southern Africa and 57 in Namibia (Griffin, 1998). However, this low figure may be due to the lack of detailed studies carried out on amphibians. The table below shows the different amphibian species that are likely to occur within the study area.

Species	
Common Platanna	*Xenopus laevis*
Guttural Toad	*Bufo gutturalis*
Karoo Toad	*Bufo gariepensis*
Raucous Toad	*Bufo rangeri*
Paradise Toad	*Bufo robinsoni*
Marbled Rubber Frog	*Phrynomantis annectens*
Tandy's Sand Frog	*Tomopterna tandyi*
Cape River Frog	*Afrana fuscigula*
Angola River Frog	*Afrana angolensis*
Clicking Stream Frog	*Strongylopus grayi*
Namaqua Stream Frog	*Strongylopus springbokensis*
Namaqua Caco	*Cacosternum namaquense*
Helmeted / Marsh Terrapin	*Pelomedusa subrufa*
Leopard Tortoise	*Geochelone pardalis*
Bowsprit Tortoise	*Chersina angulata*
Nama Padloper	*Homopus sp. nov*
Namaqualand Tent Tortoise	*Psammobates tentorius*
Namaqua Flat Gecko	*Afroedura namaquensis*
Striped Leaf-Toed Gecko	*Goggia lineata*
Richtersveld Leaf-Toed Gecko	*Goggia gemmula*
Namaqua Day Gecko	*Phelsuma ocellata*
Namibian Dwarf Gecko	*Lygodactylus bradfieldi*
Giant Ground Gecko	*Chondrodactylus angulifer*
Cape Button-Scale Gecko	*Pachydactylus. bibronii*
Tropical Button-Scale Gecko	*Pachydactylus turneri*
Weber's Gecko	*Pachydactylus weberi*
Western Cape Gecko	*Pachydactylus labialis*
Marico Gecko	*Pachydactylus mariquensis*
Speckled Gecko	*Pachydactylus punctatus*
Namibian Rough-Scaled Gecko	*Pachydactylus rugosus*
Western Spotted Gecko	*Pachydactylus serval*
Great Namaqualand Gecko	*Pachydactylus haackei*
Namaqua Gecko	*Pachydactylus namaquensis*
Common Barking Gecko	*Pachydactylus garrulous*
Festive Gecko	*Narudasia festiva*

Common Ground Agama	*Agama aculeata*
Western Rock Agama	*Agama anchietae*
Southern Rock Agama	*Agama atra*
Spiny Agama	*Agama hispida*
Namaqua Chameleon	*Chamaeleo namaquensis*
Striped legless skink	*Acontias lineatus*
Sperrgebiet Blind Legless Skink	*Typhlosaurus meyeri*
Namibian Dwarf Burrowing Skink	*Scelotes capensis*
Wedge-Snouted Skink	*Trachylepis acutilabris*
Cape Skink	*Trachylepis capensis*
Western Three-Lined Skink	*Trachylepis occidentalis*
Western Variegated Skink	*Trachylepis variegata*
Namibian Tree Skink	*Trachylepis spilogaster*
Koppie Skink	*Trachylepis sulcata*
Western Sandveld Lizard	*Nucras tessellata*
Round-Snouted Sand Lizard	*Meroles knoxii*
Spotted Desert Lizard	*Meroles suborbitalis*
Karoo Sand Lizard	*Pedioplanis laticeps*
Ocellated/Spotted Sand Lizard	*Pedioplanis lineoocellata*
Namaqua Sand Lizard	*Pedioplanis namaquensis*
Namibian Plain Sand Lizard	*Pedioplanis inornata*
Dwarf Plated Lizard	*Cordylosaurus subtessellatus*
Karoo Girdled Lizard	*Cordylus polyzonus*
Gariep Flat Lizard	*Platysaurus capensis*
Veld Leguaan / Rock Monitor	*Varanus albigularis*
Water Leguaan	*Varanus niloticus*
Slender Wormsnake	*Leptotyphlops gracilior*
Namibian Wormsnake	*Leptotyphlops occidentalis*
Delalande's Blind Snake	*Rhinotyphlops lalandei*
Beaked Blind Snake	*Rhinotyphlops schinzi*
Cape House Snake	*Lamprophis fiskii*
Brown House Snake	*Lamprophis fuliginosus*
Spotted House Snake	*Lamprophis guttatus*
Mole Snake	*Pseudaspis cana*
Spotted Skaapsteker	*Psammophylax rhombeatus*
Western Whip Snake	*Psammophis trigrammus*

Karoo Whip Snake	*Psammophis notostictus*
Namib Sand Snake	*Psammophis namibensis*
Cross-Marked Sand Snake	*Psammophis crucifer*
Dwarf-Beaked Snake	*Dipsina multimaculata*
Rhombic Egg-Eater	*Dasypeltis scabra*
Spotted Bush Snake	*Philothamnus semivariegatus*
Namaqua Tiger Snake	*Telescopus beetzi*
Southern Tiger Snake	*Telescopus semiannulatus*
Twin-Striped Shovel-Snout	*Prosymna bivittata*
Southwestern Shovel-Snout	*Prosymna frontalis*
Coral Snake	*Aspidelaps lubricus*
Black Spitting-Cobra	*Naja woodi*
Cape Cobra	*Naja nivea*
Horned Adder	*Bitis caudalis*
Desert Mountain Adder	*Bitis xeropaga*
Many-Horned Adder	*Bitis cornuta*
Puff Adder	*Bitis arietans*

Mammals

Based on the literature review, there are generally about 56 species of mammals expected to occur within the immediate area. There are generally 30 species which rarely occur, 5 species that occur seasonally, 4 that occur occasionally, and 40 that occur abundantly within the project area. Considering the relative small size of the solar plant site area, the mammal fauna will not be affected by the small fence solar power plant site of the proponent. Namibia is seemingly well endowed with mammal diversity with around 250 species know to be present within the country (Griffin, 1998). There are currently 14 mammal species which are considered to be endemic to Namibia, including 11 species of rodents and small carnivores which are not well known. Griffin (1998), points out that most of these endemic mammals are associated with the Namib and Escarpment with 60% of these appearing to be rock-dwelling species. The author, Griffin (1998) further highlights that the endemic mammal fauna is best characterized by the endemic rodent family Petromuridae (Dassie rat) and the rodent genera Gerbillurus and Petromyscus. The table below shows the mammal species which are likely to occur within the study area.

Table 1. Large mammal species that are likely to occur within the Witputs area

SCIENTIFIC NAME	COMMON NAME
Damara Ground Squirrel	*Xerus princeps*
Springhare	*Pedetes capensis*
Southern African Porcupine	*Hystrix africaeaustralis*
Cape Hare	*Lepus capensis*
Smith's Red Rock Rabbit	*Pronolagus rupestris*
African Wild Cat	*Felis lybica/sylvestris*
Small-spotted (Black-footed) Cat	*Felis nigripes*
Caracal	*Caracal caracal*
Leopard	*Panthera pardus*
Cheetah	*Acinonyx jubatus*
Small-spotted Genet	*Genetta genetta*
Slender Mongoose	*Galerella sanguinea*
Cape Grey Mongoose	*Galerella pulverulentus*
Water Mongoose	*Atilax paludinosus*
Yellow Mongoose	*Cynictis penicillata*
Brown Hyaena	*Hyaena brunnea*
Spotted Hyaena	*Crocuta crocuta*
Aardwolf	*Proteles cristatus*
Cape Fox	*Vulpes chama*
Bat-eared Fox	*Otocyon megalotis*
Black-backed Jackal	*Canis mesomelas*
African Clawless Otter	*Aonyx capensis*
Striped Polecat	*Ictonyx striatus*
Ratel / Honey Badger	*Mellivora capensis*
Steenbok	*Raphicerus campestris*
Common Duiker	*Sylvicapra grimmia*
Springbok	*Antidorcas marsupialis*
Gemsbok	*Oryx gazella*

Kudu	*Tragelaphus strepsiceros*
Hartmann's Mountain Zebra	*Equus zebra hartmannae*
Burchell's Zebra	*Equus burchelli*
Red Hartebeest	*Alcelaphus buselaphus caama*
Klipspringer	*Oreotragus oreotragus*
Giraffe	*Giraffa camelopardalis*
Antbear / Aardvark	*Orycteropus afer*
Rock Dassie	*Procavia capensis*

Avifauna (Birds)

Simmons et al (2003) points that although Namibia's Avifauna is comperatively sparse compared to the high rainfall equatorial areas elsewhere in Africa, approximately 658 species have already been recorded with a diverse unique group of arid endemics. There are approximately 650 species of birds that have been recorded in Namibia, although the country's avifauna is comparatively sparse compared to the high rainfall equatorial areas in Africa (Brown & Lawson, 1989). Brown et al (1989) mentions that 14 species of birds are endemic or near endemic to

Namibia with the majority of Namibian endemics occurring in the Savannah of which ten species occur in a north south belt of dry Savannah in Central Namibia. Simmons (2003) recorded 240 species of birds within the vicinity of the project area. These birds consist of raptors, chats, larks and karoid species. Christian (2005) recorded the presence of the following bird species in the vicinity of the area, which include:

Table 2. Some the common birds that could potentially be found around the Witputs area.

Species		
1	Common Ostrich	Struthio camelus
8	Little Grebe	Tachybaptus ruficollis
49	Great White Pelican	Pelecanus onocrotalus
50	Pinkbacked Pelican	Pelecanus rufescens
55	Whitebreasted Cormorant	Phalacrocorax lucidus
57	Bank Cormorant	Phalacrocorax neglectus
58	Reed Cormorant	Phalacrocorax africanus
60	African Darter	Anhinga melanogaster
62	Grey Heron	Ardea cinerea
63	Blackheaded Heron	Ardea melanocephala
64	Goliath Heron	Ardea goliath

65	Purple Heron	Ardea purpurea
66	Great Egret	Egretta alba
67	Little Egret	Egretta garzetta
71	Cattle Egret	Bubulcus ibis
72	Squacco Heron	Ardeola ralloides
74	Greenbacked Heron	Butorides striata
76	Black-crowned Night-Heron	Nycticorax nycticorax
78	Little Bittern	Ixobrychus minutus
81	Hamerkop	Scopus umbretta
83	White Stork	Ciconia ciconia
84	Black Stork	Ciconia nigra
85	Abdim's Stork	Ciconia abdimii
89	Marabou Stork	Leptoptilos crumeniferus
90	Yellowbilled Stork	Mycteria ibis
91	African Sacred Ibis	Threskiornis aethiopicus
95	African Spoonbill	Platalea alba
96	Greater Flamingo	Phoenicopterus ruber
97	Lesser Flamingo	Phoeniconaias minor
99	Whitefaced Duck	Dendrocygna viduata
101	Whitebacked Duck	Thalassornis leuconotus
102	Egyptian Goose	Alopochen aegyptiacus
103	South African Shelduck	Tadorna cana
104	Yellowbilled Duck	Anas undulata
105	African Black Duck	Anas sparsa
106	Cape Teal	Anas capensis
108	Redbilled Teal	Anas erythrorhyncha
112	Cape Shoveler	Anas smithii
113	Southern Pochard	Netta erythrophthalma
115	Comb Duck	Sarkidiornis melanotos
116	Spurwinged Goose	Plectropterus gambensis
118	Secretarybird	Sagittarius serpentarius
122	Cape Vulture	Gyps coprotheres
124	Lappetfaced Vulture	Aegypius tracheliotus
126	Black Kite	Milvus migrans
127	Blackshouldered Kite	Elanus caeruleus
131	Verreaux'sEagle	Aquila verreauxii

132	Tawny Eagle	Aquila rapax
136	Booted Eagle	Aquila pennatus
140	Martial Eagle	Polemaetus bellicosus
142	Brown Snake-Eagle	Circaetus cinereus
143	Black-chested Snake-Eagle	Circaetus pectoralis
148	African Fish Eagle	Haliaeetus vocifer
149	Steppe Buzzard	Buteo vulpinus
152	Jackal Buzzard	Buteo rufofuscus
153	Augur Buzzard	Buteo augur
161	Gabar Goshawk	Micronisus gabar
162	Southern Pale Chanting	Melierax canorus
168	Black Harrier	Circus maurus
170	Osprey	Pandion haliaetus
171	Peregrine Falcon	Falco peregrinus
172	Lanner Falcon	Falco biarmicus
178	Red-necked Falcon	Falco chicquera
179	Red-footed Falcon	Falco vespertinus
181	Rock Kestrel	Falco rupicolus
182	Greater Kestrel	Falco rupicoloides
183	Lesser Kestrel	Falco naumanni
186	Pygmy Falcon	Polihierax semitorquatus
194	Red-billed Spurfowl	Pternistis adspersus
195	Cape Spurfowl	Pternistis capensis
200	Common Quail	Coturnix coturnix
203	Helmeted Guineafowl	Numida meleagris
213	Black Crake	Amaurornis flavirostris
215	Baillon's Crake	Porzana pusilla
223	African Purple Gallinule	Porphyrio madagascariensis
226	Moorhen	Gallinula chloropus
228	Redknobbed Coot	Fulica cristata
230	Kori Bustard	Ardeotis kori
232	Ludwig's Bustard	Neotis ludwigii
235	Karoo Korhaan	Eupodotis vigorsii
239	Northern Black Korhaan	Afrotis afraoides
240	African Jacana	Actophilornis africanus
242	Greater Painted-snipe	Rostratula benghalensis

245	Common Ringed Plover	Charadrius hiaticula
246	Whitefronted Plover	Charadrius marginatus
247	Chestnutbanded Plover	Charadrius pallidus
248	Kittlitz's Plover	Charadrius pecuarius
249	Threebanded Plover	Charadrius tricollaris
252	Caspian Plover	Charadrius asiaticus
254	Grey Plover	Pluvialis squatarola
255	Crowned Lapwing	Vanellus coronatus
258	Blacksmith Lapwing	Vanellus armatus
264	Common Sandpiper	Actitis hypoleucos
266	Wood Sandpiper	Tringa glareola
269	Marsh Sandpiper	Tringa stagnatilis
270	Common Greenshank	Tringa nebularia
272	Curlew Sandpiper	Calidris ferruginea
274	Little Stint	Calidris minuta
284	Ruff	Philomachus pugnax
294	Pied Avocet	Recurvirostra avosetta
295	Blackwinged Stilt	Himantopus himantopus
297	Spotted Thick-knee	Burhinus capensis
299	Burchell's Courser	Cursorius rufus
301	Doublebanded Courser	Rhinoptilus africanus
338	Whiskered Tern	Chlidonias hybridus
339	Whitewinged Tern	Chlidonias leucopterus
344	Namaqua Sandgrouse	Pterocles namaqua
347	Doublebanded Sandgrouse	Pterocles bicinctus
348	Rock Dove	Columba livia
349	Speckled Pigeon	Columba guinea
352	Redeyed Dove	Streptopelia semitorquata
354	Cape Turtle Dove	Streptopelia capicola
355	Laughing Dove	Streptopelia senegalensis
356	Namaqua Dove	Oena capensis
367	Rosyfaced Lovebird	Agapornis roseicollis
373	Grey Go-away-bird	Corythaixoides concolor
375	African Cuckoo	Cuculus gularis
386	Diderik Cuckoo	Chrysococcyx caprius
392	Barn Owl	Tyto alba

395	Marsh Owl	Asio capensis
400	Cape Eagle-Owl	Bubo capensis
401	Spotted Eagle-Owl	Bubo africanus
405	Fierynecked Nightjar	Caprimulgus pectoralis
406	Rufouscheeked Nightjar	Caprimulgus rufigena
408	Freckled Nightjar	Caprimulgus tristigma
411	Common Swift	Apus apus
413	Bradfield's Swift	Apus bradfieldi
415	Whiterumped Swift	Apus caffer
417	Little Swift	Apus affinis
418	Alpine Swift	Tachymarptis melba
421	African Palm-Swift	Cypsiurus parvus
425	Whitebacked Mousebird	Colius colius
426	Redfaced Mousebird	Urocolius indicus
428	Pied Kingfisher	Ceryle rudis
429	Giant Kingfisher	Megaceryle maxima
431	Malachite Kingfisher	Alcedo cristata
438	European Bee-Eater	Merops apiaster
445	Swallowtailed Bee-Eater	Merops hirundineus
447	Lilac-breasted Roller	Coracias caudatus
451	African Hoopoe	Upupa africana
454	Common Scimitarbill	Rhinopomastus cyanomelas
465	Acacia Pied Barbet	Tricholaema leucomelas
473	Crested Barbet	Trachyphonus vaillantii
486	Cardinal Woodpecker	Dendropicos fuscescens
495	Cape Clapper Lark	Mirafra apiata
497	Fawncoloured Lark	Calendulauda africanoides
498	Sabota Lark	Calendulauda sabota
500	Cape Long-billed Lark	Certhilauda curvirostris
502	Karoo Lark	Calendulauda albescens
506	Spike-heeled Lark	Chersomanes albofasciata
507	Redcapped Lark	Calandrella cinerea
510	Sclater's Lark	Spizocorys sclateri
511	Stark's Lark	Spizocorys starki
516	Grey-backed Sparrowlark	Eremopterix verticalis
517	Black-eared Sparrowlark	Eremopterix australis

518	Barn Swallow	Hirundo rustica
520	Whitethroated Swallow	Hirundo albigularis
523	Pearlbreasted Swallow	Hirundo dimidiata
526	Greater Striped Swallow	Hirundo cucullata
529	Rock Martin	Hirundo fuligula
530	Common House-Martin	Delichon urbicum
532	Sand Martin	Riparia riparia
533	Brownthroated Martin	Riparia paludicola
541	Forktailed Drongo	Dicrurus adsimilis
543	Eurasian Golden Oriole	Oriolus oriolus
547	Cape Crow	Corvus capensis
548	Pied Crow	Corvus albus
551	Grey Tit	Parus afer
552	Ashy Tit	Parus cinerascens
557	Cape Penduline-Tit	Anthoscopus minutus
567	African Red-eyed Bulbul	Pycnonotus nigricans
577	Olive Thrush	Turdus olivaceus
583	Shorttoed Rock Thrush	Monticola brevipes
586	Mountain Wheatear	Oenanthe monticola
587	Capped Wheatear	Oenanthe pileata
589	Familiar Chat	Cercomela familiaris
590	Tractrac Chat	Cercomela tractrac
591	Sicklewinged Chat	Cercomela sinuata
592	Karoo Chat	Cercomela schlegelii
595	Anteating Chat	Myrmecocichla formicivora
596	African Stonechat	Saxicola torquata
601	Cape Robin-Chat	Cossypha caffra
614	Karoo Scrub-Robin	Cercotrichas coryphaeus
615	Kalahari Scrub-Robin	Cercotrichas paena
619	Garden Warbler	Sylvia borin
621	Chestnut-vented Tit-Babbler	Parisoma subcaeruleum
622	Layard's Titbabbler	Parisoma layardi
628	Great Reed-Warbler	Acrocephalus arundinaceus
631	African Reed-Warbler	Acrocephalus baeticatus
635	Lesser Swamp-Warbler	Acrocephalus gracilirostris
643	Willow Warbler	Phylloscopus trochilus

651	Longbilled Crombec	Sylvietta rufescens
653	Yellowbellied Eremomela	Eremomela icteropygialis
654	Karoo Eremomela	Eremomela gregalis
660	Cinnamonbreasted Warbler	Euryptila subcinnamomea
664	Zitting Cisticola	Cisticola juncidis
665	Desert Cisticola	Cisticola aridulus
669	Greybacked Cisticola	Cisticola subruficapilla
685	Blackchested Prinia	Prinia flavicans
686	Karoo Prinia	Prinia maculosa
687	Namaqua Warbler	Phragmacia substriata
688	Rufouseared Warbler	Malcorus pectoralis
689	Spotted Flycatcher	Muscicapa striata
695	Marico Flycatcher	Bradornis mariquensis
697	Chat Flycatcher	Bradornis infuscatus
703	Pririt Batis	Batis pririt
706	Fairy Flycatcher	Stenostira scita
711	African Pied Wagtail	Motacilla aguimp
713	Cape Wagtail	Motacilla capensis
714	Yellow Wagtail	Motacilla flava
716	African Pipit	Anthus cinnamomeus
717	Longbilled Pipit	Anthus similis
732	Common Fiscal	Lanius collaris
733	Redbacked Shrike	Lanius collurio
739	Crimson-breasted Shrike	Laniarius atrococcineus
741	Brubru	Nilaus afer
746	Bokmakierie	Telophorus zeylonus
757	Common Starling	Sturnus vulgaris
760	Wattled Starling	Creatophora cinerea
764	Cape Glossy Starling	Lamprotornis nitens
770	Palewinged Starling	Onychognathus nabouroup
775	Malachite Sunbird	Nectarinia famosa
783	Southern Double-collared Sunbird	Cinnyris chalybeus
788	Dusky Sunbird	Cinnyris fuscus
796	Cape White-Eye	Zosterops pallidus
	Orange River White-eye	Zosterops pallidus
799	Whitebrowed Sparrowweaver	Plocepasser mahali

800	Sociable Weaver	Philetairus socius
801	House Sparrow	Passer domesticus
802	Great Sparrow	Passer motitensis
803	Cape Sparrow	Passer melanurus
804	Southern Grey-headed Sparrow	Passer diffusus
806	Scalyfeathered Finch	Sporopipes squamifrons
813	Cape Weaver	Ploceus capensis
814	Southern Masked-Weaver	Ploceus velatus
821	Redbilled Quelea	Quelea quelea
824	Southern Red Bishop	Euplectes orix
834	Green-winged Pytilia	Pytilia melba
842	Redbilled Firefinch	Lagonosticta senegala
845	Violet-eared Waxbill	Granatina granatina
846	Common Waxbill	Estrilda astrild
847	Black-faced Waxbill	Estrilda erythronotos
856	Redheaded Finch	Amadina erythrocephala
860	Pintailed Whydah	Vidua macroura
861	Shafttailed Whydah	Vidua regia
870	Black-throated Canary	Crithagra atrogularis
876	Blackheaded Canary	Serinus alario
878	Yellow Canary	Crithagra flaviventris
879	White-throated Canary	Crithagra albogularis
885	Cape Bunting	Emberiza capensis
886	Cinnamon-breasted Bunting	Emberiza tahapisi
887	Lark-like Bunting	Emberiza impetuani

SCIENTIFIC NAME	COMMON NAME

A full list of bird species within the area is shown in the appendix.

Archaeology and Heritage Sites

Archaeological sites in Namibia are protected under the National Heritage Act of 2004 (No. 27 of 2004). Evidence shows that, the emergence of modern humans and their ancestors have lived in Namibia for more than one million years, and there are fossil remains of lineal hominin ancestors as early as the Miocene Epoch (Kinahan, 2017). Erongo is one part of the country with high archaeological sensitive areas, with more than 37 declared national monuments in Namibia and other non-designated archaeological sites. Archaeological sites offers an abstract of the past with regards to the way our forefathers lived and interacted with the environment. All historical objects that are older than 50 years and which can be found in the state of disuse, ranging from tools, artefacts, human and hominoid remains and artificial features and structures can all be considered as archaeological objects.

Reviewing the previous reports and data has shown that there no known heritage sites close to the existing solar plant site.

Figure 10. Map showing all the major heritage sites in Namibia

Socio-Economic Environment

4.9.1 Demographics of Rosh Pinah

The Rosh Pinah is located in the southern to south-western part of Karas Region bordering with neighbouring towns being Oranjemund towards the southwest and Aus towards the north. Rosh Pinah forms part of the Oranjemund electoral constituency. RoshSkor, a joint venture between the two mines, namely Rosh Pinah Mine and Skorpion Mine jointly manage the town since Rosh Pinah does not have a municipality. The 500 hectares (1,500 acres) farm Witputs South is situated near the small village Witputz. Rosh Pinah`s population is roughly around 12 000 while Witputs has about 500.

Rosh Pinah's economy is completely reliant on the presence of the mines. The small economy is fueled either by the salaries earned by mine staff or by staff of contractors that do work for the mines. Any fluctuation in the international Zinc Industry or performance of either one of the two mines has an immediate impact on this micro economy. The economics of Rosh Pinah revolves around the mines, other surrounding land uses include farming,

conservation and tourism activities. Social issues should be adequately managed to ensure that the project is implemented successfully.

4.9.2 Social Economic Impact

Although a few people (including farmers) and animals might be negatively affected by dust and noise, the proponent must ensure that these aspects are properly mitigated. With the potential employment of 80 people, this means that 100 families will benefit from the solar power plant project. The project has great potential to improve livelihoods and contribute to sustainable development within the surrounding community. Community meetings will be held from time to time by the proponent wherever possible, with the purpose of effectively communicating with the local community and to avoid any unexpected social impacts.

5. Assessment of Impacts

The purpose of this assessments of impacts section is to identify and consider the most pertinent environmental impacts and to provide possible mitigation measures that are expected from the agricultural activities from the allocated area. Two different phases are associated with the proposed development. Firstly, the clearing phase, and secondly the harvesting after the cultivation are being covered by this assessment. Should the agricultural activities cease in the future, an EIA will need to be conducted to deal with the associated changes to environment. Mitigation measures for the identified impacts are also provided in this Section.

The following assessment methodology was used to examine each impact identified:

Table 3. Criteria for Assessing Impacts

PART A: DEFINITION AND CRITERIA		
Definition of SIGNIFICANCE		**Significance = consequence probability**
Definition of CONSEQUENCE		**Consequence is a function of severity, spatial extent and duration**
Criteria for ranking of the SEVERITY/NATURE of environmental impacts	**H**	Substantial deterioration (death, illness or injury). Recommended level will often be violated. Vigorous community action. Irreplaceable loss of resources.
	M	Moderate/measurable deterioration (discomfort). Recommended level will occasionally be violated. Widespread complaints. Noticeable loss of resources.
	L	Minor deterioration (nuisance or minor deterioration). Change not measurable/will remain in the current range. Recommended level will never be violated. Sporadic complaints. Limited loss of resources.
	L+	Minor improvement. Change not measurable/will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	M+	Moderate improvement. Will be within or better than the recommended level. No observed reaction.
	H+	Substantial improvement. Will be within or better than the recommended level. Favorable publicity.

Criteria for ranking the DURATION of impacts	**L**	Quickly reversible. Less than the project life. Short-term
	M	Reversible overtime. Life of the project. Medium-term
	H	Permanent beyond closure – Long-term.
Criteria for ranking the SPATIAL SCALE of Impacts	**L**	Localized-Within the site boundary.
	M	Fairly widespread–Beyond the site boundary. Local
	H	Widespread – Far beyond site boundary. Regional/national

Table 4. The various impacts consequences

PART B: DETERMINING CONSEQUENCE					
SEVERITY = L					
DURATION	Long-term	**H**	Medium	Medium	Medium
	Medium term	**M**	Low	Low	Medium
	Short-term	**L**	Low	Low	Medium
SEVERITY = M					
DURATION	Long-term	**H**	Medium	High	High
	Medium term	**M**	Medium	Medium	High
	Short-term	**L**	Low	Medium	Medium
SEVERITY = H					
DURATION	Long-term	**H**	High	High	High
	Medium term	**M**	Medium	Medium	High
	Short-term	**L**	Medium	Medium	High
			L	M	H
			Localized Within site boundary Site	Fairly widespread Beyond site boundary Local	Widespread Far beyond site boundary

Table 5. The various significance of the impacts

PART C: DETERMINING SIGNIFICANCE					
PROBABILITY (of exposure to impacts)	Definite/Continuous	H	Medium	Medium	High
	Possible/frequent	M	Medium	Medium	High
	Unlikely/seldom	L	Low	Low	Medium
			L	M	H
			CONSEQUENCE		

Table 6. The various interpretation of significance.

PART D: INTERPRETATION OF SIGNIFICANCE	
Significance	**Decision guideline**
High	It would influence the decision regardless of any possible mitigation.
Medium	It should have an influence on the decision unless it is mitigated.
Low	It will not have an influence on the decision.

*H = high, M = medium and L = low and + denotes a positive impact.

Public Participation Process

The public participation process commenced with newspaper advertisements in two widely distributed newspapers for three consecutive weeks as shown in Appendix B. Known

interested and affected parties were notified directly via mail and fax. Posters were placed at the office of the Regional Council office and at the site as well. Interested and affected parties that were notified directly including farmers. No negative concerns were received at this stage. Should any interested and affected parties raise any concerns during the on-going project phase, the Ministry of Environment and Tourism will be immediately notified. The registered interested and affected are indicated in the table below:

5.1. Overall socio-economic benefits and issues

5.1.1. Socio-economic benefits

With the potential employment of 15 people, this means that 15 families will benefit from the project during the exploration phase. The project has great potential to improve livelihoods and contribute to sustainable development within the surrounding community. Community meetings will be held from time to time by the proponent wherever possible, with the purpose of effectively communicating with the local community and to avoid any unexpected social impacts.

5.1.1.1. Potential Direct Benefits

Direct capital investment: The agricultural project will require a significant capital investment of at least N$ 10 million. This will be used for clearing of the field, fertilizing the fields and planting the grapes, citrus and avocados.

Stimulation of skills transfer: Due to the nature of agricultural projects, the proponent will implement ad-hoc training programme for some of its staff members. Training programmes will be well structured and staff members will permanently benefit from these training programmes.

Job creation: With the potential employment of 15 people, this means that 50 families will benefit from the project during the on-going phase. The project has a great potential to improve livelihoods and contribute to sustainable development within the surrounding community.

5.1.1.2. Potential Indirect Benefits

- The data generated from the solar power project programme will be made available to the Ministry of Mines and Energy for future research purposes.
- General enhancement of the health conditions and quality of life for a few people in the surrounding settlements.
- Of significance is the prospect of diversification of the surrounding economy, which is presently mainly focussed on subsistence communal farming.

5.1.1.3. General socio-economic concerns

Notwithstanding the above benefits there are a few concerns that could reduce or counteract the above benefits related to the project, as follows:

- As the movement of staff and contractors to and from the area increases, the risk of spread of HIV/AIDS increases.
- Increased influx of people to the area as people come in search of job opportunities during the construction of the solar power plant project; and
- Increased informal settlement and associated problems.

Table 7. Impact evaluation for socio-economy

Identified	**Significance**		**Duration**	**Extent**	**Intensity**	**Probability**
Impact	**NMM**	**MM**				
Increased spread of HIV/AIDS & Covid-19	M	L	LD	N	M	LP
Increased influx of people to the area	L	L	SD	L	L	P
Increased informal settlement in the area	M	L	MD	L	L	LP

Solar Plant activity phases and associated issues

5.2.1. Construction of the Solar Power Plant Phase of the Project

The following potential effects on the environment during the construction phase of the solar power plant project have been identified:

5.2.1.1. Dust

Dust may be generated during this phase and might be aggravated during the winter months when strong winds occur. Dust will be generated by the vehicles moving in the area. Fall out dust settling on vegetation is likely to cause local disruptions in herbivorous and predatory complexes and should be minimised as far as possible.

5.2.1.2. Noise

Noise will most likely be generated by vehicles during the target generation phase. It is recommended that vehicle movement be limited to normal daytime hours to allow nocturnal animals to roam freely at night.

5.2.1.3. Safety and Security

During the construction phase, small tools and equipment will be used on site. This increases the possibility of injuries, and the responsible manager must ensure that all staff members are briefed about the potential risks of injuries on site. The manager is further advised to ensure that adequate emergency facilities, including first aid kits, are available on site. All Health and Safety standards specified in the Labour Act should be complied with. Should a camp be necessary at a later stage, it should be in such a way that it does not pose a risk to the community members and wildlife that roam the area.

5.2.1.4. Visual

The allocated area is situated more than 1 km from any main road. As such, any visual impact that might be caused by the solar power plant workers team are minimal. In some parts of the area, the topography of the allocated site is very flat.

Table 8. Impact evaluation for the target generation phase of the project.

Identified	Significance		Duration	Extent	Intensity	Probability
Impact	NMM	MM				
Dust	L	L	LD	N	M	LP
Noise	M	L	SD	L	L	P
Safety & Security	M	L	MD	L	L	LP
Visual	L	L	MD	O	L	LP

5.2.2. Generating Energy Phase of the Project

During the operation phase of the project, many workers might be needed to assist with the generation and supplying of energy to the main grid line. To conveniently refuelling company vehicles without driving long distances, a small portable fuel storage tank will be brought on site.

5.2.2.1. Air Quality

In terms of air quality, emissions will be given off by 4x4 vehicles and tractors but not to an extent that warrants concern. Dust will also be produced by the tractors and the movement of vehicles in the area.

5.2.2.2. Fire and Explosion Hazard

Hydrocarbons are volatile under certain conditions and their vapours in specific concentrations are flammable. If precautions are not taken to prevent their ignition, fire and subsequent safety risks may arise.

All fuel storage and handling facilities in Namibia must however comply with strict safety distances as prescribed by SANS 10089. SANS 10089 is adopted by the Ministry of Mines and Energy as the national standard. It must further be assured that enough water is available for fire firefighting purposes. In addition to this, all personnel must be sensitised about responsible fire protection measures and good housekeeping such as the removal of flammable materials including rubbish, dry vegetation, and hydrocarbon-soaked soil from the vicinity of the exploration area. Regular inspections should be carried out to inspect and test firefighting equipment and pollution control materials at the various agricultural fields.

All fire precautions and fire control at the site must be in accordance with SANS 10089 1:1999, or better. A holistic fire protection and prevention plan is needed.

Experience has shown that the best chance to rapidly put out a major fire, is in the first 5 minutes. It is important to recognise that a responsive fire prevention plan does not solely include the availability of firefighting equipment, but more importantly, it involves premeditated measures and activities to timeously prevent, curb and avoid conditions that may result in fires. An integrated fire prevention plan should be drafted before harvesting.

5.2.2.3. Generation of Waste

Solid waste be generated from contractors, staff members and other visitors to the area. Care should be taken when handling waste material. The types of waste that could be generated during operation include hazardous industrial waste (e.g. lubricants), general industrial waste (e.g. scrap material), and domestic waste (e.g. packaging). The waste will be temporarily handled and stored on site before being removed for final disposal at permitted waste disposal facilities. A registered Waste Management Company would be contracted to remove all hazardous waste from the exploration site. Ablution facilities will use chemical toilets and/or sealed septic tanks and the sewerage taken to Witputs village periodically. No waste will be discharged on site.

5.2.2.4. Health and Safety

Occupational exposures are normally related to the dermal contact with fuels and inhalation of fuel vapours during handling of such products. For this reason, adequate measures must be brought in place to ensure safety of staff on site, and includes:

- Proper training of operators;
- First aid treatment;
- Medical assistance;
- Emergency treatment;
- Prevention of inhalation of fumes;
- Protective clothing, footwear, gloves and belts; safety goggles and shields;
- Manuals and training regarding the correct handling of materials and packages should be in place and updated as new or updated material safety data sheets becomes available;
- And Monitoring should be carried out on a regular basis, including accident reports.

5.2.2.5. Fauna

Solar power plant generating facilities may have minor disturbances on the habitat of a few species but no significant impacts on the animals are expected. The proponent shall ensure that no animal shall be captured, killed or harmed by any of the employees in any way. Wildlife poaching will strongly be avoided as this is an offence and anyone caught infringing in this regard will face suspension from the project and will be liable for prosecution.

5.2.2.6. Vegetation

The natural vegetation is seemingly undisturbed in the project area except for grasses, which have been grazed by livestock and wild animals. Some vegetation species in the area may be adversely impacted by the project. The type of vegetation that might be affected by the project are:

- Bushes
- Ephemeral grasses
- Small trees

Some of the sensitive vegetation types in the area include:

- Shallow drainage line vegetation
- Scrublands surrounding the mineral exploration area

Certain species regarded as particularly important for conservation may yet be identified and made known via an Addendum to this report. If particularly important species are found, they will be located by GPS and their locations communicated to the Ministry of Environment and Tourism. Such locations will then be demarcated and completely avoided.

5.2.2.7. Avifauna

Birds or Nest sites will not be disturbed by any employee, tourist or contractor. Should the employees observe any bird nesting sites for vultures, they will be reported to the Ministry of Environment and Tourism and the site will be avoided.

5.2.2.8. Alien Invasive Plants

Disturbance to the natural environment often encourages the establishment of alien invasive weed species. Some of the plant species that could become invasive in the area are listed below:

- Prosopis glandulosa
- Lantana camara

- Cyperus esculentus
- Opuntia imbricate
- Cereus jamacara
- Melia azedarach

There are numerous ways in which invasive species can be introduced deliberately or unintentionally.

5.2.2.9 Heritage Impacts

Although no archaeological sites have been identified yet in the project area, appropriate measures will be undertaken upon discovering any new archaeological sites. All archaeological remains are protected under the National Heritage Act (2004) and will not be destroyed, disturbed or removed. The Act also requires that any archaeological finds be reported to the Heritage Council Windhoek.

Table 9. Impact evaluation for the operational phase of the project.

Identified Impact	Significance		Duration	Extent	Intensity	Probability
	NMM	MM				
Air Quality	M	L	LD	L	M	HP
Fire & Explosion Hazard	H	L	SD	O	M	LP
Generation of waste	M	M	SD	O	M	D
Health and Safety	H	M	LD	N	M	P
Fauna	M	L	MD	L	M	D
Vegetation	M	L	MD	L	M	D
Avifauna	M	L	MD	L	M	LP
Alien Invasive Plants	M		L	MD	L	P
Heritage	M		L	O	H	LP

Figure 11. Map showing all the major heritage sites in Namibia.

5.2.2.10 Groundwater Impacts

Solar Power Supply services may affect the availability of water and the quality therefore works may affect the water availability for deep rooted trees in riverbeds. Surface water for animals may be affected by the energy supply activities. In rare instances, the quality of the groundwater for water consumption may be compromised by energy supply activities.

6. Environmental Management Plan

6.1 Overview

This Environmental Management Plan is intended to give effect to the recommendations of the Environmental Impact Assessment. To achieve this goal, it is essential that all personnel involved on the agricultural project are fully aware of the environmental issues and the means to avoid or minimize the potential impacts of activities on site. The proposed agricultural activities are summarized in Section 3 of the scoping report above. Legal and policy requirements are well known and understood by the proponent, its employees and contractors and will be strictly enforced by its management team. A general description of the environment is contained in Section 4, and more site-specific information on particularly sensitive areas is contained in Section 4 as well. Issues and concerns identified in the EIA will form a set of environmental specifications that will be implemented on site. It is the intention that these environmental specifications should form the basis for an agreement between the proponent and the Ministry of Environment and Tourism. By virtue of that agreement, these specifications will become binding on the proponent. Environmental management requires a joint effort on the part of all parties involved. The proponent has assigned certain roles to ensure that all players fulfil their responsibilities in this regard.

6.2 Environmental Management Principles

The proponent will ensure that all parties involved in the project uphold the following broad aims:

1. All persons will be required to conduct all their activities in a manner that is environmentally and socially responsible. This includes all consultants, contractors, and sub-contractors, transport drivers, guests and anyone entering the exploration areas in connection with the mineral exploration project.

2. Health, Safety and Social Well Being

- Safeguard the health and safety of project personnel and the public against potential impacts of the project. This includes issues of road safety, precautions against natural dangers on site, and radiation hazards; and,
- Promote good relationships with the local authorities and their staff.

3. Biophysical Environment

- Wise use and conservation of environmental resources, giving due consideration to the use of resources by present and future generations.
- Prevent or minimise environmental impacts.
- Prevent air, water, and soil pollution, Biodiversity conservation and Due respect for the purpose and sanctity of the area.

To achieve these aims, the following principles need to be upheld.

A. Commitment and Accountability:

The proponent's senior executives and line managers will be held responsible and accountable for: Health and safety of site personnel while on duty, including while travelling to and from site in company vehicles and environmental impacts caused by energy supply activities or by personnel engaged in the energy supply activities, including any recreational activities carried out by personnel in the area.

B. Competence

The proponent will ensure a competent work force through appropriate selection, training, and awareness in all safety, health and environmental matters.

C. Risk Assessment, Prevention and Control

Identify, assess, and prioritise potential environmental risks. Prevent or minimize priority risks through careful planning and design, allocation of financial resources, management, and workplace procedures. Intervene promptly in the event of adverse impacts arising.

D. Performance and Evaluation

Set appropriate objectives and performance indicators. Comply with all laws, regulations, policies and the environmental specifications. Implement regular monitoring and reporting of compliance with these requirements.

E. Stakeholder Consultation

Create and maintain opportunities for constructive consultations with employees, authorities, other interested or affected parties. Seek to achieve open exchange of information and mutual understanding in matters of common concern.

F. Continual Improvement

Through continual evaluation, feedbacks, and innovation, seek to improve performance about social health and well-being and environmental management throughout the lifespan of the agricultural project.

G. Financial Provisions for agricultural

In line with Namibia's environmental rehabilitation policy, the proponent will make the necessary financial provision for compliance with the EMP.

6.3 Impacts on the Bio-physical Environment

6.3.1 Impacts on Archaeological Sites

The nature of impact is outlined below:

- Potential damage to archaeological sites because of vehicle tracks, footprints and actions of contractors, employees and visitors of the agricultural site.
- As the mitigation measures below are fully enforced, any impact will be significantly reduced compared to with present situation.

Mitigation Measures to be enforced:

- Buffer zones will be created around the sites.
- Adhere to practical guidelines provided by an archaeologist to reduce the archaeological impact of mineral exploration activities.
- All archaeological sites to be identified and protected before further agricultural activities commences.
- Notices/information boards will be placed on sites.
- Training employees regarding the protection of these sites.

Methods for monitoring:

- An archaeologist will inspect any identified archaeological sites before commencing with the agricultural activities.

6.3.2 Impacts on Fauna

The nature of impact is outlined below:

- Movement of vehicles in and out of the site.
- Noise produced by moving earth-moving equipment.

Mitigation Measures to be enforced:

- Some habitat areas such as trees of the riverbeds and tunnels outcrops will be avoided wherever possible.
- A fauna survey will be conducted to determine the effect of fragmented habitat on game species should the need arise.
- No animals shall be killed, captured, or harmed in any way.

- No foodstuff will be left lying around as these will attract animals which might result in human-animal conflict.
- Care will be taken to ensure that no litter is lying around as these may end up being ingested by wild animals.
- No animals shall be fed. This allows animals to lose their natural fear of humans, which may result in dangerous encounters.

Methods for monitoring:

- Regular monitoring of any unusual signs of animal habitat.

6.3.3 Impacts on Avifauna

Birds or Nest sites will not be disturbed by any employee, visitor or contractor.

6.3.4 Impact on Vegetation

The nature of impact is outlined below:

- Negative impacts on plants from trenching, compacting and removal of plants.
- Negative Impact from movement of vehicles and the movement of people around the site.
- Negative impacts from land-clearing and mineral exploration operations.

Mitigation Measures to be enforced:

- Environmental considerations will always be adhered to before clearing roads, trenching, and excavating.
- Paths and roads will be aligned to avoid root zones. Permeable materials will be used wherever possible.
- The movement of vehicles in riverbeds, rocky outcrops and vegetation sensitive areas will be avoided.
- The movement of vehicles will be restricted to certain tracks only.
- Areas with species of concern will be avoided.
- Ministry of Environment and Tourism will be informed of any protected species which will be transplanted in consultation with MET.

6.3.5 Impacts of Alien invasive Plants

The nature of impact is outlined below:

- Plant or seed material may adhere to car tyres or animals
- Seed or plant material may be imported to site in building materials if the source is contaminated.
- Seeds may blow from debris removed at sites.

Mitigation Measures to be enforced:

- The explorer will ensure that debris is properly disposed of.
- Vehicle tyre inspections can be carried out although this may not be a practical mitigation measure.
- Eradicating alien plants by using an Area Management Plan

Methods for monitoring:

- Regular monitoring of any unusual signs of alien species.

6.3.6 Impacts on Socio-Economic

The **nature of impact** is outlined below:

- Impact from loss of grazing for domestic livestock in "exclusive use zone"
- Impacts on cultural and spiritual values.
- Demographic factors: Attraction of additional population that cannot benefit from the project.
- Perception of Health and Safety risks associated with mineral exploration.

Mitigation Measures to be enforced:

- The population change can be mitigated by employing people from the local community and encouraging the contractors to employ local individuals.
- The perception of risks will be mitigated by putting up safety signs wherever possible and ensuring that all employees and visitors to the site undergo a safety induction course.

Methods for monitoring:

- Public meetings will be held by the proponent whenever necessary.

6.3.7 Visual Impacts

The **nature of impact** is outlined below:

- Tracks and damaged vegetation caused by the mineral exploration vehicles.

Mitigation Measures to be enforced:

- Environmental considerations will be always adhered to before clearing roads, trenching and excavating.

Methods for monitoring:

- Employees will be trained on the importance of minimising visual impacts.

6.3.8 Use of Natural Resources

Water and electricity are very scarce in Namibia. During the construction, best international practices will be considered as a minimum standard for operation. The bulk of the power supply to the agricultural site will be sourced from the proponent's own generator. The proponent will maximise water recycling opportunities wherever possible.

6.3.9 Generation of Solid Waste

Correct management of solid waste will involve a commitment to the full waste life cycle by all the employees and contractors of the site. The Proponent's goal is to avoid the generation of solid waste in the first place and if not possible, to minimise the volumes generated by looking at technologies that promote longevity and recycling of products. Ideally, the proponent should transport solid waste to a registered site for disposal. However, it is not certain if such facilities are available in the area or if they have the capacity to handle large increases in volume. Appropriate on-site facilities will be designed to store large volumes of waste.

6.3.10 Noise

The nature of impact is outlined below:

- Movement of people, and vehicles.
- Noise may be generated from an airborne geophysical survey which may be carried out at a later stage.

Mitigation Measures to be enforced:

- Disturbance to fauna that roam the area will be minimized by training the employees on ways to minimise noise.

6.3.11 Air Quality

The nature of impact is outlined below:

- Dust from movement of people, vehicles, and earth-moving machinery.

Emissions from vehicles and tractors as well.

Mitigation Measures to be enforced:

- All staff on should be equipped with dosimeters that measure exposure levels to radiation.
- All staff must be made aware of the health risk and obliged to wear dust masks.

6.4 Summary of Environmental Management Plan during construction, operation and decommissioning phases

CONSTRUCTION/INITIAL PHASE			
Environmental Impact	**Proposed mitigation measures**	**Responsibility**	**Monitoring plan**
Air pollution	• Control speed and operation of construction vehicles. • Prohibit idling of vehicles. • Maintenance of vehicles and equipment. • Sensitize field exploration workers and contractors. • Workers should be provided with dust masks if working in sensitive areas.	• Contractor • Site Manager	• Amount of dust produced. • Level of Landscaping carried out.
Noise Pollution	• Maintain equipment and vehicles. • Field work should only be carried out only during daytime i.e. 08h00 to 17h00. • Workers should wear earmuffs if working in noisy section. • Management to	• Contractor • Management	**Amount of noise**

	ensure that noise is kept within reasonable levels.		
Solid waste	• Any debris should be collected by a waste collection company • If trenches are dug, waste should be re-used or backfilled. • The site should have waste receptacles with bulk storage facilities at convenient points to prevent littering during exploration.	• Management	Presence of well-Maintained receptacles and central collection point.
Oil leaks and spills	• Vehicles and equipment should be well maintained to prevent oil leaks. • Contractor should have a designated area where maintenance is carried out and that is protected from rainwater. • All oil products should be handled carefully.	• Contractor	No spills and leaks on the site
First aid	A well-stocked first aid kit shall be maintained by qualified personnel	• Management	**Contents of the first aid kit**
Visual	Environmental considerations will be adhered to at all times before clearing roads, trenching and excavating.	• Management	Employees will be trained on the importance of minimising visual impacts
Archaeological Sites	• Buffer zones will be created around the sites. • Adhere to practical guidelines provided by an archaeologist to reduce the archaeological impact of mineral exploration activities. • All archaeological sites to be identified and protected before further exploration commences.	• Contractor • Management	• Register of all archaeological sites identified.
Occupational Health and Safety	Provide Personal Protective Equipment Train workers on personal safety and how to handle equipment and machines.	• Contractor • Management	• Workers using Protective Equipment. • Presence of Well stocked First Aid Box.

	• A well-stocked first aid kit shall be maintained by qualified personnel. • Report any accidents / incidences and treat and Compensate affected workers. • Provide sufficient and suitable sanitary conveniences which should be kept clean.		• Clean sanitary facilities.
Fauna	• Some habitat areas such as trees of the riverbeds and tunnels outcrops will be avoided wherever possible. • A fauna survey will be conducted to determine the effect of fragmented habitat on game species should the need arise. • No animals shall be killed, captured or harmed in any way. • No foodstuff will be left lying around as these will attract animals which might result in human animal conflict.	• Contractor • Management	• Regular monitoring of any unusual signs of animal habitat.
Alien Invasive Plants	• The explorer will ensure that debris is properly disposed off. • Vehicle tyre inspections can be carried out although this may not be a practical mitigation measure. • Eradicating alien plants by using an Area Management Plan	• Contractor • Management	• Regular monitoring of any unusual signs of alien species.
Loss of vegetation	• Environmental considerations will be adhered to at all times before clearing roads, trenching and excavating. • Paths and roads will be aligned to avoid root zones. Permeable materials will be used wherever possible. • The movement of vehicles	• Management	• Warning signs on site • restored vegetation

	in riverbeds, rocky outcrops and vegetation sensitive areas will be avoided. • The movement of vehicles will be restricted to certain tracks on		
OPERATIONAL PHASE			
Archaeological Sites	• Buffer zones will be created around the sites. • Adhere to practical guidelines provided by an archaeologist to reduce the archaeological impact of mineral exploration activities. • All archaeological sites to be identified and protected before further exploration commences.	• Management • Contractor	• Update Register of all archaeologic al sites identified.
First aid	• A well-stocked first aid kit shall be maintained by qualified personnel	• Management	• Contents of the first aid kit.
Fire preparedness	• Firefighting drills carried out regularly. • Firefighting emergency response plan. • Ensure all firefighting equipment are regularly maintained, serviced and inspected. • Fire hazard signs and directions to emergency exit, route to follow and assembly point in case of any fire incidence.	• Management	• Number of fire drills carried. • Proof of inspection on firefighting equipment. • Fire Signs put up in strategic places. • Availability of firefighting equipment.
Environment Health and Safety	• Train workers on personal safety and disaster preparedness. • A well-stocked first aid kit shall be maintained by qualified personnel. • Report any accidents / incidences and treat and compensate affected workers. • Provide sufficient and suitable sanitary conveniences which should be kept clean. • Conduct Annual Health and	• Management	• Provide sanitary facilities. • Copies of Annual Audit

	Safety Audits.		
DECOMMISSIONING PHASE			
Environmental/ Social Impact	**Proposed mitigation measures**	**Responsibility**	**Monitoring plan/indicator**
Noise & Air pollution	• Maintain plant equipment. • Decommissioning works to be carried out only during daytime. • Workers working in noisy section to wear earmuffs. • Workers should be provided with dust masks.	• Management	Amount of noise
Disturbed Physical environment	• Undertake a complete environmental restoration programme and introducing appropriate vegetation	• Management	
Solid waste	• Solid waste should be collected by a contracted waste collection company • Excavation waste should be re-used or backfilled.	• Contractor • Management	• Amount of waste on Site. • Presence of Well maintained receptacles and central collection point
Occupational Health and Safety	• Provide Personal Protective Equipment. • Train workers on personal safety and how to handle equipment and machines. • A well-stocked first aid kit shall be maintained by qualified personnel. • Demarcate area under decommissioning.	• Management	• Workers using Protective Equipment. • Presence of a First Aid Box.

6.5 Monitoring, Auditing and Reporting

6.5.1 Inspections and Audits

During the life of the project, performance against the EMP commitments will need to be monitored, and corrective action taken where necessary, to ensure compliance with the EMP and relevant enviro-legal requirements.

6.5.1.1 Internal Inspections/Audits

The following internal compliance monitoring programme will be implemented:

1.Project kick-off and close-out audits will be conducted on all contractors. This applies to all phases, including drilling contract work during operations:

- Prior to a contractor beginning work, an audit will be conducted by the applicable phase site manager to ensure that the EMP commitments are included in Contractors' standard operating procedures (SOPs) and method statements.
- Following completion of a Contractors work, a final close-out audit of the contractor's performance against the EMP commitments will be conducted by the applicable phase site manager.

2. Monthly internal EMP performance audits will be conducted during the construction/initial and decommissioning phases.

3. Ad hoc internal inspections can be implemented by the applicable phase exploration manager at his/her discretion, or in follow-up to recommendations from previous inspection/audit findings.

6.5.1.2 External Audits

- At the close of each project phase, and annually during the operational phase, an independently conducted audit of EMP performance will be conducted.
- Specialist monitoring/auditing may be required where specialist expertise are required or in order to respond to grievances or authorities directives.
- Officials from the DEA may at any time conduct a compliance and/or performance inspection of mineral exploration operations. The proponent will be provided with a written report of the findings of the inspection. These audits assist with the continual improvement of the exploration project and the proponent will use such feedback to help improve its overall operations.

6.5.1.3 Documentation

Records of all inspections/audits and monitoring reports will be kept in line with legislation. Actions will be issued on inspection/audit findings. These will be tracked

and closed out.

6.5.1.4 Reporting

Environmental compliance reports will be submitted to the Ministry of Environment and Tourism on a bi-annual basis.

6.5.2 Environmental Management System Framework

In order implement Environmental Management Practices, an Environmental Management System (EMS) will be established and implemented by the proponent and their Contractors. This subchapter establishes the framework for the compilation of a project EMS. The applicable exploration manager will maintain a paper based and/or electronic system of all environmental management documentation. These will be divided into the following main categories:

6.5.2.1 Policy and Performance Standards

A draft environmental policy and associated objective, goals and commitments has been included in the EMP. The mineral explorer may adapt these as necessary.

6.5.2.2 Enviro-Legal Documentation

A copy of the approved environmental assessment and EMP documentation will always be available by the proponent. Copies of the Environment Clearance Certificate and all other associated authorisations and permits will also be kept with the exploration team. In addition, a register of the legislation and regulations applicable to the project will be maintained and updated as necessary.

6.5.2.3 Impact Aspect Register

A register of all project aspects that could impact the environment, including an assessment of these impacts and relevant management measures, is to be maintained. This Draft EMP identifies the foreseeable project aspects and related potential impacts of the proposed project, and as such forms the basis for the Aspect- Impact Register; with the Project Activity. It is however noted that during the life of the project additional project aspects and related impacts may arise which would need to be captured in the Aspect-Impact Register. In this regard, the impact identification principles set forth in the scoping report can be used to update the Register. This method can be modified as required by the applicable exploration manager as necessary during the life of the project.

6.5.2.3 Procedures and Method Statements

To affect the commitments contained in this EMP, procedures and method statements will be drafted by the relevant responsible mineral exploration staff and Contractors. These include, but may not be limited:

- Standard operating procedures for environmental action plan and management programme execution.
- Incident and emergency response procedures.
- Auditing, monitoring, and reporting procedures, and
- Method statements for EMP compliance for ad hoc activities not directly addressed in the EMP action plans.

All procedures are to be version controlled and signed off by the applicable exploration manager. In addition, knowledge of procedures by relevant staff responsible for the execution thereof must be demonstrable and training records maintained.

6.5.2.4 Register of Roles and Responsibilities

During project planning and risk assessments, relevant roles and responsibilities will be determined. These must be documented in a register of all environmental commitment roles and responsibilities. The register is to include relevant contact details and must be updated as required.

6.5.2.5 Site Map

An up-to-date map of the exploration site indicating all project activities is to be maintained. In addition to the project layout, the following detail must be depicted:

- Materials handling and storage;
- Waste management areas (collection, storage, transfer, etc.);
- Sensitive areas;
- Incident and emergency equipment locations; and Location of responsible parties.

6.5.2.6 Environmental Management Schedule

A schedule of environmental management actions is to be maintained by the applicable phase site managers and/or relevant Contractors. A master schedule of all such activities is to be

kept up to date by the exploration manager. Scheduled environmental actions can include, but are not limited to:

- Environmental risk assessment;
- Environmental management meetings;
- Soil handling, management and rehabilitation;
- Waste collection
- Incident and emergency response equipment evaluations and maintenance
- Environmental training;
- Stakeholder engagement; Environmental inspections; and
- Auditing, monitoring and reporting.

6.5.2.7 Change Management

The EMS must have a procedure in place for change management. In this regard, updating and revision of environmental documentation, of procedures and method statements, actions plants etc. will be conducted as necessary in order to account for the following scenarios:

- Changes to standard operating procedures (SOPs);
- Changes in scope;
- Ad hoc actions;
- Changes in project phase; and
- Changes in responsibilities or roles

All documentation will be version controlled and require sign off by the applicable phase site managers.

6.6 Closure Plan

The closure vision for the proposed project is to establish a safe, stable, and non-polluting post-prospecting landscape that can facilitate integrated, self-sustaining and value generating opportunities, thereby leave a lasting positive legacy. The aim of the closure plan is to:

- Creating a safe, physically stable rehabilitated landscape that limits long-term erosion potential and environmental degradation.
- Sustaining long term catchment yield and water quality.
- Focusing on establishing a functional post-prospecting landscape that enables self-sustaining agricultural practices where possible.

- To encourage, where appropriate, the re-instatement of terrestrial and aquatic wetland biodiversity

6.6.1 Alternatives Considered

Considering that this is an exploration project, the proposed project is not complex, and the risks associated with prospecting are understood and can be mitigated at closure. Alternative options for closure are limited. There are only two options that have been considered as activity alternatives for the closure plan:

- **Preferred Alternative:** Closure or Backfill of boreholes with overburden removed during drilling.
- **Alternative 2:** To Leave boreholes open, in-order to allow for groundwater recharge by surface run-off.

6.6.2 Preferred Alternative: Rehabilitation/ Backfill of boreholes

Rehabilitation is the restoration of a disturbed area that has been degraded as a result of activities such as digging, clearing of land, road construction or waste disposal, to a land use in conformity with the original land use before the activity started. This also includes aesthetical considerations, so that a disturbed area will not be visibly different to the natural environment. This also involves maintaining physical, chemical and biological ecosystem processes in degraded environments, hence the preferred option of backfilling the boreholes with the overburden removed during development and cover with growth medium to establish vegetation. This option has several advantages as discussed below:

Advantages:

- The site will be aesthetically acceptable;
- The site will blend in with the environment;
- The site will be a suitable habitat for fauna and flora again.
- The site will be safe and pollution free;
- Revegetating the site will ensure that the site in non-erodible.

Opting for alternative 1, which is to leave boreholes without backfilling poses a risk in that, these boreholes may fill in with water, which may become attractive to wildlife and communities leading to drowning and the risk of being trapped in the declines. To mitigate these risks, it is necessary to backfill. Treatment technologies should be used to prevent decanting.

6.6.3 Closure Assumptions

This closure plan has been developed based on limited available information including environmental data. Some of the information currently available may need to be supplemented during the operational period. Therefore, several assumptions were made about general conditions, and closure and rehabilitation of the facilities at the site to develop the proposed closure actions. As additional information is collected during operations, these assumptions will be reviewed and revised as appropriate.

The assumptions used to prepare this plan include the following:

- The closure period will commence once the last planned harvestable fruits has been extracted from the site for laboratory testing.
- The proposed prospecting sites will be adhered to minimise the potential impacts.
- Vegetation establishment will be in line with a project area's indigenous vegetation.
- Water management infrastructure developed for the operational phase will be retained for closure /end of the life of the project as necessary.
- There are limited opportunities for any infrastructure to be built on site and if any infrastructure is built, it will be of limited benefit to the community.

Therefore, all buildings will be demolished.

- All hazardous and domestic waste will be transported offsite for disposal in licensed landfills.
- No roads are anticipated to be constructed to access the site; existing roads will be used as far as possible. Where access tracks have been developed in cases where there are no roads, these will be rehabilitated and closed as part of normal closure actions.

6.6.4 Closure and Rehabilitation Activities

The rehabilitation actions intended to be undertaken at the end of the life of the proposed prospecting activities are described below.

6.6.4.1 Infrastructure

All infrastructures will be decommissioned, and the footprints rehabilitated for the establishment of vegetation. Material inventories will be managed near the end of prospecting activities to minimize any surplus materials at closure. Where practicable, equipment and materials with value not needed for post-closure operations will be sold and or removed from

the site. Equipment with scrap or salvage value will be removed from the site and sold to recyclers. A soil contamination investigation will be conducted on completion of demolition activities. The purpose of this is to identify areas of possible contamination and design and implement appropriate remedial measures to ensure that the soil contaminants are removed. Closure actions will include:

- All power and water services to be disconnected and certified as safe prior to commencement of any decommissioning works;
- All remaining inert equipment and decommissioning waste will be disposed to the nearest licensed general waste disposal facility;
- Salvageable equipment will be removed and transported offsite prior and during decommissioning.
- All tanks, pipes and sumps containing hydrocarbons to be flushed or emptied prior to removal to ensure no hydrocarbon/chemical residue remains;

6.6.4.2 Boreholes

Closure of boreholes will entail backfilling with overburden stripped ahead of prospecting activities. All overburden should be replaced into the void and the final surface reshaped to simulate surrounding topography while ensuring that the surface is free draining. Once backfilling is complete a growth medium cover will be placed, and vegetation will be established. There may be a requirement to include sacrificial erosion protection measures on the surface while vegetation is being established.

6.6.4.3 Roads

Existing roads will be used as far as possible. Closure actions concerning roads and parking areas will include:

- Removal of all signage, fencing, shade structures, traffic barriers, etc.
- All ‘hard top’ surfaces to be ripped along with any concrete structures.
- All potentially contaminated soils are to be identified and demarcated for later remediation; and
- All haul routes that have been treated with saline dust suppression water need to be treated, with the upper surface ripped and removed to designated contaminant disposal areas.

6.6.4.4 Remediation of Contaminated Areas

All soil, contaminated with hydrocarbons, will be identified, excavated, if possible, to at least 200 mm below the contaminated zone and then treated.

- All tanks, pipes and sumps containing hydrocarbons will be flushed or emptied.
- Removed soils will be managed as determined by the nature and extent of the contamination.
- Liquid storage tanks will be emptied, the structure removed/demolished and sub-surface holes filled; and
- All equipment in which chemicals have been stored or transported will be cleaned and disposed of in a suitable disposal facility.

6.6.4.5 Vegetation

Successful revegetation will help control erosion of soil resources, maintain soil productivity and reduce sediment loading in streams utilizing non-invasive plants that fit the criteria of the habitat (e.g. soils, water availability, slope and other appropriate environmental factors). Invasive species will be avoided, and the area will be managed to control the spread of these species.

To counter the effects of erosion, naturally occurring grassland species will be planted on slopes. These species will provide soil holding capacity and reduce runoff velocity. The flatter areas will be re-vegetated with the objective of creating a sustainable ecosystem. The occurrence of protected plant species will need to be determined before vegetation is removed and the required permits will be obtained for either destruction or relocation.

6.6.4.6 Waste Management

Waste management activities will include:

- Hazardous waste will be managed handled, classified and disposed.
- Non-hazardous will be disposed in the nearby licensed landfill site;
- Scrap and waste steel will be sold to recyclers.
- It may be necessary to fence temporary salvage yards for security reasons, particularly where these are located close to public roads.

Public Participation Process

The public participation process commenced with newspaper advertisements in two widely distributed newspapers for three consecutive weeks as shown in Appendix B. Known interested and affected parties were notified directly via mail and fax. Posters were placed at the office of the Regional Council office and at the site as well. Interested and affected parties

that were notified directly including farmers. No negative concerns were received at this stage. Should any interested and affected parties raise any concerns during the on-going project phase, the Ministry of Environment and Tourism will be immediately notified. The registered interested and affected are indicated in the table below:

Name	Position	Organization
Iipinge Ndelimona	EIA tracking and Monitoring in Namibia	Namibian Environment and Wildlife Society
Chamwe Kaira	Social Activist	N/A

The issues raised are shown in the appendix, under the public meeting section.

Conclusion

The scoping report is prepared for the Environmental Impact Assessment for a solar power plant project on an area located about 37 km north of Rosh Pinah, along C13 national road, and approximately 2.8 km east of C13 national road via a private access road. Environmental scoping is a critical step in the preparation of an EIA for the proposed solar power plant project. In most cases, they are solar power project will not be complicated, and it involves the clearing an area that is sparsely vegetated. The methods that will be employed are mainly minimal clearing of land, planting of the trees, acquiring water from ground water aquifers.

With the potential employment of 50 people, this means that 150 families will benefit from the project during the construction phase of the project and once the plant becomes a production energy supplier. The project has great potential to improve livelihoods and contribute to sustainable development within the surrounding community.

At this stage, electricity requirements for the project are minimal. The bulk of the power supply to the solar power plant site will be sourced from the proponent's own solar power plant. The potential negative impacts associated with the proposed agricultural project are expected to be low to medium in significance. Provided that the relevant mitigation measures are successfully implemented by the proponent, there are no environmental reasons why the proposed project should not be approved. The project will have significant positive economic impacts that would benefit the local, regional and national economy of Namibia.

Several other potential impacts have been addressed in Section 5 and 6 of this EIA, and will be managed through the implementation of the EMP. The EMP contains a set of Environmental Specifications that will form part of all contracts between the proponent and contractors such as lubrication companies. The requirements of the EMP will be enforced on site by the Management team, and periodic environmental audits will be undertaken and submitted to MET. This EIA has been subject to a few limitations, which are explained as follows: -

- the time available in which to secure an environmental contract with the authorities; and, The limited botanical work done to date did not raise any concerns but will be monitored on an on-going basis. If any "special" species of plants are found, these will be located by GPS. An addendum will then be added to the EMP to indicate

localities that should be avoided, or to implement other appropriate measures about any special plants.

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Appendix A

DR KAUKURAUEE KANGUEEHI

ENVIRONMENTAL SCIENTIST

BIO

I am a qualified and professional environmental scientist with experience in environmental geochemistry and biogeochemisty. Strong scientific report writing and data analysis skills. Team player with an eye for detail.

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EXPERIENCE

SENIOR RESEARCHER & EXPLORATION GEOLOGIST

Arcadia Minerals

01 October 2021 - Present

- Exploration geological activities
- Hydrogeology
- Drilling supervision & management
- Geological mapping
- Geochemical sampling
- Environmental impacts assessments monitoring
- Quarterly report writing for EPL renewals
- EIA & EMP reports
- Identifying new geological targets
- Geotechnical & structural core logging
- Financial & budget planning
- Market monitoring & evaluation
- Report writing & research
- Data analysis, interpretation & presentations

EDUCATION

DOCTOR OF PHILOSOPHY (PHD) | EARTH SCIENCES

University of Stellenbosch

2018 - 2021

MASTER OF SCIENCE | EARTH SCIENCES

University of Stellenbosch

2016 - 2017

BACHELOR OF SCIENCE (Honors)

University of Stellenbosch

2015

BACHELOR OF SCIENCE

University of Namibia

2010

STUDENT DEMONSTRATOR/TUTOR

University of Stellenbosch

01 February 2015 - 15 December 2020

Taught 2nd & 3rd year students the following subjects whilst pursuing my Masters & PhD on a full-time basis:

- Geo-Environmental Science
- Introduction to Environmental Geochemistry
- Economic Geology
- Field skills & Engineering Geology

EXPLORATION GEOLOGIST

Sabre Resources Namibia

01 March 2010 - 31 October 2013

- Exploration geological activities
- Hydrogeology
- Drilling supervision
- Geological mapping
- Geochemical sampling
- Environmental impacts assessments monitoring
- Quarterly report writing for EPL renewals
- Geotechnical and structural core logging

Reason for leaving: To pursue Postgraduate studies on a full-time basis.

SKILLS

- Scientific report writing
- Data analysis & interpretation
- Proficient in MS Office Package

SOFTWARE

- GIS
- BenMap
- R Programming
- Hysplit Modeling Software
- Micromme 3D Modelling

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Appendix B

Appendix C

Appendix D