ENVIRONMENTAL SCOPING ASSESSMENT

KLEIN SPITSKOP SOLAR ENERGY

ENVIRONMENTAL SCOPING REPORT

NOVEMBER 2022

emesco

URBAN green cc
Town and Regional Planning Consultants
Environmental Management Consultants

PROJECT INFORMATION

Developer	**EMESCO ENERGY NAMIBIA (PTY) LTD**
Proponent:	**KLEIN SPITSKOP SOLAR ENERGY (PTY) LTD**
Project Title:	**KLEIN SPITSKOP SOLAR ENERGY (KSSE)**
Type of Project:	**ENVIRONMENTAL SCOPING ASSESSMENT**
Project Location:	**KEETMANSHOOP – //KARAS REGION (NAMIBIA)**
Project Number:	**KAR/SPITK/001**
Competent Authority:	**MINISTRY OF MINES AND ENERGY**
	PRIVATE BAG 13297
	WINDHOEK
Approving Authority:	**MINISTRY OF ENVIRONMENT, FORESTRY AND TOURISM**
	DEPARTMENT OF ENVIRONMENTAL AFFAIRS
	PRIVATE BAG 13306
	WINDHOEK
	NAMIBIA
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LIST OF ACRONYMS

BIPA	Business and Intellectual Property Authority of Namibia
BID	Background Information Document
˚C	degrees Celsius
CBD	Convention on Biological Diversity
CSP	Concentrated Solar Power
CSR	Corporate Social Responsibility
DEA	Directorate of Environmental Affairs
DSR	Draft Scoping Report
EAP	Environmental Assessment Practitioner
ECB	Electricity Control Board
ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMA	Environmental Management Act
EMP	Environmental Management Plan
EPC	Engineering, Procurement and Construction
EPL	Exploration Licence
FSR	Final Scoping Report
GHG	Greenhouse Gases
GHI	Global Horizontal Irradiance
Ha	Hectare
HPP	Harambee Prosperity Plan
I&AP	Interested and Affected Parties

INDC	Intended Nationally Determined Contributions
IPP	Independent Power Producer
KSSE	Klein Spitskop Solar Energy
kV	KiloVolt
kVA	Kilowatts Ampère
L	Litre
MAWLR	Ministry of Agriculture, Water and Land Reform
MET	Ministry of Environment and Tourism
MEFT	Ministry of Environment, Forestry and Tourism
ML	Mining Licence
MME	Ministry of Mines and Energy
MVA	Mega-volt-amperes
MW	Megawatt
NDP5	Namibia's 5th National Development Plan
NIRP	National Integrated Resource Plan
NMD	Nominal Maximum Demand
No	Number
O&M	Operations and Maintenance
PPA	Power Purchase Agreement
PPP	Public Participation Process
PV	Photovoltaic
SPV	Special Purpose Vehicle
SAPP	Southern African Power Pool
ToR	Terms of Reference
UNFCCC	United Nations Framework Convention on Climate Change

GLOSSARY OF TERMS

Alternatives - A possible course of action, in place of another, that would meet the same purpose and need but which would avoid or minimize negative impacts or enhance project benefits. These can include alternative locations/sites, routes, layouts, processes, designs, schedules and/or inputs. The "no-go" alternative constitutes the 'without project' option and provides a benchmark against which to evaluate changes; development should result in net benefit to society and should avoid undesirable negative impacts.

Assessment - The process of collecting, organising, analysing, interpreting and communicating information relevant to decision making.

Bulk Supply - The wholesale supply of i.e., water on a business-orientated basis, in large quantities, whether in treated or untreated form, for any utilisation purpose to a customer for own use or for subsequent supply by the customer to consumers.

Competent Authority - Means a body or person empowered under the local authorities act or Environmental Management Act to enforce the rule of law.

Critically Endangered (IUCN) - A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Section V of the IUCN Red List Categories and Criteria[1]), and it is therefore considered to be facing an extremely high risk of extinction in the wild.

Cumulative Impacts - In relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

Endangered (IUCN) - A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Section V of the IUCN Red List Categories and Criteria[2]), and it is therefore considered to be facing a very high risk of extinction in the wild.

Environment - As defined in the Environmental Assessment Policy and Environmental Management Act - "land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, paleontological or social values".

Environmental Impact Assessment (EIA) - The process of examining the environmental effects of a development as prescribed by the Environmental Impact Assessment Regulations (GN. No. 30 of 2012) for activities listed as List of Activities which may not be undertaken without an Environmental Clearance Certificate from the Environmental Commissioner (GN. No. 29 of 2012).

[1] Available at http://s3.amazonaws.com/iucnredlist-newcms/staging/public/attachments/3097/redlist_cats_crit_en.pdf

[2] Available at http://s3.amazonaws.com/iucnredlist-newcms/staging/public/attachments/3097/redlist_cats_crit_en.pdf

Environmental Management Plan (EMP) - A working document on environmental and socioeconomic mitigation measures, which must be implemented by several responsible parties during all the phases of the proposed project.

Evaluation – the process of ascertaining the relative importance/significance of information, in light of people's values, preference and judgements in order to make a decision.

Hazard - Anything that has the potential to cause damage to life, property and/or the environment. The hazard of a particular material or installation is constant; that is, it would present the same hazard wherever it was present.

Interested and Affected Party (I&AP) - any person, group of persons or organisation interested in, or affected by an activity; and any organ of state that may have jurisdiction over any aspect of the activity.

Mitigate - The implementation of practical measures to reduce adverse impacts.

Protected - Protected under Namibian legislation.

Proponent - Any person who has submitted or intends to submit an application for an authorisation, as legislated by the Environmental Management Act no. 7 of 2007, to undertake an activity or activities identified as a listed activity or listed activities; or in any other notice published by the Minister or Ministry of Environment, Forestry & Tourism.

Public - Citizens who have diverse cultural, educational, political and socio-economic characteristics. The public is not a homogeneous and unified group of people with a set of agreed common interests and aims. There is no single public. There are a number of publics, some of whom may emerge at any time during the process depending on their particular concerns and the issues involved.

Public consultation - The process of engagement between stakeholders (the proponent, authorities and I&APs) during the planning, assessment, implementation and/or management of proposals or activities. The level of stakeholder engagement varies depending on the nature of the proposal or activity as well as the level of commitment by stakeholders to the process. Stakeholder engagement can therefore be described by a spectrum or continuum of increasing levels of engagement in the decision-making process. The term is considered to be more appropriate than the term "public participation".

The term therefore includes the proponent, authorities (both the lead authority and other authorities) and all interested and affected parties (I&APs). The principle that environmental consultants and stakeholder engagement practitioners should be independent and unbiased excludes these groups from being considered stakeholders.

IUCN Red List - The IUCN Red List of Threatened Species™ is widely recognised as a comprehensive, objective global approach for evaluating the conservation status of plant and animal species.

Scoping Process - Process of identifying: issues that will be relevant for consideration of the application; the potential environmental impacts of the proposed activity; and alternatives to the proposed activity that are feasible and reasonable.

Significant Effect/Impact - Means an impact that by its magnitude, duration, or probability of occurrence may have a notable effect on one or more aspects of the environment.

Sustainable Development – Development that meets the needs of the current generation without compromising the ability of future generations to meet their own needs and aspirations.

Species of Special Concern - Those species listed in the Endangered, Threatened, Rare, Indeterminate, or Monitoring categories of the South African Red Data Books, and/or species listed in Globally Near Threatened, Nationally Threatened or Nationally Near Threatened categories (Barnes, 1998).

Topsoil - The top 150 mm of soil (topsoil) and root material of cleared vegetation.

Vulnerable - A taxon is vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V of the IUCN Red List Categories and Criteria[3]), and it is therefore considered to be facing a high risk of extinction in the wild.

[3] Available at http://s3.amazonaws.com/iucnredlist-newcms/staging/public/attachments/3097/redlist_cats_crit_en.pdf

EXECUTIVE SUMMARY

EMESCO Energy (Namibia) (Pty) Ltd. (the Developer) is of the intention to develop, construct and operate a photovoltaic solar power plant with a maximum export capacity of 125 MWp near Keetmanshoop on behalf of Klein Spitskop Solar Energy (Pty) Ltd (The Proponent). The aim of the project is to supply renewable electricity to the Southern African Power Pool (SAPP) into the NamPower grid and export market.

The worldwide drive to stabilise greenhouse gas (GHG) concentrations in the atmosphere is increasing the importance of alternative energy sources such as solar, wind, wave and biomass. Climate Change also press Namibia to move towards a low-carbon and climate resilience development. This project is accordingly in line with Namibia's National Energy Policy to make use of renewable energy rather than fossil fuels, while ensuring security of supply to the local demand. This investment will allow southern Namibia to benefit from its natural resources without permanent harm to this ecologically sensitive area.

In accordance with the Environmental Management Act, (Act No. 7 of 2007) and within the framework of the Environmental Impact Assessment Regulations (2012), Urban Green cc (EAP) has been appointed by the Developer to undertake an Environmental Scoping Assessment and apply for an Environmental Clearance Certificate for the solar park. This ESA process was carried out in accordance with provisions for EA, as prescribed by the Environmental Impact Assessment Regulations (GN. No. 30 of 2012), provided for by Section 56 of the Environmental Management Act (No. 7 of 2007).

Given the nature of the activities associated with the Project and the sensitivity of the receiving environment, an Ecological Baseline Assessment (attached as Appendix D) and an Archaeological Baseline Assessment (see Appendix E) was conducted. For purpose of assessing the loss of agricultural land, an Agricultural Impact Assessment (Appendix F) was also conducted.

EMESCO currently owns 100% of Klein Spitskop Solar Energy (Pty) Ltd and will be responsible for the development of the solar PV facility based on the Modified Single Buyer (MSB) framework. KSSE will fulfil the role of Independent Power Producer (IPP) on a Build-Own-Operate (BOO) basis with Emesco arranging all necessary financing, insurance, authorizations, engineering, procurement and construction requirements for the solar PV facility.

The proposed Project entails the construction and operation of the 125 MWp photovoltaic solar power plant to the extent of 200 ha, which will consist of the energy generation component (solar plant) and the transmission component (overhead transmission line), extending from the solar plant to Nampower's Kokerboom Sub-station, as explained in Section 4.3.

The Project Site is located in the Karas Region, 20 km north-east of Keetmanshoop. (refer to Fig. 5.1, Chapter 5 for the locality within Namibia). The site proposed for the solar park is envisaged on a portion of the Remainder of Portion 2 of the commercial Farm Klein Spitskop No. 153. The 200-ha set aside on the farm for this Project is located on the north-western

side of the M29 opposite Nampower's Kokerboom Substation (situated on the south-eastern side of the M29) and next to the newly developed GreeNam Kokerboom PV Project. Refer to Fig. 4.2 for the lay-out of the Project Site as well as to Figure 1 and 2 of Appendix F Agricultural Impact Assessment Report.

The 33 kV OHTL will extend from the solar farm for 4 km across the M29 to connect to a 33kV intake at the Kokerboom Substation south-east of the Project Site.

The solar farm is planned to be constructed and developed in 25 MWp phases up to a 125 MWp Solar Park with the solar panels in configuration as indicated in Fig. 4.3.

The layout consists of a variety of infrastructure, each having a particular purpose. This includes PV panels to harvest the sun's energy, a tracking system to ensure optimal exposure of the PV panels during daylight, inverters and field transformers to step-up the voltage and cables to transmit electricity to the site substation. The Project will feed into a 33 kV intake of the Kokerboom Substation of NamPower via a 4 km 33 kV wood structure overhead transmission line from the project site.

Alternative criteria were considered to identify Farm Klein Spitskop, because of its ideal locality considering optimal solar radiation and duration of sunlight exposure (i.e. maximum energy yield), and due to its locality next to the existing Kokerboom Substation of NamPower.

The project area falls within the *Nama Karoo* biome within the Main Karoo Basin found to the west of the Weissrand plateau. It is located on relatively featureless sloping plains covered with sparse shrubland.

In the precolonial era the general area was not suitable for permanent fixed settlement due to its aridity. Low density shifting settlement has ensured that the archaeological signature of human occupation is both meagre and subtle.

Sites of archaeological interest that were identified by palaeontologists are approximately 14 km north-east of Keetmanshoop which include fossil remains of Mesosaurus, the well-known Giant's Playground as well as the Kokerboom forest.

The land use in the surrounding area is typical of a rural area in relatively close proximity to a small urban centre, with infrastructure concentrated towards and around Keetmanshoop. Land use activities in the rural area comprise livestock and game farming, tourism ventures and some mining.

Service infrastructure is concentrated around Keetmanshoop. The town is situated in an important geographical location as it is on the Trans-Orange Corridor that links the harbour of Lüderitz with the eastern provinces of South Africa, via road and railway. The electricity network of the //Karas Region is well distributed to provide in the electricity needs of the region.

The visual aesthetics and as a result the sense of place, correlates with the land uses and related infrastructure. In the Project area land use include extensive agriculture and tourism in large undeveloped open landscape.

The Project Site identified for Klein Spitskop Solar Energy is next to the existing Kokerboom Solar Plant and opposite the M29 from the Kokerboom Substation of NamPower. The Substation accommodates various overhead transmission lines. The visual aesthetics and sense of place in the abutting area is thus already altered to an extensive electricity transmission network.

The //Karas Region is the southernmost region of Namibia and is the largest, in terms of land, in the country. It is, however, sparsely populated and relatively underdeveloped when compared with other regions. The Project Site falls within the Keetmanshoop Urban Constituency and is the highest populated within the //Karas Region.

Rural to urban migration increased since 2001, mainly due to young adults in search of job opportunities. The town consequently had an annual population growth rate of 3.2%.

Public consultation for the purposes of this project was done as prescribed by Regulations 21 to 24 of the Environmental Impact Assessment Regulations (GN. 30 of 2012). Engagement with the public and authorities as part of the first round of public consultation commenced on the 06th of April 2022 and concluded on the 30th of April 2022. During the first round of consultation, I&APs and authorities were given an opportunity to register and submit comments and/or concerns on the proposed project.

Following the Scoping Assessment, the following positive impacts were identified:

- This project will have a positive Impact on the National Energy Supply Strategy to diversify and decentralise electricity supply of low energy levels required across long distances and will contribute to the security of electricity supply of Namibia.
- The project will provide a means for Climate Change Adaptation to enhance economic development in an arid environment that is changing to become less suitable for livestock, especially cattle farming.
- KSSE will reduce the annual GHG's emitted in the production of utility supplied power in the region by 331 973 t CO^2 compared to conventional energy generation.
- New solar technology will be used to make maximum use of the abundant sunlight available, whilst reducing the use of limited water available in Namibia.
- The proposed Project holds various direct and indirect socio-economic benefits for both the local people of Keetmanshoop area and the //Karas Region.

Impacts identified as to not have any significance and not requiring further assessment are:

- Loss of Agricultural Land;
- Loss of Protected Areas;
- Impact of glare from Solar PV Panels on aeroplane pilots, since it was confirmed by the Namibia Civil Aviation Authority that an assessment of solar glare from the solar farm onto landing planes are not required, because the KSSE is approximately 25 km from the aerodrome of Keetmanshoop.
- Impact of lights from Construction Camp Site on nearby night star gazing activities, since no accommodation for construction personnel or labourers will be set up on the

Project Site. Lightning at night will be site specific, focusing to the ground for security purpose only.

Construction impacts identified (Section 7.4.1) were loss of biodiversity and habitat destruction for flora, fauna and avifauna, possible disturbance of archaeological and heritage resources, ground and surface water pollution, waste pollution, impact on natural resource (water) and some socio-economic impacts, of which dust nuisance is expected to cause the most impact. These were assessed and mitigations provided in Section 7.4.1 Tables 7.2.1 to 7.4.12.

Removal of some of the natural vegetation cover are inevitable to make way for the roads, buildings, steel poles, cables, field transformers, substation and powerline. The permanent shadow under the PV solar panels might also have an influence on the vegetation beneath. However, the general area is not viewed as a site of special ecological importance in Namibia and has the lowest species/area ratio of all the regions with very few endemic species. Endemic and protected trees of significance do occur in the area, but are associated with drainage lines and outcrops and not present on the Project Site itself.

The impact of dust generated by construction vehicles on the M29 on vegetation, especially on *Aloe dichotoma*, was investigated during the Scoping Study. It was concluded that it is highly unlikely that dust could be the cause of death in *Aloe dichotoma*. Dust was, however, identified as a nuisance to the Quiver Tree Forest Rest Camp and the impact assessment and mitigations for dust nuisance was done in Section 7.4.1.6.1 and Table 7.2.9 under Socio-economic impacts.

The impact during construction on reptiles and small mammals associated with the affected area/habitat are expected to be detrimental. This would, however, affect a relatively small area (~200ha) over a short/limited period of time. Mitigations are provided in Table 7.2.3. Loss of avifauna through collision with power lines is a reality that accompanies power lines and this impact assessment and mitigations are addressed in Table 7.2.4.

Since archaeological sites of importance do occur in the Keetmanshoop area, the “chance finds” procedure is prescribed in Section 7.4.1.2 to indicate the actions to be taken from the discovery of a heritage site or item, to its investigation and assessment by a trained archaeologist or other appropriately qualified person.

Operational impacts identified (Section 7.4.2) were loss of biodiversity and habitat destruction, visual impact, ground and surface water pollution, natural resources (water & energy), socio-economic impacts and change in land use.

These are assessed and mitigations provided in Section 7.4.2 Tables 7.3.1 to 7.3.4.

Loss of biodiversity and habitat destruction can be caused by shading, removal of flora & fauna as part of site maintenance, heat and glare from solar farm, avifauna collision to powerlines and increase human activity. These are discussed and mitigated in Section 7.4.2.1 and Table 7.3.1.

Visual impact would probably be the most significant impact during project life. However, the unique desolate sense of place of the surrounding area has been disturbed by the NamPower Kokerboom Substation, two existing solar farms and associated electricity transmission development. These electricity infrastructures and the proposed solar farm will be visible from the M29. The visual impact is thus very significant, but will form part of the electricity infrastructure already developed here.

Decommissioning phase will activate after 30 years (i.e. Project's life) where after the new agreement will be negotiated with the land owner whether the permanent buildings and fence should be removed (with all other solar infrastructure) or whether it can be re-used for other purposes by the owner. In case a full rehabilitation is requested, it will be the responsibility of the Proponent to undertake the decommissioning. Given the nature of the activities associated with decommissioning (see section 4.3.8), the expected impacts are very similar to that of the construction phase (see section 7.4.1), as is the case with the required mitigations to be applied.

This Environmental Scoping Assessment has come to the conclusion that this project has the potential to contribute positively to the country's electricity supply in a manner that compliments the National Energy Strategy of Namibia (see Chapter 4.1.1 and 7.1.2.1). The project has the potential to assist NamPower in replacing some of its fossil fuel consumption with clean renewable energy at an affordable rate. It can provide socio-economic benefits to the //Karas Region and specifically Keetmanshoop (see Chapter 4.5.1 and 7.1.1.5).

The greatest potential negative impact is expected to be the creation of dust during construction phase and that of visual impact during operational phase.

Based on the information presented in this scoping report, the Environmental Assessment Practitioner is of the opinion that, accept for the visual impact, the immediate and larger environment will not be significantly impacted if the recommendations as proposed in this report are implemented and monitored, and responsible environmental practises are applied by the proponent, appointed contractors and sub-consultants.

1 INTRODUCTION TO THE PROJECT AND THIS REPORT

This chapter of the report provides a background and motivation to the proposed project; the study's terms of reference; study approach and methodology, purpose of this report; the assumptions and limitations of the study; and an outline of the remainder of the report.

1.1 PROPOSED PROJECT

EMESCO Energy (Namibia) (PTY) Ltd. (the Developer) is of the intention to develop, construct and operate a photovoltaic solar power plant with a maximum export capacity of 125 MWp near Keetmanshoop on behalf of Klein Spitskop Solar Energy (Pty) Ltd (The Proponent).

The aim of the project is to supply renewable electricity to the Southern African Power Pool (SAPP) into the NamPower grid and export market. The generated electricity will enter the NamPower grid via an Overhead Transmission Line at the existing nearby Kokerboom Substation (see Chapter 4 for more details on the proposed Project).

Infrastructure for the generation and supply of energy (and associated activities) require an Environmental Clearance Certificate (ECC) before being implemented [Section 27(3) of the Environmental Management Act, No. 7 of 2007].

In accordance with the Environmental Management Act, (Act No. 7 of 2007) and within the framework of the Environmental Impact Assessment Regulations (2012), Urban Green cc (EAP) has been appointed by the Developer to undertake an Environmental Scoping Assessment and apply for an Environmental Clearance Certificate for the solar park.

1.2 NEED FOR AND DESIRABILITY OF THE PROJECT

The worldwide drive to stabilise greenhouse gas (GHG) concentrations in the atmosphere is increasing the importance of alternative energy sources such as solar, wind, wave and biomass. Climate Change also press Namibia to move towards a low-carbon and climate resilience development and Namibia's National Energy Strategies and Policies was drafted accordingly. (*NDP5, 2017*).

Throughout the past decade, Namibia's total electricity consumption has increased by an average annual rate of approximately 4.1% (*NDP 5, 2017*). The country's demand for electrical energy is outgrowing the available supply and the Country's generation capacity is under pressure to meet the rising demand.

NamPower is a member of the Southern Africa Power Pool (SAPP) which coordinates electricity supply operations and trades in the SADC region. To meet the demand, NamPower supplements its energy requirements with power from the region through SAPP

long term bilateral agreements (PPAs) and short-term trade markets. NamPower currently has three PPAs:

• 200 MW with ESKOM (South Africa)

• 100 MW with ZESCO (Zambia)

• 80 MW with ZPC (Zimbabwe)

With 53 % of electricity utilised in Namibia being imported during 2019 - 2020, security of supply is chief among Nampower's key challenges. NamPower also recognises the importance of sustainable energy production to society. To this end NamPower aim to source at least 10 % of the energy mix from renewables other than hydropower.

This project is in line with Namibia's National Energy Policy to make use of renewable energy rather than fossil fuels, while ensuring security of supply to the local demand. The development of this project will contribute to energy access and the promotion of economic development of southern Africa by increasing the availability of clean energy via the SAPP to southern African countries. This investment will also allow southern Namibia to benefit from its natural resources without harm to this ecologically sensitive area.

1.3 STUDY TERMS OF REFERENCE

No formal Terms of Reference (ToR) were provided, but rather were inferred from the requirements of the applicable legislation namely the Environmental Impact Assessment Regulations (Government Notice No. 30 of 2012), to enable an application for an ECC with the Environmental Commissioner, as required by Section 27(3) of the Environmental Management Act (No. 7 of 2007).

The purpose of this Study is to apply for an ECC only. All other permits and/or licenses (see section 3.4) required for the operation of the proposed project still needs to be applied for by the Proponent.

1.4 STUDY APPROACH AND METHODS

This EA process was carried out in accordance with provisions for EA, as prescribed by the Environmental Impact Assessment Regulations (GN. No. 30 of 2012), provided for by Section 56 of the Environmental Management Act (No. 7 of 2007).

The study's approach and methods were guided by the Terms of Reference (Section 1.3) and the relevant legislation (Chapter 3).

The EA process is a planning, design and decision-making tool used to inform the relevant authorities and Proponent on what the consequences of their decisions will be in biophysical and social terms. As such, it identifies potential impacts (negative and positive) that the Project may have on the natural and social environments; as well as identifying potential opportunities and constraints the natural and social environment may pose to the Project.

The steps followed as part of this EA process, are (i) registration of application for an ECC, and (ii) execution of a scoping assessment (content of this report). A flowchart indicating the process being followed is presented by Figure 1.4 below.

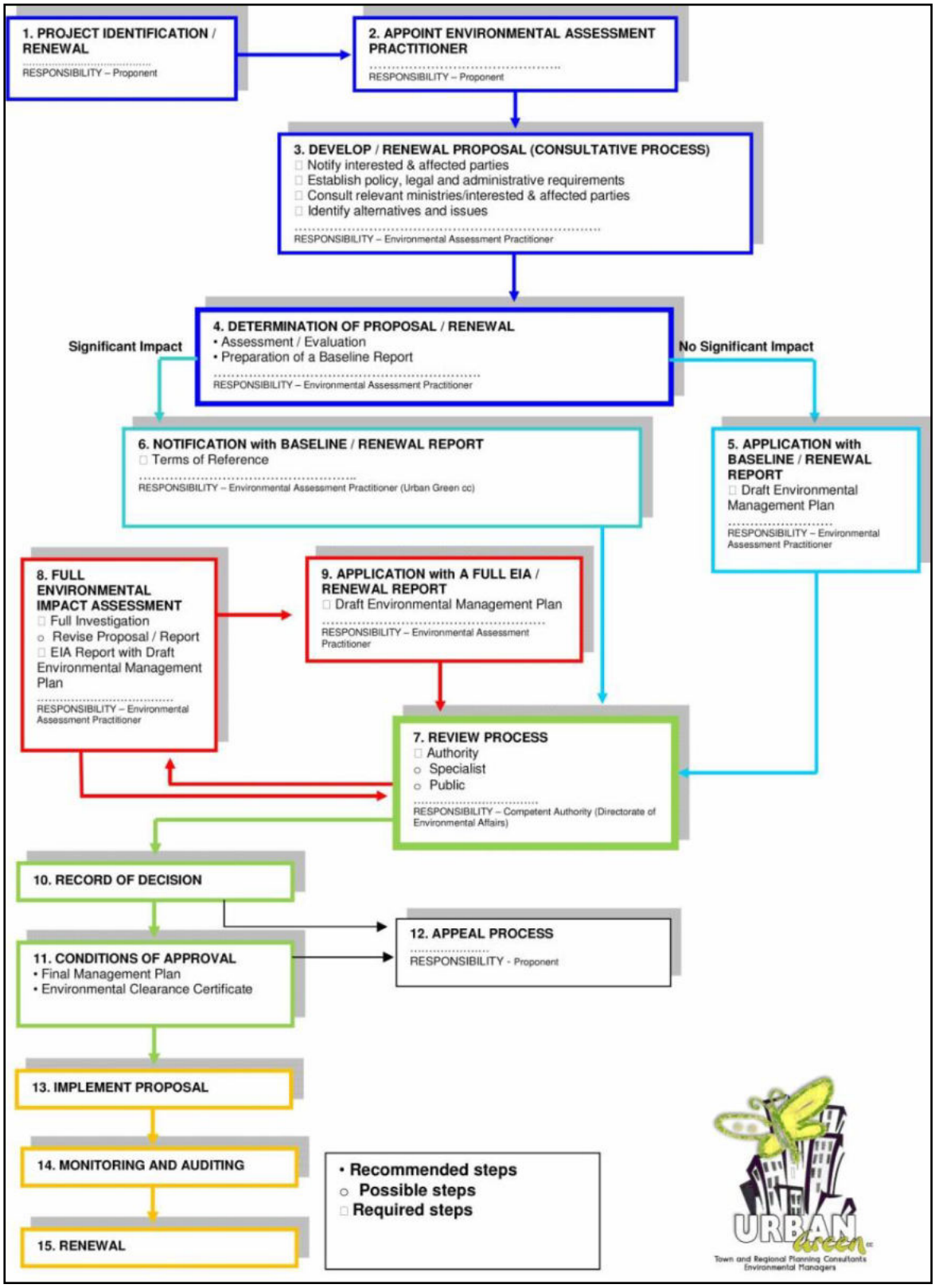


Figure 1.4: *Diagrammatic representation of Namibia's Environmental Assessment process*

1.4.1 REGISTRATION OF APPLICATION FOR ECC

The first step followed as part of this EA process was to identify the listed activities potentially associated with the Project, as stipulated in the '*List of Activities that may not be undertaken without an Environmental Clearance Certificate'* (GN. No. 29 of 2012) and register the mentioned with the Office of the Environmental Commissioner.

The listed activities for which an ECC is applied for are:

"ENERGY GENERATION, TRANSMISSION AND STORAGE ACTIVITIES

The construction of facilities for -

1. (a) the generation of electricity;

(b) the transmission and supply of electricity;"

"LAND USE AND DEVELOPMENT ACTIVITIES

5.1 The rezoning of land from –

(c) agricultural use to industrial use;" (Government Gazette, 2007)

In accordance with Section 32 of the EMA, applications for an ECC should be submitted with the relevant Competent Authority, which for this Project was identified to be the Ministry of Environment, Forestry and Tourism (decision making authority) and the Ministry of Mines and Energy – Electricity Control Board (Energy Generation and Transmission Competent Authority). Although no formal rezoning of land is intended or required, approval for the change in the use of the land has to be obtained from the Ministry of Agriculture, Water and Land Reform. The Ministry of Mines and Energy was informed in writing on 6 April 2022 of the proponent's intention to apply for an ECC with the Environmental Commissioner, with a copy of the application submitted with the office of the Environmental Commissioner with the Ministry of Environment, Forestry and Tourism (Appendix A).

1.4.2 SCOPING STAGE AIMS

The next step followed as part of this EA process was the scoping stage. The identification of impacts and their significance, as well as public consultation (as prescribed by Regulation 21 to 24 of the EIA Regulations (GN. No. 30 of 2012) are important elements of the scoping stage. Hence, during the scoping stage issues/impacts that are likely to be significant are identified and those that are less significant are evaluated and if warranted, eliminated.

This stage, which began during April 2022 and concluded in November 2022, set out to -

- Collect baseline information and professional/public opinion with regards to the project and the receiving environment (i.e., social and biophysical environments);
- Determine the manner in which and to what extent the project may affect the biophysical and social environments;
- Establish the need and desirability of the project;
- Compare advantages and disadvantages of feasible alternatives;

- Highlight the potential significant effects that are likely to be of most importance and to develop or recommend mitigation measures; and
- Advise on any further studies to be conducted (if any) and provide appropriate Terms of Reference for these.

1.4.3 SCOPING STAGE METHOD

The method followed during the scoping stage was as per the requirements set by the Environmental Impact Assessment Regulations (GN. No. 30 of 2012), which included –

- Giving notice to all potential interested and affected parties (I&APs) of the application (ECC application);
- Public consultation as per Regulation 21 which included the -
  - Opening and maintaining a register of all I&APs;
  - Receiving and recording of all comments and representations received from I&APs following the public consultation processes;
- Preparing a scoping report by subjecting the proposed application to scoping by -
  - Assessing the potential effects of the proposed listed activities on the environment (specialist studies also formed part of this stage);
  - Assessing whether and to what extent the potential effects identified can be mitigated and whether there are any significant issues and effects that require further investigation;
  - Identifying feasible alternatives related to the project;
  - Setting the Terms of Reference for further investigations (if required);
  - Informing I&APs of the way forward in the EA process;
  - Ensuring informed, transparent and accountable decision-making by the relevant authorities; and
  - Inviting all registered I&APs to comment on the scoping report.
- Informing all registered I&APs of the decision of the office of the Environmental Commissioner.

1.4.4 SPECIALIST STUDIES

Given the nature of the activities associated with the Project and the sensitivity of the receiving environment, an Ecological Baseline Assessment (attached as Appendix D) and an Archaeological Baseline Assessment (see Appendix E) was conducted. For purpose of assessing the loss of agricultural land, an Agricultural Impact Assessment (Appendix F) was also conducted.

1.4.5 ISSUES AND CONCERNS RAISED, IDENTIFIED AND ASSESSED

During the screening stage, the following issues for further investigation was identified –

- Although the overall footprint of the solar park can be decreased to a minimum by not clearing vegetation, there will be some damage to the natural vegetation and fauna.
- Possible impact of OHTL on avifauna;
- Possible impact of PV modules on avifauna;
- Possible archaeological sites; and
- Possible visual impact.

Concerns raised during the 1st round of public consultation are -

- Interference with civil aviation;
- Additional dust generation from construction vehicles on the M29 might negatively influence trees of the Quiver Tree Forest and cause nuisance to tourists accommodated there; and
- Light pollution from construction camp that may have a negative impact on night/star photographing by tourists residing at the Quiver Tree Forest Camp.

As a result, an Ecological Baseline Assessment and an Archaeological Baseline Assessment was carried out as part of the scoping stage.

Positive impacts of the project that was identified as part of the scoping assessment are -

- The proposed Klein Spitskop Solar Energy (KSSE) will provide an environmentally friendly, renewable alternative electricity source to fossil fuels and thus reduce GHG emissions.
- It will reduce energy inequality in southern Africa.
- The Project will bring capital investment to an arid region in Namibia that is particularly sensitive to the impacts of Climate Change and with limited other prospects for economic development.
- Infrastructure investment in southern Namibia.
- Employment creation of approximately 400 people during construction phase and approximately 15 people during the operations phase with approximately 60 people on an ad hoc basis for maintenance and cleaning of the PV Modules when required.
- Opportunity for skills development and poverty relieve in the Region.

These impacts and issues are discussed in detail in Chapter 6.1.2 in this report. Mitigation measures and recommendations are provided in Section 7.4.

1.5 PURPOSE OF THIS SCOPING REPORT

This Final Scoping Report (FSR) has been compiled as part of an assessment that has been undertaken for the development of the solar farm and related amenities. This FSR summarises the process followed to date, provides a description of the Project and

addresses the issues raised by Interested and Affected Parties (I&APs). It further provides an assessment of the impacts of the proposed Project along with mitigation measures and recommendations.

The Draft version of this Report was made available for public review and comment from 14 to 28 November 2022, as required by section 23 of the Environmental Impact Assessment Regulations (GN. No. 30 of 2012). Comments received were included into this Final Scoping Report (FSR) to be submitted with the Ministry of Mines and Energy and (i.e., Competent Authorities) and the Directorate of Environmental Affairs (i.e., Approving Authority) with the Ministry of Environment, Forestry and Tourism for decision-making.

After the DEA has reached a decision, all registered I&APs on the project database will be notified of the decision and the requirements of the statutory Appeal Period.

1.6 STUDY ASSUMPTIONS AND LIMITATIONS

In undertaking the EA and compiling the scoping report, the following assumptions and limitations apply:

- It is assumed that all the information provided by the developer, proponent, appointed consultants and authorities consulted, is accurate and that those aforementioned have disclosed all necessary information available;
- It is assumed that all permit or licence requirements, other than the ECC, associated with the Project will be addressed as separate investigations and are not included in this EA process;
- It is assumed that there will be no significant changes to the project (see Chapter 4) or the affected environment (see Chapter 5) between the compilation of this report and implementation of the project that could substantially influence findings, recommendations with respect to mitigation and management, etc.;
- The EA process involved the assessment of impacts on the current conservation value of affected land and not on either the historic or potential future conservation value; and
- The assessment is based on the prevailing environmental (social and biophysical) and legislative context at the time of writing this report.

1.7 STRUCTURE OF THE REPORT

This report consists of nine chapters as outlined below.

***Table 1.7** – Structure of the Report*

SECTION	CONTENTS
Executive Summary	**Executive Summary** Provides an overview of the main findings of the Study.
Chapter 1	**Introduction** Provides a background and motivation to the proposed development; Terms of Reference; Study approach and methods; the study assumptions and limitations; outlines the purpose, goals and structure of the Report. It also describes the procedure for submitting comment on the Study.
Chapter 2	**Project Team and Expertise** Provides an overview of the role-players participating in the project as well as their experiences.
Chapter 3	**Legislations Applicable to the EA & Project** Provides an overview of the key legislation having relevance to the environmental assessment and activities associated with the proposed project.
Chapter 4	**Description of the Proposed Project** Provides a description of the physical appearance of the proposed project, the technology intended to be used, land use, service infrastructure, construction and operation activities.
Chapter 5	**The Affected Environment** Describes the details pertaining to the site, the existing physical, biophysical, socio-economic environment of the study area.
Chapter 6	**Details of the Public Participation Process** Explains in detail the entire public consultation process followed as part of this study. Feedback received from registered Interested and Affected Parties and Stakeholders are listed as well.
Chapter 7	**Assessment of Potential Impacts** Describes and assesses the potential impacts of the proposed project. Mitigation measures relevant to the planning; design, construction and operational phases of the proposed solar park as appropriate and recommended.
Chapter 8	**Conclusions and Recommendations** Provides conclusions to the impact assessment and evaluates the overall suitability of the proposed solar park. Recommendations for implementation during the further planning, design, construction and operation of the proposed solar park are also provided, as appropriate.
Chapter 9	**References** Provides information on the information referenced in the document.

2 PROJECT TEAM

This chapter of the report provides an introduction and overview of the various role players on this Project and environmental assessment study as well as the expertise and qualifications of the environmental consultants and specialists.

2.1 ROLE PLAYERS

The role players in this project are set out in Table 2.1.

Table 2.1 *- The role players*

ORGANISATION	PROJECT ROLE
Ministry of Mines and Energy – Electricity Control Board	Competent Authority
Ministry of Environment, Forestry and Tourism	Competent Authority
Directorate of Environmental Affairs	Decision-making authority for environmental authorization
EMESCO Energy Namibia (Pty) Ltd	Developer / Client
Klein Spitskop Solar Energy (Pty) Ltd.	Proponent
Urban Green cc – Christina Tromp	Independent Environmental Consultant (EAP)
Urban Green cc – Brand van Zyl	Independent Environmental Consultant (EAP)
Peter Cunningham	Ecologist
Henry Nakale	Archaeologist
Francois Knight	Soil Scientist / Land Capability Specialist

2.1.1 DEVELOPER

EMESCO Energy (Namibia) (PTY) Ltd (hereafter EMESCO) operates in renewable energy markets across Namibia and southern Africa. EMESCO provides solar and wind solutions to utility, commercial and industrial customers by delivering reliable, cost-effective, clean energy.

EMESCO currently owns 100% of Klein Spitskop Solar Energy (Pty) Ltd and will be responsible for the development of the solar PV facility in its entirety. It will arrange all necessary financing, insurance, authorizations, engineering, procurement and construction requirements for the solar PV facility. EMESCO was responsible for selecting the equipment technology, dictating the design of the facility and carrying out the plant design, construction, and commissioning. It will also provide overall project management as required to develop, construct, own and operate the Project until the end of plant design life. During the execution of the scope of works, EMESCO and its contractors is accordingly compelled to adhere at all times to, and strictly comply with, all applicable health and safety legislation,

codes of practice regulations, industry codes and the specification provided in this document.

2.1.2 PROPONENT

Klein Spitskop Solar Energy (Pty) Ltd has been registered with the Business and Intellectual Property Authority of Namibia (BIPA) as the project's Special Purpose Vehicle (SPV) for the construction and operation of Klein Spitskop Solar Energy (KSSE) park. The required agreements will be signed in this entity's name. KSSE will fulfil the role of Independent Power Producer (IPP) on a Build-Own-Operate basis.

2.1.3 ENVIRONMENTAL ASSESSMENT PRACTITIONER

Urban Green Consultants cc is a multi-disciplinary consultancy, which has been offering innovative and environmentally sound solutions for over 18 years to private-, public- and NGO clients in Namibia. They offer professional services in Environmental Management, and Town and Regional Planning, as well as advise and products in the water and wastewater treatment industry.

2.2 EXPERTISE OF THE EAP AND EIA SPECIALISTS

The qualifications and expertise of the environmental consultants and specialists are set out in Table 2.2 below.

Table 2.2 – *Qualifications and expertise of the environmental consultants*

NAME	**Christina Tromp**
RESPONSIBILITY ON THE PROJECT	EAP Impact assessment and mitigation formulation, reporting and application for Environmental Clearance
QUALIFICATIONS	M. Phil Degree in Environmental Management and Bachelor of Science Degree in Agriculture, majoring in Nature Conservation
PROFESSIONAL REGISTRATION	Environmental Assessment Professional Association of Namibia (EAPAN)
EXPERIENCE IN YEARS	13
EXPERIENCE	Christina Tromp is an educated environmentalist with work experience in the Namibian environment in Rural Development, Agricultural and Environmental sectors. She is a registered Environmental Assessment Practitioner. Her work experience was gathered in most regions of Namibia.
NAME	**Mr Brand van Zyl**
RESPONSIBILITY ON THE PROJECT	EAP Public consultation, impact assessment and mitigation formulation, reporting and application for Environmental Clearance

QUALIFICATIONS	M. Degree in Environmental Management; M. Degree Town and Regional Planning; Bachelor of Arts Urban Geography
PROFESSIONAL REGISTRATION	Namibian Council for Town and Regional Planners Member of the Green Building Council of South Africa
EXPERIENCE IN YEARS	18
EXPERIENCE	Brand van Zyl has been involved in various Environmental Impact Assessment studies throughout Namibia and of different kind.
NAME	**Mr Pieter Cunningham**
RESPONSIBILITY ON THE PROJECT	Ecologist
QUALIFICATIONS	M.Sc; B.Sc Honours; B.Sc (Conservation Ecology)
PROFESSIONAL REGISTRATION	N/A
EXPERIENCE IN YEARS	24
EXPERIENCE	Peter Cunningham has been involved as ecologist in various Environmental Impact Assessment studies throughout Namibia (including Angola, South Africa, Swaziland, Tanzania, United Arab Emirates and Saudi Arabia)
NAME	**Mr Henry Nakale**
RESPONSIBILITY ON THE PROJECT	Archaeologist
QUALIFICATIONS	Bachelor of Arts Honors Degree in Archaeology, Museums and Heritage Studies] (GZU), Bachelor of Social Science in Heritage and Museum Studies (UP), Master of Social Science in Tangible Heritage Conservation & Management
PROFESSIONAL REGISTRATION	National Heritage Council of Namibia, IIC, ASAPA and ICOM Namibia
EXPERIENCE IN YEARS	11 years
EXPERIENCE	Archaeological field work (research and excavation), Heritage impact Assessments and Museology.
NAME	**Mr Francois Knight**
RESPONSIBILITY ON THE PROJECT	Soil Scientist / Land Capability Specialist
QUALIFICATIONS	B.Sc.Agric.Hons degree in Soil Science from the Free State University, a post graduate diploma in terrain evaluation from Potchefstroom University and a M.Sc.Agric. cum laude degree in Soil Science from the University of Stellenbosch.
PROFESSIONAL	N/A

REGISTRATION	
EXPERIENCE IN YEARS	34
EXPERIENCE	Experience in natural agricultural resource assessments, which stems from his work as a senior researcher at the Department of Agriculture and, for the past 19 years, as an independent consultant

3 LEGISLATION APPLICABLE TO STUDY AND PROPOSED PROJECT

For environmental protection and sustainable renewable resource management to the benefit of all, legislation from different spheres under control of different ministries have been adopted and enacted by Parliament. In support to the goal of sustainable renewable resource management, various international treaties and conventions have also been agreed to by Namibia.

There are several sectoral laws that fall under the general rubric of environmental laws. Sectoral laws are generally specific and apply to sectors such as forestry, water, mining and so forth. Any development, such as this, is expected to have certain impacts and would therefore have to comply with some or other legislative requirement/s before commencement.

This chapter provides an overview to the legislation that is applicable to both the assessment process and the various activities making up the solar park development. It is accordingly divided into: (i) the legal framework for environmental management in Namibia; (ii) national sectoral legislative requirements applicable to the activities of the project; and (iii) other relevant legislation and approvals required for the commencement of the project.

3.1 NAMIBIAN LEGAL FRAMEWORK FOR EIA

Several Namibian legislation and policies have environmental considerations with respect to the proposed Project.

The instruments accounting for the legal framework for conducting an environmental assessment is listed in Table 3.1 below.

Table 3.1 *– Namibian legislation applicable to the EA process*

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
ENVIRONMENTAL ASSESSMENT LEGAL FRAMEWORK		
The Namibian Constitution (1990)	Article 95 (1) 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"* Article 100 stipulates that all natural resources are vested in the state, unless	The Project should support the provisions of the Namibian Constitution

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
	otherwise legally owned. The use of such resources is only allowed within reasonable limits and beyond such limits, permission should be obtained from a competent authority responsible for the use and governance of the concerned natural resources.	
Environmental Management Act (No 7 of 2007)	Section 3(2) of the EMA provides a set of principles that give effect to the provisions of the Namibian Constitution for integrated environmental management. Section 27(3) stipulates that no party, whether private or governmental, can conduct a listed activity without an ECC obtained from the Environmental Commissioner. Section 40(1) stipulates that an ECC remains valid for a period not exceeding three years, subject to cancellation or suspension.	The Project should adhere to the principles provided in the EMA. An ECC should be obtained for the Project. The Proponent should renew the ECC (if granted) every three years.
EIA Regulations 2012 (GG No. 4878 GN No. 29 and 30)	Provides for the process to be followed in undertaking an environmental assessment, stipulating particular requirements with regards to public consultation, the identification of impacts and establishing the significance thereof, as well as the content of an environmental scoping report. Of particular interest is the transfer of an ECC, which is regulated by section 20 of the EIA Regulations.	The EA process should be undertaken as prescribed in the EIA Regulations. Transfer of the ECC should be done as per the requirements, at the time when so required.

3.2 NAMIBIAN SECTORAL LEGISLATIVE REQUIREMENTS

A number of Namibian legislation and policies have environmental considerations in respect of the proposed Project, as listed in Table 3.2 below.

Table 3.2 *- Cross-sectoral legislation applicable to the project*

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
NATIONAL SECTORAL LEGISLATION		
Electricity Act of 2007	The regulation of electricity generating activities falls within the jurisdiction of the Ministry of Mines and Energy (MME), specifically the Electricity Control Board. The act provides the requirements and conditions involved in obtaining licenses for the generation and provision of electricity. It also addresses the powers and obligation of the licensees and provides for incidental matters.	The Proponent will have to plan and operate in consultation with this regulatory board.
Subdivision of the Agricultural Land Act No. 70 of 1970 ("Subdivision Act")	To control the subdivision and, in connection therewith, the use of agricultural land.	The long-term lease is subject to the provisions of this Act, which requires the Proponent to obtain consent from the Ministry of Agriculture, Water and Land Reform to register a long-term lease against the title deed of the agricultural land within which the project site resides.
Forest Act No. 12 of 2001, as amended	Provision for the protection of various plant species. and of the environment. Prohibits the removal of and transport of various protected plant species.	The project site may harbour endemic, endangered and/or protected species Permits are required for the removal of these trees, bushes or shrubs, or any indigenous plants.
Nature Conservation Ordinance No. 4 of 1975, as amended	Protects wild animals and indigenous plants. Prohibits disturbance or destruction of the eggs of huntable game birds or protected birds without a permit. Requires a permit for picking (the definition of "picking" includes damage or destroy)	The project site may harbour some of the endemic, endangered and/or protected species as listed in Schedule 9 of the Ordinance. Permits are required for the removal of the listed

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
	protected plants without a permit. Prohibits the removal of and transport of various protected plant species.	species.
Soil Conservation Act No. 76 of 1969, as amended	Prevention and combating of soil erosion; conservation, improvement and manner of use of soil and vegetation, and protection of water sources.	The proposed Project's activities should adhere to the requirements as set in the Act.
Water Act No. 54 of 1956, as amended	Makes provision for a number of functions pertaining to the management, control and use of water resources, water supply and the protection of water resources. Of importance is that the Act - • Prohibits the pollution of underground and surface water bodies. • Liability of clean-up costs after closure / abandonment of an activity.	The Proponent should ensure that water use during the construction and operational phases are as sustainable as possible and that no pollution of any above and/or below ground water resource takes place.
National Heritage Act (Act 27 of 2004), as amended	The Act requires the identification of cultural and archaeological sites within the study area, registration and protection thereof. Heritage sites or remains are defined in Part 1, as "any remains of human habitation or occupation that are 50 or more years old found on or beneath the surface". Part V Section 46 of the Act prohibits removal, damage, alteration or excavation of heritage sites or remains. Part VI Section 55 Paragraphs 3 and 4 require that any person who discovers an archaeological site should notify the National Heritage Council.	All protected heritage resources (e.g. human remains etc.) discovered, need to be reported immediately to the National Heritage Council (NHC) and require a permit from the NHC before they may be relocated.
Hazardous Substances Ordinance No. 14 of 1974, as amended	This ordinance provides for the control of substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or	During the construction and operation phases, any hazardous waste needs to be handled, stored, and disposed of in a responsible

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
	the generation of pressure thereby in certain circumstances. It is administered by the Ministry of Health and Social Services.	manner and at appropriate waste sites.
Atmospheric Pollution Prevention Ordinance No 11 of 1976, as amended	Provides for the prevention of the pollution of the atmosphere. Part IV of this ordinance deals with dust control and provides for the proclamation of dust control areas.	Excessive dust emissions caused during the construction and operational phases should be avoided or mitigated as it could be categorised as causing a public nuisance under common law.
Public Health Act No. 36 of 1919, as amended Health and Safety Regulations GN 156/1997 (GG 1617)	Section 119 states that "no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health."	The Project should both during the construction and operational phases consider and ensure proper human health and safety conditions.
Labour Act No. 11 of 2007, as amended	The Labour Act (No. 6 of 1992), the New Labour Act (no. 11 of 2007) and Government Notice 156 of 1997: Labour Act, 1992: Regulations Relating to the Health and Safety of Employees at Work, governs working conditions of employees. These regulations are prescribed for among others safety relating to hazardous substances, exposure limits and physical hazards. Special consideration must be given to: • Chapter 3: Welfare and Facilities at Work-Places • Chapter 4: Safety of Machinery • Chapter 5: Hazardous Substances • Chapter 6: Physical Hazards and general provision	The Proponent (including their appointed contractors) needs to comply with health and safety regulations pertaining to the health and safety of employees during construction. Operational activities should not result in any potential negative health implications to the residents and/or larger community.
Road Traffic and Transport Act 52 of	Provides for the control of traffic on public roads and the regulations pertaining to	All personnel and vehicles active during the

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
1999 and its 2001 Regulations, as amended	road transport, including the licensing of vehicles and drivers. Part 5 of the 2001 Regulations lays out detailed provisions pertaining to vehicle loads – i.e. types of loads and the appropriate manner in which loads for different vehicle classes should be carried.	construction and the operational phase should be appropriately licensed. Construction materials transported/delivered to the construction site should adhere to the requirements of the 2001 Regulations – i.e. should not exceed limits stipulated and should be transported in a safe manner.
Namibia Civil Aviation Regulations (NAMCARs) and Namibia Civil Aviation Technical Standards – Aerodromes and Heliports (NAMCATS - AH) Part 139	Subparts 11 of the NAMCARs and NAMCATS of 2018, stipulate the requirements for Obstacle Restriction and Removal.	An application is necessary for permanent structures (Operations Building) and temporary structures (UV panels) for screening by NCAA. A glint and glare assessment is only applicable to erection of objects within 15km radius and outside the vicinity of the nearest aerodrome and thus not applicable to KSSE

While it has been set out to list all those laws and regulations, which regulate the healthy functioning of the environment, it is not necessarily complete and the proponent has the responsibility to make themselves aware of all legislation and permit requirements applicable to the Project.

3.3 INTERNATIONAL TREATIES AND CONVENTIONS

The international treaties and conventions applicable to the Project and affected environment worth taking note of are listed below in Table 3.3 below.

Table 3.3 *- International Treaties and Conventions applicable*

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
The 1992 United Nations Framework Convention on Climate Change	The UNFCCC was adopted to regulate levels of greenhouse gas concentration in the atmosphere so as to avoid the occurrence of climate change on a level that would impede sustainable economic development.	Energy production adaptation should strive toward long-term energy security and energy efficient production technologies and decrease the dependence on non-renewable, volatile and environmentally unsound resources.
The 1985 Vienna Convention for the Protection of the Ozone Layer	Aims to protect human health and the environment against the adverse effects resulting from modifications of the ozone layer.	Parties commit themselves to cooperate in formulation and implementation of measures to control activities that cause adverse modifications of the ozone layer.
Convention on Biological Diversity 1992	Regulate or manage biological resources important for the conservation of biological diversity whether within or outside protected areas, with a view to ensuring their conservation and sustainable use. Promote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings.	Removal of vegetation cover and destruction of natural habitats should be avoided and where not possible minimised.
The United Nations Convention to Combat Desertification 1994	Focuses on land degradation in the dry lands where some of the most vulnerable ecosystems and people in the world exist.	The Project should adhere to land management, which contributes to the conservation and sustainable use of biodiversity and the mitigation of climate change.
The 1972 Convention Concerning the Protection of the World's Cultural and Natural Heritage	This convention intends to establish an effective system of collective protection of the cultural and natural heritage of outstanding universal value, organised on a permanent basis and in accordance with modern scientific methods.	Possible cultural heritage resources (e.g. human remains, fossils, etc.) discovered, need to be reported immediately to the National Heritage Council (NHC) and require a permit from the NHC before they

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
		may be relocated.
Stockholm Declaration on the Human Environment 1972	Recognises the need for: *"a common outlook and common principles to inspire and guide the people of the world in the preservation and enhancement of the human environment"*.	The proponent should strive to protection of natural resources and prevention of any form of pollution.
National Policy on Climate Change for Namibia 2011	Seeks to promote the primary government objectives, which include job creation, provision of basic services and infrastructure development, alleviation of poverty and provision of housing. These priorities are generally compatible with the principles of sustainable development as defined in the Rio Declaration of 1992.	Energy production adaptation works toward long-term energy security through the use of renewable and energy efficient production technologies and decreases the dependence on non-renewable, volatile and environmentally unsound resources.

3.4 AGREEMENTS, PERMITS, LICENCES AND/OR APPROVALS REQUIRED

The following agreements/permits and/or licenses (Table 3.4) should be concluded/obtained prior to construction.

Table 3.4 – *Permits, licences, approvals and/or agreements that may also be required.*

Activity	Type of Permit / Licence	Legislation / Institute
Equity Finance Agreements		Emesco Energy Namibia (Pty) Ltd and Klein Spitskop Solar Energy (Pty) Ltd
Debt Finance Agreements	Limited Suretyship Bank Account Pledge	Emesco Energy Namibia and Potential Lenders
Shareholders Agreement	Agreement, including provision of equity contributions, has to be signed prior to Financial Close	SPV's shareholders
Activity	**Type of Permit / Licence**	**Legislation / Institute**

Agreement between all and each participant and Market Operator		Klein Spitskop Solar Energy (Pty) Ltd and SAPP Members
Land Lease Agreement	Land secured under a lease option agreement	Klein Spitskop Solar Energy (Pty) Ltd and Private Landowner
Development Agreement	An agreement outlining the development responsibilities of EMESCO and compensation for its development activities.	Klein Spitskop Solar Energy (Pty) Ltd and Emesco Energy (Namibia) (Pty.) Ltd
Generation and Export Licence		ECB (Regulatory Authority)
Market Participant Agreement		NamPower
EPC Agreement:	Full turnkey EPC contract based on FIDIC silver book will be signed	Emesco Energy (Namibia) (Pty.) Ltd
O&M Contract:	A contract for the long-term operations and maintenance of the plant to be signed.	Klein Spitskop Solar Energy (Pty) Ltd and Emesco Energy Namibia (Pty) Ltd
Power Purchase Agreement	A Power Purchase Agreement has to be signed	Klein Spitskop Solar Energy (Pty) Ltd and NamPower.
Asset Management Agreement		Klein Spitskop Solar Energy (Pty) Ltd and Emesco Energy Namibia (Pty) Ltd
Consent to use land for use other than agricultural purposes	In progress	Ministry of Agriculture, Forestry and Land Reform.
Consent for the registration of a servitude for an overhead powerline	Consent letter from land owner required. Consent letter from Roads Authority required.	Landowner Roads Authority
Environmental Clearance certificate	Environmental Impact Assessment in progress	Ministry of Environment, Forestry and Tourism
Water use	Approval and Agreement required	Landowner and/or NamWater
Access road	Approval and Agreement by RA is required and negotiations must still be undertaken. It is scheduled for once the final investment decisions are made.	Landowner and/or Roads Authority
Construction of permanent and/or temporary structures	Application must be submitted	Namibian Civil Aviation

within 25 km from an airport.		Authority (NCAA)
Removal of protected and indigenous species	Permit required if applicable	Ministry of Environment, Forestry and Tourism

4 DESCRIPTION OF THE PROPOSED PROJECT

EMESCO Namibia (Pty) Ltd is of the intention to develop a 125 MW utility-scale Solar PV Plant that will link to the national grid of NamPower for electricity supply to the Southern African Power Pool (SAPP), export market and/or individual consumers, such as local mines, within the Modified Single Buyer Framework.

The proposed Project entails the construction and operation of the 125 MWp photovoltaic solar power plant to the extent of 200 ha, which will consist of the energy generation component (solar plant) and the transmission component (overhead transmission line), extending from the solar plant to Nampower's Kokerboom Sub-station, as explained below.

This chapter provides first of all a brief overview of the national strategies and policies relevant to the energy supply sector, followed by a description of the project development, implementation and shareholding. The remainder of this chapter provides a detailed description of the proposed Project.

4.1 NATIONAL STRATEGIES & POLICIES

4.1.1 NAMIBIA'S NATIONAL ENERGY SUPPLY STRATEGY

Like many other countries, Namibia aspires to use more renewable energy, to achieve reductions in its greenhouse gas (GHG) emissions, as well as to avail the Country of the numerous other benefits associated with their use. Namibia's submission to the UNFCCC's COP 21 meeting in Paris, France, titled "*Intended Nationally Determined Contributions*" (INDC) shows that the energy sector is expected to contribute to the national level INDC by increasing the share of renewables in electricity production from 33% in 2010, to 70% by 2030. This objective is indicative of the importance of increased consideration of renewable energy in the Country's energy mix, but it is conditional on Namibia receiving foreign financial support. A significant number of the generation options of the country under consideration would be based on renewable energy.

4.1.2 NATIONAL ENERGY POLICY AND (DRAFT) NATIONAL RENEWABLE ENERGY POLICY

The National Energy Policy aims to "*ensure the development of Namibia's natural capital and its sustainable use for the benefit of the country's social, economic and environmental wellbeing*". The Policy's main goals are to ensure the security of all relevant energy supplies to the country; to create cost-effective, affordable, reliable and equitable access to energy for all Namibians; to promote the efficient use of all forms of energy; and to incentivise the discovery, development and productive use of the country's diverse energy resources. The policy supports sustainable energy and exploration of low carbon developments.

To this effect the National Renewable Energy Policy, still with draft, states that renewable energy holds the solution to Namibia's energy challenges, if developed strategically and with foresight. This Policy responds to the energy problem statement, and will better equip Namibia to prevail over these difficulties.

4.1.3 NATIONAL INTEGRATED RESOURCE PLAN (NIRP)

The National Integrated Resource Plan (NIRP) is a 20-year development plan for Namibia's Electricity Supply Industry, spanning the period between 2016 and 2035. It provides a projection of Namibia's expected future electricity demand, and identifies the mix of resources required to meet the country's electricity needs in an efficient and reliable manner at the lowest reasonable cost.

Namibia has numerous power supply options that could potentially be developed to meet its future electricity requirements. However, the relatively small size of the Country's power sector, as well as the low load densities and long distances between major load centres and some potential generation connection points make it challenging to expand the power system, while ensuring the security of supply, maintaining reliability levels, and keeping costs to reasonable levels.

With one of the highest solar radiation levels in the world, Namibia stands to benefit as the world-wide boom in the solar power market results in reduced costs and improved efficiency of solar photovoltaic (PV) panels and related equipment. Small solar PV installations can assist NIRP for the Electricity Supply Industry (ESI) in Namibia. Distributed generation can potentially reduce the technical and financial challenges associated with delivering small amounts of power across a large area.

The NIRP Implementation Plan encourages continued programs to install solar PV and wind generation and further investigate the use of other renewable power technologies.

4.1.4 NDP 5 AND HPP

Energy remains the number one key input for development and thus Government recognizes it in both the Harambee Prosperity Plan (HPP) and the 5th National Development Plan as a priority infrastructure area needed for the nation's socio-economic growth and development. In order to meet the growing demand for energy, the NDP 5 promotes the entrance of Independent Power Producers (IPP). The mining, water pumping, construction sector and urban growth are expected to be major drivers of energy demand. The promotion of IPPs in the electricity supply industry is required to meet this demand.

4.1.5 NAMPOWER'S CORPORATE STRATEGY AND BUSINESS PLAN

Nampower's Corporate Strategy & Business Plan for 2019 - 2023 has been compiled to guide and provide strategic direction for electricity provision for five years. This plan is in line with the National Energy Policy to prioritise generation projects from renewable, non-polluting, indigenous, diverse and decentralised resources in a manner which optimises long-term cost of electricity supply. Technology listed in the plan are:

- Solar PV
- Wind
- Energy Storage
- Smart grids
- Thermal

- Behind the meter solutions

NamPower intends to procure electricity from Independent Power Produces (IPP) who develop Solar PV Plants.

4.1.6 GOVERNMENT INITIATIVES

The Ministry of Mines and Energy (MME), which is responsible for the Electricity Supply Industry (ESI) in Namibia, recently introduced the Modified Single Buyer (MSB) model to the electricity industry as approved by the Namibian Cabinet during the second quarter of 2019. The MSB model is a new market framework which is an incremental modification of the older Single Buyer (SB) model which allowed only NamPower to procure electricity supply from Southern Africa Power Pool (SAPP) utilities or Independent Power Producers (IPP).

The new Modified Single Buyer (MSB) model allows identified Contestable Customers (CC) and Eligible Sellers (ES) to transact with each other directly for the supply of electricity of up to 30% of the customer's energy requirement as identified and licensed by the Electricity Control Board (ECB). The MSB model also aims to allow for private generators to build new generation capacity in Namibia for export purposes. MSB is a step further towards greater competition and choice in the electricity industry. (*NamPower, 2020*)

4.2 PROJECT DEVELOPMENT, IMPLEMENTATION AND SHAREHOLDING

4.2.1 PROJECT DEVELOPMENT

EMESCO Namibia (Pty) Ltd, on behalf of the Klein Spitskop Solar Energy (Pty) Ltd, will be responsible for the development of the solar PV facility in its entirety. The activities involved in the development of KSSE include, but are not limited, to the following:

a) Entering into a Market Participant Agreement with NamPower, SAPP member or a single buyer for a duration of 25 years;

b) Obtaining all necessary licenses and permits as set out in 3.4 required to construct, operate and maintain the power plant for the duration of the Market Participant Agreement;

c) Concluding a long-term Land Lease Agreement with the owner of the agricultural land;

d) Design, engineering, procurement, transportation to site, erection, construction, installation, quality assurance, testing (on and off-site), commissioning and acceptance testing of the solar plant for all auxiliary and ancillary plant, services, and works and rehabilitation of associated sites;

e) Design and construction of all infrastructure required for the connection of the solar PV plant to the Kokerboom NamPower Substation; and

f) Appointment of international EPC contractor via competitive bidding process;

g) Appointment of international O&M contractor with local presence via competitive bidding process; and

h) Rehabilitation of the project site after plant design life.

4.2.2 PROJECT IMPLEMENTATION

With respect to the implementation strategy, EMESCO will –

a) arrange all necessary financing, insurance, authorizations, engineering, procurement and construction requirements for the solar PV facility;

b) provide overall project management as required to develop, construct, own and operate the plant until the end of plant design life;

c) will be responsible for selecting the equipment technology, dictating the design of the facility, and carrying out the plant design, construction, and commissioning; and

d) study and implement mitigation measures for the project to comply with the Government environmental regulations and guidelines, which may include a corporate social responsibility (CSR) initiative to foster social and economic improvements in communities located near the site.

4.2.3 SHAREHOLDING

EMESCO Energy Namibia (Pty) Ltd. currently owns 100% of Klein Spitskop Solar Energy (Pty) Ltd. and will be responsible for the development of the solar PV facility based on the Modified Single Buyer (MSB) framework.

Klein Spitskop Solar Energy (KSSE) will fulfil the role of Independent Power Producer (IPP) on a Build-Own-Operate (BOO) basis with EMESCO arranging all necessary financing, insurance, authorizations, engineering, procurement and construction requirements for the solar PV facility. Refer to Appendix C for the Project Information Memorandum of a similar EMESCO Solar Farm, Schonau Solar Energy near Karasburg, which received Environmental Clearance in 2022.

4.2.4 PROJECT IMPACT

The development of this project will contribute to energy access and the promotion of economic development of southern Africa by increasing the availability of clean energy via the Southern African Power Pool to Southern African countries.

This investment will allow southern Namibia to benefit from its natural resources without harm to this ecologically sensitive area.

Klein Spitskop Solar Energy will reduce the annual Green House Gas (GHG) emitted in the production of utility supplied power in the region by 331 973 over 30 years of project life.

The project will increase skills levels in the region, creating temporary job opportunities during construction and permanent as well as seasonal jobs during the 30 years of operations.

It will also promote industry innovation and infrastructure development in the Keetmanshoop area.

4.3 PROJECT'S TECHNICAL DETAILS

4.3.1 PROJECT OVERVIEW

The Project entails the construction and operation of a photovoltaic solar power plant to the extent of 200 ha, which consists of the energy generation component (solar plant) and the transmission component (overhead transmission line), extending from the solar plant to the intake sub-station, as explained below.

In accordance with the PPA and the Modified Single Buyer market rules, the solar plant will be developed by EMESCO Energy Namibia (Pty) Ltd. according to the following milestones presented in Table 4.3 below.

Table 4.3 *– Project development planning*

Milestone	**Milestone Date**
Generation and Export Licence	July 2023
SAPP Membership	Apr 2024
Start of Construction	July 2024
Scheduled Connection Date	Nov 2025
Commercial Operation/Grid Compliance Date	Nov 2025
Target First Supply Date	Nov 2025

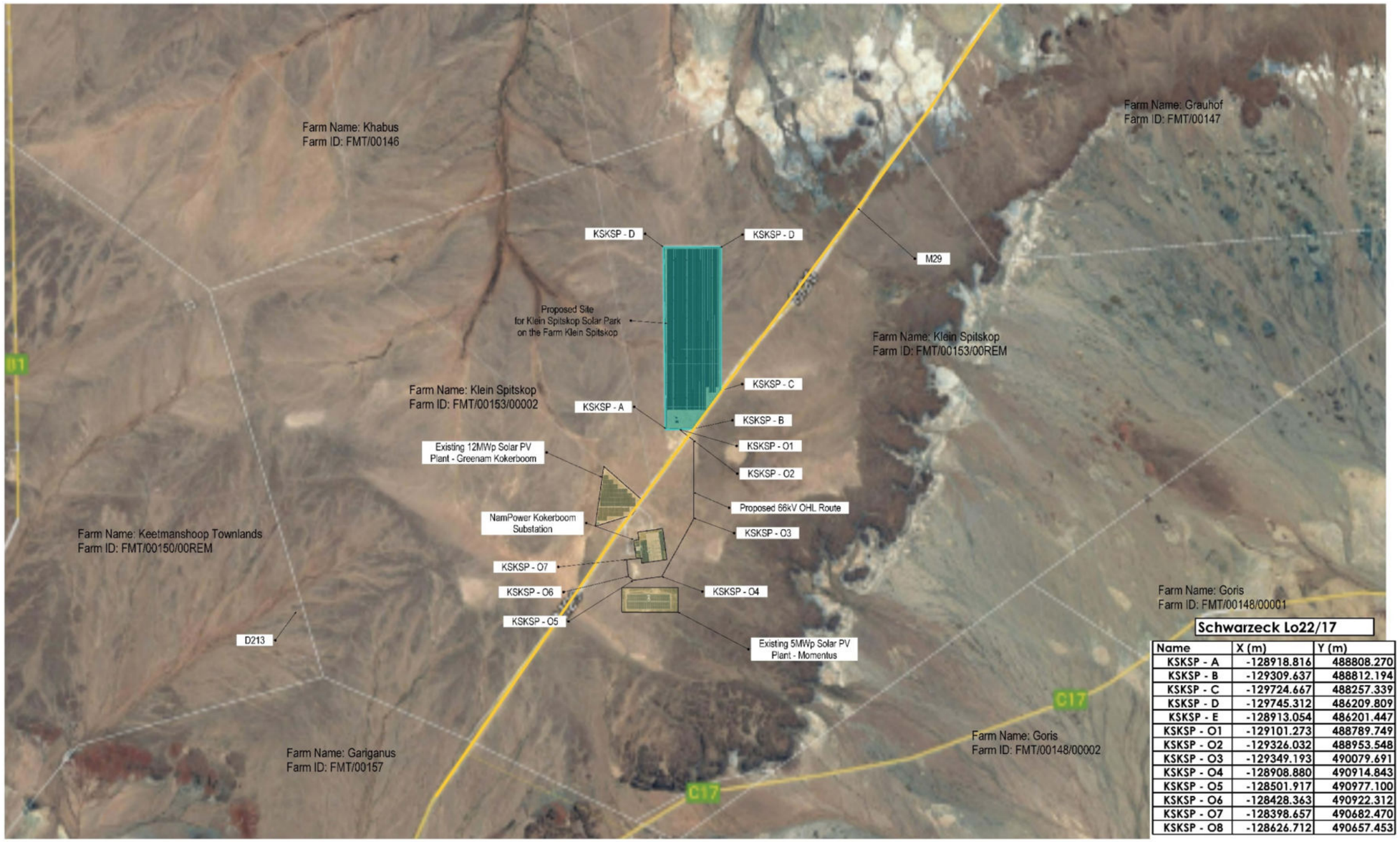
The Project is expected to reach Commercial Operation and First Supply Date by November 2025. Refer to Appendix C for the Project Information Memorandum of a similar EMESCO Solar Farm, Schonau Solar Energy near Karasburg, which received Environmental Clearance in 2022.

4.3.2 SITE LOCALITY AND OHTL ALIGNMENT

The Project Site is located in the southern parts of Namibia, in the Karas Region, 20 km north-east of Keetmanshoop. (refer to Fig. 5.1, Chapter 5 for the locality within Namibia). The site proposed for the solar park is envisaged on a portion of the Remainder of Portion 2 of the commercial Farm Klein Spitskop No. 153. The 200-ha set aside on the farm for this Project is located on the north-western side of the M29 opposite Nampower's Kokerboom Substation (situated on the south-eastern side of the M29) and next to the newly developed GreeNam Kokerboom PV Project. Refer to Fig. 4.2 for the lay-out of the Project Site as well as to Figure 1 and 2 of Appendix F Agricultural Impact Assessment Report.

The 33 kV OHTL will extend from the solar farm for 4 km across the M29 to connect to a 33kV intake at the Kokerboom Substation south-east of the Project Site as indicated by Fig. 4.2.

The solar farm is envisaged to be constructed and developed with the solar panels in configuration as indicated in Fig. 4.3 below.



Schwarzeck Lo22/17

Name	X (m)	Y (m)
KSKSP - A	-128918.816	488808.270
KSKSP - B	-129309.637	488812.194
KSKSP - C	-129724.667	488257.339
KSKSP - D	-129745.312	486209.809
KSKSP - E	-128913.054	486201.447
KSKSP - O1	-129101.273	488789.749
KSKSP - O2	-129326.032	488953.548
KSKSP - O3	-129349.193	490079.691
KSKSP - O4	-128908.880	490914.843
KSKSP - O5	-128501.917	490977.100
KSKSP - O6	-128428.363	490922.312
KSKSP - O7	-128398.657	490682.470
KSKSP - O8	-128626.712	490657.453

emesco

CUSTOMER:

Lats: 26°23'57.70"S Longs: 18°17'36.03"E

Region: KARAS REGION, NAMIBIA

Project: KLEIN SPITSKOP SOLAR PARK

Drawing Description: Site Locality Map and Farms

Task	Name	Signature	Date
Draughtsperson	R Sonnekus	RHS	22 March 2022
Design Approval			
Technical Approval			
Approved for Issue			

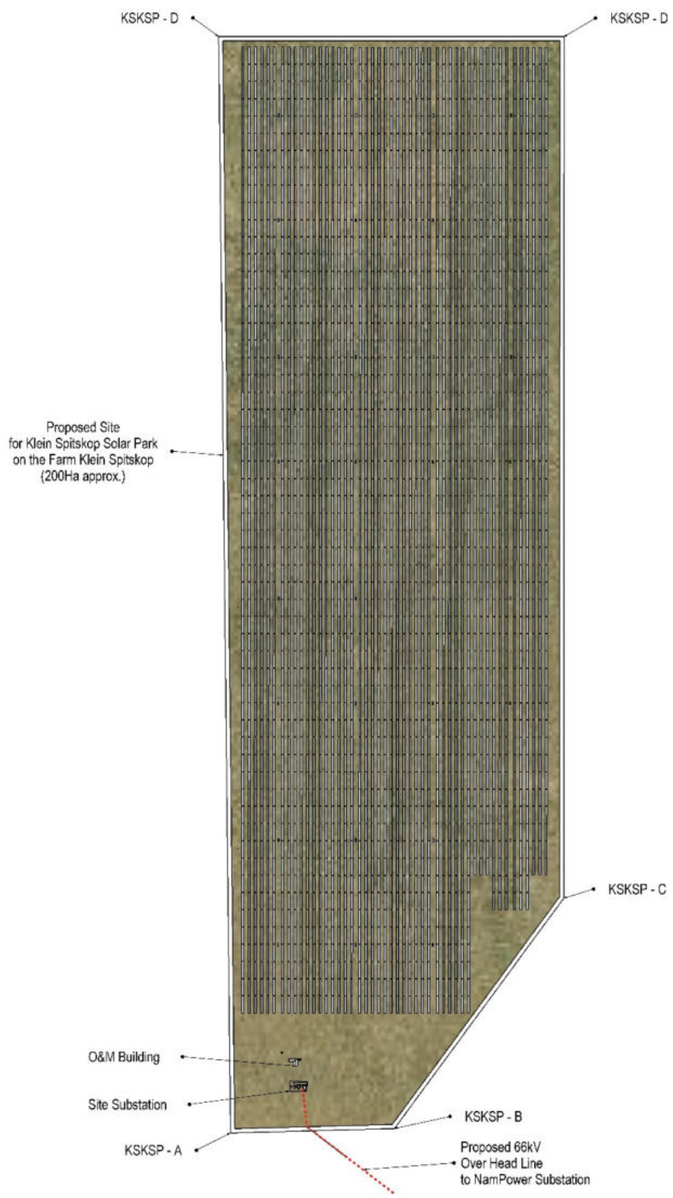
SCALE 1:50 000

SHEET 1 / 2

Drawing Reference: PV/KSKSP/001

REV: 1
ISSUED FOR INFORMATION

Figure 4.1 *–Site Lay-out of KSSE*



Schwarzeck Lo22/17

Name	X (m)	Y (m)
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KSKSP - O7	-128398.657	490682.470
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emesco

CUSTOMER:

Lats: 26°23'57.70"S Longs: 18°17'36.03"E

Region: KARAS REGION, NAMIBIA

Project: KLEIN SPITSKOP SOLAR PARK

Drawing Description: Site Layout - KSKSP

Task	Name	Signature	Date
Draughtsperson	R Sonnekus	RHS	22 March 2022
Design Approval			
Technical Approval			
Approved for Issue			

SCALE 1:12 100

SHEET 2 / 2

Drawing Reference: PV/KSKSP/001

REV: 1
ISSUED FOR INFORMATION

Figure 4.2 - *Configuration of the Solar Panels on the Project Site*

4.3.3 SOLAR FARM

The solar farm is planned to be constructed and developed in 25 MWp phases up to a 125 MWp Solar Park.

The layout of the solar farm consists of a variety of infrastructure, each having a particular purpose. This includes PV panels to harvest the sun's energy, a tracking system to ensure optimal exposure of the PV panels during daylight, inverters and field transformers to step-up the voltage and cables to transmit electricity to the site substation. The Project will feed into a 33 kV intake of the Kokerboom Substation of NamPower via a 3,4 km 33 kV wood structure overhead transmission line from the project site. This process is visualised by Figure 4.4 below.

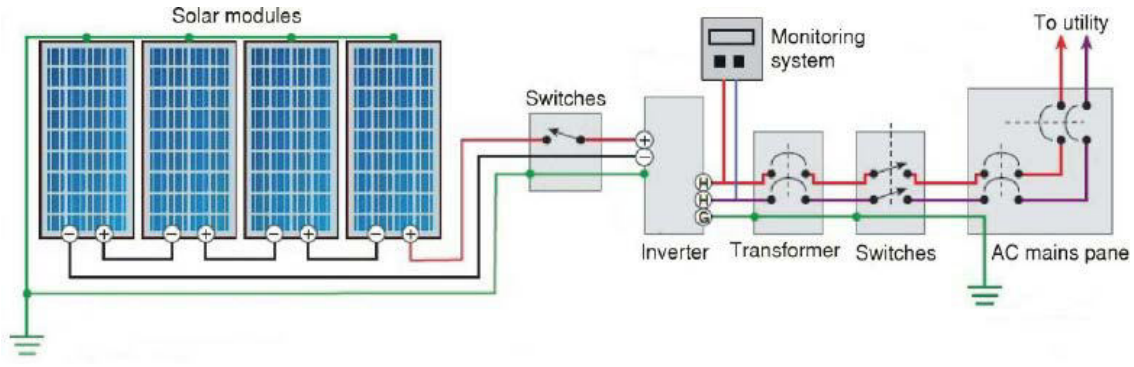

Figure 4.3 *– Schematic illustration of solar harvesting and transmission process*

(i) Solar PV modules (panels)

The solar panels to be installed is a high-quality solar product from Canadian Solar (or similar) with a 12 year guarantee on material and workmanship, and 30-year performance warranty, which reduce operational requirements and maintenance cost. The life span of these PV modules minimises the carbon footprint of the Project.

The PV modules can harvest up to 30% more electricity from the back, in addition to the electricity generated from the front (maximum system voltage – 1500V).

A single panel has a dimension of 2,384 x 1,303 x 35mm, weighing 39.5 kg. More details on the Canadian Solar PV modules are attached in Appendix H.

The real-world life expectancy of these panels is more than 25 to 30-year performance guarantee and regular replacement of modules is not anticipated. Panels that are damaged will be replaced as part of the routine maintenance. Redundant panels still producing electricity, can be reused for rural electrification purpose, while those panels not functional anymore be recycled (i.e., glass, aluminium, copper, silica and plastic) and reused in the manufacturing of new panels.

(ii) Trackers on planted steel poles

The modules (solar panels) will be mounted on a single axis tracking system requiring 2m high steel posts (above ground), as indicated by Photo 4.1 below.

Photo 4.1 *– Example of single axis tracking system*

The solar tracking system both works as a support structure for the PV panels and to provide maximum potential sun light by tracking the Sun. The table row (PV panels) is 4 800 mm wide and 10 200 mm apart to allow for optimal sun exposure and maintenance access.

The single-axis solar trackers track the sun east to west, rotating on a single point, moving either in unison, by panel row or by section, ensuring optimal exposure to the sun for a longer time during the day.

The particular technology to be installed is the IDEEMATEC Horizon L:TEC PV tracker (or similar), which offers most advanced zero loss bifacial, two-in-portrait tracker solution. The system provides the highest additional gains, optimizes overall yields and improves lifetime cost performance of a solar system. It offers unprecedented safety against wind induced instabilities.

More details on the IDEEMATEC Horizon L:TEC PV tracker are attached in Appendix I.

The life expectancy of these structures are on average more than 25 years, where after the structures will be replaced with new steel poles. Redundant poles are recycled and reuse as part of the steel and aluminium chain.

(iii) Inverters

Inverters are installed below the module rows (PV panels) on the tracker posts, which reduce the required structures.

The inverters used are the Multi-MPPT String Inverter for 15000 Vdc systems, which is a small device of 916 x 690 x 340mm. Inverters convert direct current electricity to alternating current either for stand-alone systems or to supply power to an electricity grid.

More details on the SG125HX Multi-MPPT String Inverter are attached in Appendix J.

(iv) Field transformers

A total of 35 transformers will be installed for the 200 ha development. The field transformers (see Photo 4.2) will be located in between the PV panel sections, placed on a plinth of 12m² per transformer.

These transformers have the purpose to step-up the voltage to deliver the renewable energy to the utility grid, with the added benefit that it provides galvanic isolation between the solar facility and the utility grid.

The real-world life expectancy of these transformers is more than 30 years, where after the transformers will be replaced with new transformers. The transformers will be re-furbished at the end of plant life and re-introduced into the energy market.

Photo 4.2 *– Example of a field transformer*

(v) Cables & trenching

For purpose of transmitting the electricity from the field transformers to the site substation, direct buried cables will be provided. Raised cable trays will feed electricity generated down each tracker row. At the end of the tracker rows a trenched system would be used to link the rows to field transformer stations. The field transformer stations would be linked to the site substation via a trenched system.

(vi) Site Substation

A single site substation will be provided on-site, expected to take-up about 1,250 m². Photo 4.3 gives a visual representation of such a site substation.

Photo 4.3 *– View of a similar site substation & buildings*

(vii) Operations and Maintenance Building

A building for operations and maintenance will be erected which will consist of a storeroom, office and ablution with sewage system. An example of such a building can be seen on Photo 4.3 next to the site substation.

(viii) Lightning Protection System

A lightning protection system will be installed to protect equipment on site.

(ix) Internal Road

For purpose of providing access during the construction phase and the operational phase, a 4m wide compacted gravel road will be constructed to accommodate large trucks that need to access the site during emergencies and repairs.

For access in between the PV panel sections and routine daily maintenance no formal constructed roads are provided for. Routine inspections will be done with small quad bikes. Any crossings of water drainage lines will be engineered to allow water thoroughfare. There are, however, no indication of such drainage lines on the Project Site.

(x) Security Fence with Controlled Access

A 2.5 m high electrified security fence (see Photo 4.4) will be installed along the perimeter of the solar farm. The length for the entire 200 ha site will have a total length of approximately 6036 m. No lights are used on the fence during the night.

Access to the solar farm will be controlled by means of a gate at the entrance, manned by a guard on duty 24/7.

Photo 4.4 *– View of a similar electrified security fence*

4.3.4 OVERHEAD TRANSMISSION LINE

The transmission line will be a 33 kV overhead power line extending from the solar park's substation for 4 km to the intake of the Kokerboom Substation across the M29 road. For this a permit from Roads Authority will be required.

The transmission lines will be mounted on wooden pole structures of approximately 10m high and 80 to 120m span in between, of which an estimated 100 pole structures will be constructed. Photo 4.5 below gives a visual representation of a similar pole structure.

***Photo 4.5** – View of a similar pole structure for OHTL*

(i) Kokerboom Substation

The OHTL will connect to an existing intake of the Kokerboom Substation (see Photo 4.6), located about 4 km to the south-east of the Klein Spitskop Solar Energy Project Site, opposite the M029 main road.

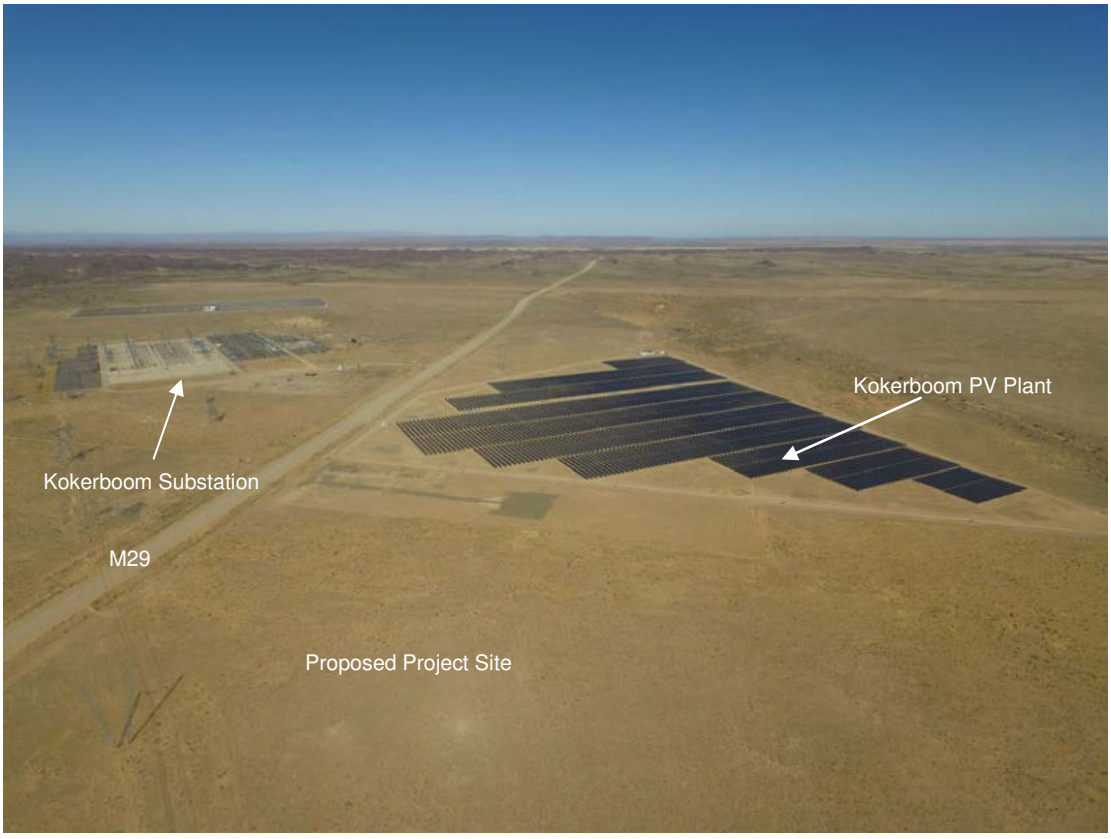

***Photo 4.6** – View of Kokerboom Substation, Kokerboom PV Plant and Proposed Project Site*

4.3.5 SUPPORTING INFRASTRUCTURE

(i) Access & Roads

A permit from Roads Authority is required for the access road. It is envisaged that access to KSSE will be obtained via the existing Farm entrance off the M29 road (Refer to Photo 4.6). This will be determined when final technical studies are completed and access agreed upon in consultation with Roads Authority.

From the access road a 4m wide gravel road will be constructed into the Project Site to give access to the Solar Farm.

A suggestion was made that an access road be constructed from the B1 National Road to the Project Site to be used for the construction phase to prevent excessive dust generation on the M29. This option was, however, not found economically feasible.

(ii) Electricity

The solar farm will by its nature be self-sufficient for electricity. High illumination is not expected during the night. Electric lights will shine downwards over the Solar Park fence for security reason only.

(iii) Potable Water

The highest water demand will be during the construction phase, for on-site concrete works (i.e. construction of buildings and concrete platforms), cleaning and potable use.

During the operational phase, potable water will be used at the kitchen within the administrative building, flushing of toilets and when so required cleaning of panels. A robotic cleaner will use approximately 200 litre of water per 1 MWp per year. Thus the 125 MWp solar park will use 68.5 litre per day (*Knight, 2022*).

Water for daily use will be sourced from a borehole supplied by the landowner of Farm Klein Spitskop No. 153.

(iv) Sewage

No sewer infrastructure exists at the proposed site. During the construction phase a total of ± 400 people are expected to work on site during the day for which temporary mobile toilets will be provided.

Sewage to be generated during the operational phase is from the administrative office, having 15 permanent staff on a daily basis with 60 temporary staff during emergency or routine maintenance and cleaning of panels. For the operational phase it is envisaged that a French drain system will be constructed.

(v) Domestic Waste

Domestic waste generated on a daily basis during the construction and operational phase should be handled similar to the standard waste management system of Keetmanshoop Town. General waste must be stored on site within municipal bins, which must be removed on a weekly basis to Keetmanshoop landfill.

Domestic waste to be generated during the operational phase is from the administrative office, having 15 permanent staff on a daily basis with 60 temporary staff during emergency or routine maintenance.

(vi) Hazardous Waste

Construction waste generated must be stored on-site in an appropriate manner and disposed of at the Keetmanshoop dumpsite.

Waste of a semi-hazardous nature, which require special disposal, are the PV panels, inverters, transformers and related equipment that is either not functional or need to be replaced as part of the routine maintenance programme during the operational phase. These must be stored on site and disposed of in an appropriate manner at the nearest hazardous waste site.

4.3.6 CONSTRUCTION ACTIVITIES & METHODOLOGY

This section predicts activities associated with the construction phase as presented below.

4.3.6.1 Site Surveillance and Demarcation:

The first step within the construction phase entails -

- setting out the project site borders;
- identification and setting out the existing roads & tracks that can be used;
- identification and setting out the site office, ablutions, smoking and eating areas and parking;
- identification and setting out the construction yard, storage area and stockpile area;
- identification and setting out the waste storage area for the handling of all different waste types, wash bays, bulk storage and dispensing of fuel;
- drafting of construction and operational site layout; and
- ecological survey and rescue of species to be relocated.

This step of the construction phase will be done in consultation with the EAP or Ecologist to identify areas suitable for the various uses and to identify and rescue species to be affected.

4.3.6.2 Site Clearance

Once the survey and demarcation has been completed, clearance of vegetation within pre-identified areas will commence, which will be done as per the requirements of the EMP (Appendix K). The vegetation of the area allows that the proposed Project Site surface does not have to be cleared entirely as with other solar farms. For purpose of preventing erosion and conserving the local vegetation and habitat should be left intact for most of the area.

Areas to be cleared of vegetation are as indicated in Table 4.4, below.

Table 4.4 *– Footprint of area to be developed:*

Activity	m²	% of Project Site	Nature of Disturbance (Temporary / Permanent)
Project Site	2 000 000 m²	100%	
Fencing	6 036 m²	0.3%	Permanent
Roads	20 000 m²	1%	Permanent
Buildings x 3	400 m²	0.02%	Permanent
PV Modules (5880 x 30 176400)	552 166 m²	27.6%	Shading only
Tracking system foundations (20580)	13 093 m²	0.65%	Temporary
Trenching	49 000 m²	2.45%	Temporary
Inverters (490)			Installed on tracker posts
Field transformer stations x 35	420 m²	0.02%	Permanent
Substation	2 500 m²	0.125%	Permanent
Steel pole transmission lines x 4			
	Total	**Total**	
	29 356 m²	1.47%	**Permanent**
	62 093 m²	3.1%	**Temporary**
	91 449 m²	4.57%	**Total**

The total area to be disturbed calculates to 91 449 m² of which 29 356 m² is of a permanent nature, which calculates to 1.47 % of the Project Site. The Project Site makes up 1.9 % of the total Farm Klein Spitskop No. 153.

Areas other than the mentioned, for example areas in between PV panel sections, will not be cleared of vegetation. Temporary storage and disposal of the removed vegetation will be done as per the requirements of the EMP (Appendix K), as is the case with topsoil removal, temporary storage and replacement.

4.3.6.3 Construction Methods

(i) Vegetation Clearance

As indicated above, the proposed Project Site's surface will not be cleared entirely as with other solar farms, because of the vegetation type that exists on site.

Clearance for purpose of the roads is done by means of a grader, while manual labour will be used to clear those areas earmarked for the buildings, field transformers, tracking foundations, fencing and substation.

(ii) Drilling/digging & Casting of Collar (Tracking Foundations)

The steel posts on which the tracking system will be mounted will be drilled into the ground to a depth of 1,500mm to 2,200mm below ground making use of a small augur.

Each post would have a concrete collar at its base extending 150 to 200 mm above ground and 300 to 400 mm below ground (typical dimension of the collars would be Ø800 mm x 600 mm deep), as indicated by Figure 4.4 below.

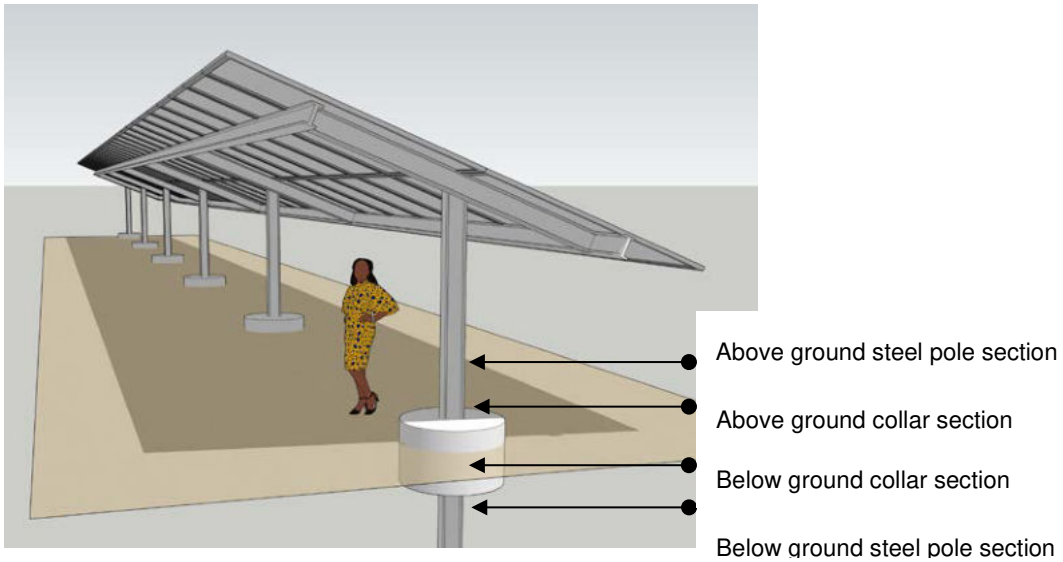

Figure 4.4 *– Tracking Poles & Foundations*

The selected mounting system will be installed along the existing site levels as far as possible with minimal levelling required, typically limited to module ground clearances only, but may also be required at some post locations to stay within the trackers slope tolerance, as indicated by Figure 4.6 below.

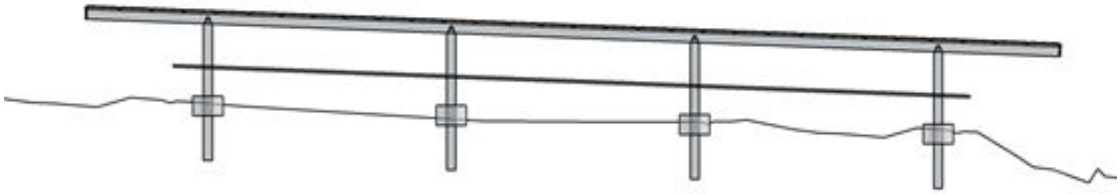

Figure 4.5 *– Installing of system along site gradient*

Each tracker row can be installed on a different elevation height and the row itself can accommodate a slope of up to 3% thus reducing disruption of the ground surface, as indicated by Photo 4.7 below.

Photo 4.7 *– Installing of system along site gradient*

The works for this installation will be done by both semi-skilled and skilled labour.

(iii) Field Transformers

For purpose of the field transformers, concrete plinth of 12 m² will be cased, which will be done by manual labour (i.e., semi-skilled labour).

The installation and connection of the field transformer will be done by skilled labour.

(iv) Cables & Trenching

The trenching to host the cables, linking the PV panels with the field transformer stations and the mentioned again with the site substation, would be at a depth of between 400 and 1,000 mm and width of 500mm.

Trenching will be done by semi-skilled labour while connections will be done by skilled labour. Excavated material will be re-used for backfill of the trenches though some imported soil material may be required depending on the soil's thermal capacity of the soil on site.

(v) Site Substation

An area of 25 x 50 m (1,250 m²) would be raised to create a level platform with the required earthing. This area will be covered with stone-chip and a concrete plinth for the large transformer and switchgear, +/-250 m² concrete and the balance of 1,000 m² would be stone-chip.

Construction of the mentioned and installation of the substation will be done by manual labour (i.e. semi-skilled and skilled).

(vi) Internal Roads

The construction of these roads will involve grading of surface, in-situ gravel compacting, imported surface soil grading and compacting. Any crossings of water drainage lines will be engineered to allow water thoroughfare.

For this purpose, a grader, tipper trucks and a roller compactor will be used.

(vii) Security Fence

The security fence will be a 2.5m high fence of galvanised poles and wire mesh (see Photo 4.4), electrified for security purpose.

For purpose of securing the galvanised poles, a hole of Ø300 mm x 600 mm deep will be dug and filled with concrete, making use of manual labour. The fence will be installed along the existing site levels.

(viii) Buildings

Three buildings (see Photo 4.3) will be constructed on-site, i.e. guard house, operations and maintenance building and switchgear station.

Standard building methods will be used to construct these buildings, i.e. digging of trenches for foundations, casting of foundations, brick works for building, etc.

(ix) Other

The following activities are also associated with the construction phase:

- Daily commuting of labour force from Keetmanshoop to the Project Site and back;
- Access to and from the Project Site by construction & delivery vehicles;
- Handling and removal of sewage;
- Handling, storage and removal of construction waste; and
- Usage of water for daily construction activities and generation of waste water.

The impacts expected to occur during the construction phase, the assessment therefore and the mitigations recommended are discussed in more detail in Section 7.4.1, while the environmental requirements are listed in much detail within the Environmental Management Plan (EMP), attached in Appendix K.

4.3.7 OPERATIONAL ACTIVITIES & METHODOLOGY

Once operational very little is required on-site and most is controlled from the Control Room, while specific operational and maintenance checks are performed as per the particular Solar Farm's Site Operation Manual.

These activities are only to be performed by authorized operators, maintenance teams and site personnel. The operation instruction manual of the specific equipment must be followed to complete the procedures discussed below. Strict safety measures (Personal and site safety measures) as outlined in the Solar Farm's Site Operation Manual should be followed at all times to ensure health & safety of all personnel and others.

Typical dangers that exist during operations are high voltage due to lighting, danger of electrocution, and/or crush hazard from moving parts of a motor. Several sources of combustion exist on a solar farm, the most common being electrical fire others including combustible materials, flammable liquids, and grass fires.

The activities associated with the operational phase are presented below.

- Day-to-day site checks, which includes –
    - General checks
        - Ensure that appropriate safety signs are in place at each access point of the site.
        - All areas are cleaned and free from obstacles or dangerous materials.
        - All waste materials have been dealt with according to the waste site management plan.
        - Ensure all equipment and Site O&M Manual are safely kept and easily accessible.

- Conduct a health and safety checks as per Site O&M Manual.
- Ensure there is enough water to drink and for daily usage and sun protection (HAT and sun block).
- Ensure that everything, e.g. tools, documents, brooms etc., are in the correct areas.

o Security and surveillance

- Check perimeter fencing and entrance gate for damages or signs of attempted entry.
- Inspect CCTV monitors to ensure all are operational.
- Ensure that the fire detection system is armed and operational.

- Operation and Maintenance, which would involve:
  - Daily rounds on the project site along existing tracks;
  - Plant start-up and shut down;
  - Diagnostic testing;
  - Fuse checks;
  - Vegetation management, which entail;
    - ⊡ Clearing of vegetation that attached to the tracking system;
    - ⊡ Clearing of vegetation that grew into array wiring;
    - ⊡ Clearing of vegetation if shading onto PV panels appear; and
    - ⊡ Clearing of vegetation around skids and other electrical equipment (i.e. field transformers; substation);
  - Maintenance to roads;
  - Cleaning of PV panels, which entails:
    - ⊡ Removal of noticeable dirt by rubbing away by gentle cleaning-implement (soft cloth, sponge or brush with soft bristles);
    - ⊡ Cleaning of soft dirt (like dust) on modules to be done weekly with compressed air. This technique can be applied as long as the method is efficient enough considering the existing conditions;
    - ⊡ If excessive soiling is present on the module surface, water will be used (2l/panel). This will be seldom necessary, expected once a year; and
    - ⊡ If grease is present, an environmentally friendly cleaning agent may be used with caution.

The vegetation control method currently applied with great success is grazing of the site by farm animals, such as sheep (see Photo 4.8).

***Photo 4.8** – View of sheep grazing the site and controlling vegetation growth*

Common repairs on a PV site include the following:

- Broken module replacements.
- Inverter shutdowns require inverter swops.
- Burnt connections.
- Communication fault finding and system repairs (smaller electronic equipment).
- Tracker gearbox and motor replacements.
- Wind damaged steel structure replacements.

4.3.8 DECOMMISSIONING

The project life is envisaged to be 25-30 years where after a new agreement will be negotiated with the land owner whether the permanent buildings and fence should be removed (along with all other solar infrastructure) or whether it can be re-used for other purposes after project life by the owner.

In case a full rehabilitation is requested, it will be the responsibility of the Proponent to undertake the decommissioning, which will be done as per the Proponent's Decommissioning & Rehabilitation Plan. It is recommended that a Botanist / Ecologist be involved to advise on how to go about restoring the area to a pristine condition. It will involve:

- Demolishing and removal of all temporary and permanent structures;
- Disposing of building rubble;
- Preparation of disturbed areas and recovery of topsoil;
- Search and relocate of local indigenous vegetation onto the site;

- Rehabilitated Karas dwarf shrubland vegetation patch; and
- Rehabilitation monitoring.

4.4 ALTERNATIVE SITES & ALIGNMENTS CONSIDERED

The criteria applied during the initial investigation by EMESCO was:

- sufficient solar radiation;
- available infrastructure (i.e.,. NamPower grid and substations, access, etc.);
- private owned land;
- available land for lease;
- land use & potential;
- underutilised or unutilised land; and
- site topography, drainage and size.

The larger area of the //Karas Region was considered and evaluated, which resulted in identifying Farm Klein Spitskop No. 153. This particular Farm was chosen, because of its ideal locality considering optimal exposure and duration of sunlight (i.e. maximum energy yield), while the site was chosen due to its locality (within 4km) to NamPower's Kokerboom Substation, into which the Solar Park will feed along a 3,4 km 33 kV OHTL. An existing access road (M29) leading from Keetmanshoop to Mariental is located next to the site. A Solar Resource Assessment that was carried out determined that the project site is ideal for maximum energy yield.

4.5 PROJECT BENEFITS

4.5.1 SOCIO-ECONOMIC

4.5.1.1 Employment & Skills Development

During the construction phase direct employment opportunity for approximately 400 people (i.e. unskilled & semi-skilled) will be created. During the operation phase approximately 15 people residing in Keetmanshoop will have to be employed and approximately 60 people on an ad hoc basis for maintenance and cleaning of the PV Modules when required. The project life is envisaged to be 25-30 years, which is as long as the equipment is warranted.

The project will thus have a direct impact on creating much needed employment, again contributing to alleviating poverty and socio-economic upliftment within the //Karas Region, which is in line with Vision 2030.

Apart from the direct employment opportunities, a variety of skills development exists within the solar technology, electricity supply and maintenance of the proposed Project. Skills development is expected as part of the on-the-job training that will be done, which is an added benefit to socio-economic upliftment.

4.5.1.2 Economic Spin-offs & Opportunities

The construction phase is expected to create opportunities to various small scale contractors and/or entrepreneurs within the town of Keetmanshoop, as well as //Karas Region. Local businesses will be supported and in so doing poverty in the region can be alleviated to some extent.

4.5.1.3 Security in Supply of Electricity

The Project will be part of the solution to overcome the current challenges within the Southern African Power Pool.

4.5.2 CARBON EMISSIONS

The Solar Farm will replace fossil fuel consumption with clean renewable energy at an affordable rate. Over the project life span this amounts to 331 973 tons of reduction in CO^2 emissions (*Rossouw, 2022*). This is in line with Namibia's Energy Policy (See Chapter 4.1) to reduce GHG and cost of electricity supply over vast distances to rural areas.

5 THE AFFECTED ENVIRONMENT

This chapter describes the details pertaining to the larger study area's existing biophysical and socio-economic environments, which defines the sensitivities to be considered during the planning, construction and operation of the Project.

This chapter provides base line information according to which the likely negative and positive impacts of the solar park will be assessed, as well as the significance thereof (as presented in Section, which in turn will inform the applicable mitigating measures and need for any further detailed assessments.

A great deal of this chapter is derived from specialist input (i.e., Ecological, Archaeological and Agricultural assessments), attached as Appendix D, E and F.

5.1 LOCALITY

The proposed Project Site is located in the southern parts of Namibia, in the //Karas Region, approximately 22 km north-east of Keetmanshoop. Klein Spitskop Solar Energy (KSSE) is envisaged on a portion, Portion 2, of the commercial farm, Klein Spitskop No. 153. The 200 ha set aside on the farm for this Project is located on the north-western side of the M29 opposite NamPower's Kokerboom Substation, situated on the south-eastern side of the M29, and directly adjacent to the newly developed Kokerboom Photovoltaic Project (KPVP). Refer to Fig. 5.1 for the locality of the Project Site.

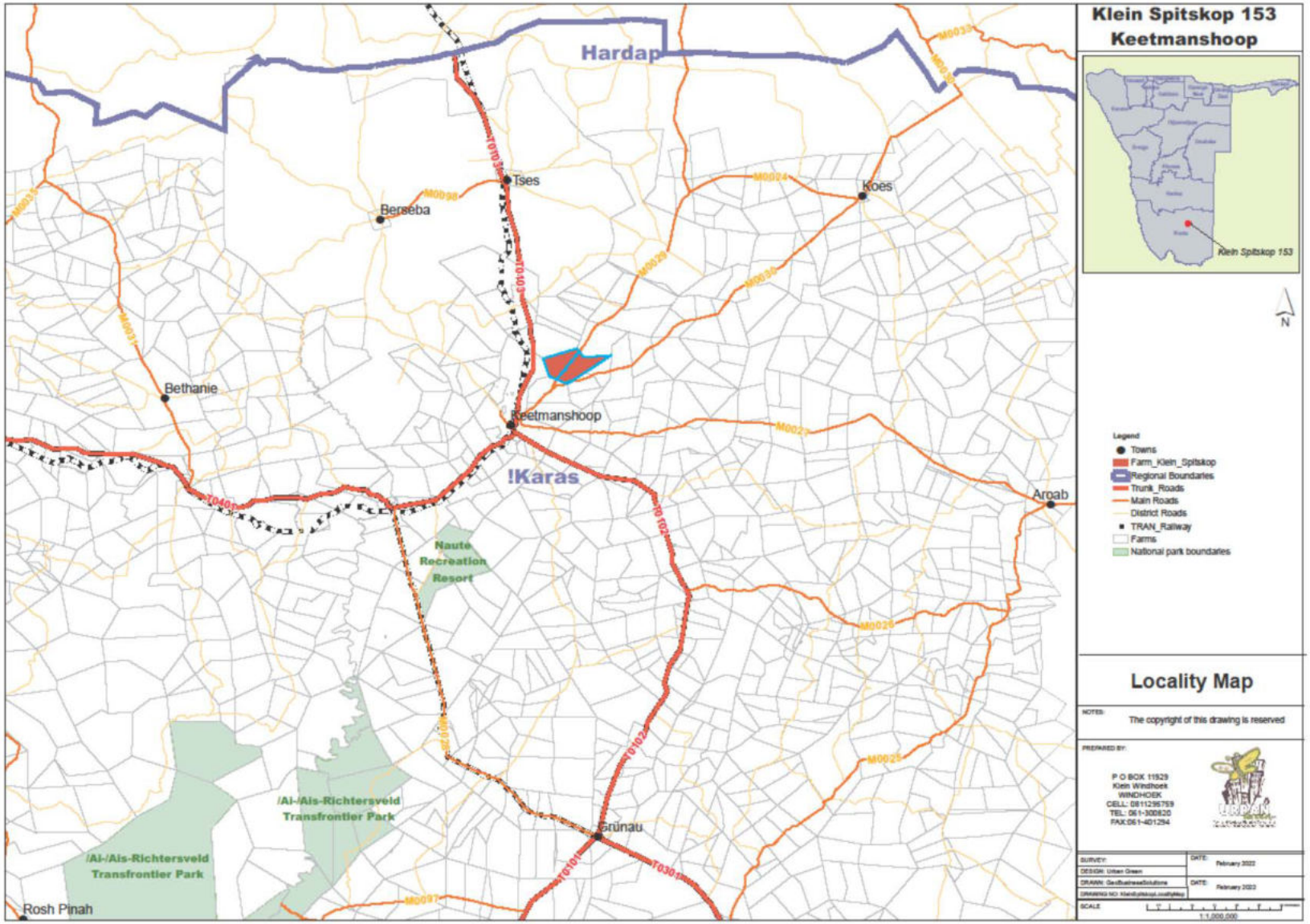

Figure 5.1 *– Locality Map of Klein Spitskop Solar Energy Farm*

5.2 PHYSICAL ENVIRONMENT

The project area falls within the *Nama Karoo* biome found within the southern parts of Namibia, which directly determines this particular bio-physical environment (see Section 5.3 of this chapter).

The proposed Project will by its nature impact on the project site's physical character and vice-versa, which again will affect the bio-physical environment.

5.2.1 CLIMATE

The town of Keetmanshoop is situated in an arid climate, with low rainfall, high evaporation and extreme temperature fluctuations. Refer to Appendix F - Agricultural Impact Assessment Report Section 4.2, Figure 7 and Table 1 for recorded climate data of the Project area.

5.2.1.1 Temperature

The *Nama Karoo* experience extreme temperature fluctuations with mean lowest 4˚C in June and mean highest 34 ˚C recorded in January. Average winter minimum temperatures are cool to cold and mid-winter temperatures can fall below 0 ˚C. Average summer temperatures rise extremely and maximum temperatures above 40 ˚C frequently occurs from November to February (*Mendelson et al., 2002*).

5.2.1.2 Rainfall

Summer rain is experienced in this area with mean annual rainfall recorded as a mere 100 - 150 mm and an annual evaporation rate of more than 2660 mm/year. Rain is highly variable in terms of amount and its distribution. (*Mendelson et al. 2002*)

5.2.1.3 Fog

Fog is does not occur in the Keetmanshoop area. (*Mendelson et al.*, *2002*).

5.2.1.4 Sunshine and Solar Radiation

Namibia's solar energy potential is amongst the world's best. At an annual solar radiation average exceeding 6 kWh / m² per day, this resource has the most significant potential for the supply of energy.

Keetmanshoop falls within the solar radiation category of 5.6 – 5.8 kWh/m² with an average 10 - 11 hours of sunshine per day (*Mendelson et al., 2002*). This makes the town ideal for solar technology, both in the case of PV panels for the harvesting of electricity and solar collectors for the harvesting of heat.

A Solar Resource Assessment that was conducted by Emesco in the //Karas Region determined that the project site is ideal for maximum energy yield (*Rossouw, P. 2021*).

5.2.1.5 Wind

The predominant winds experienced at Keetmanshoop are from the north-west, north, south-south-west and north-east. (*www.meteoblue.com*)

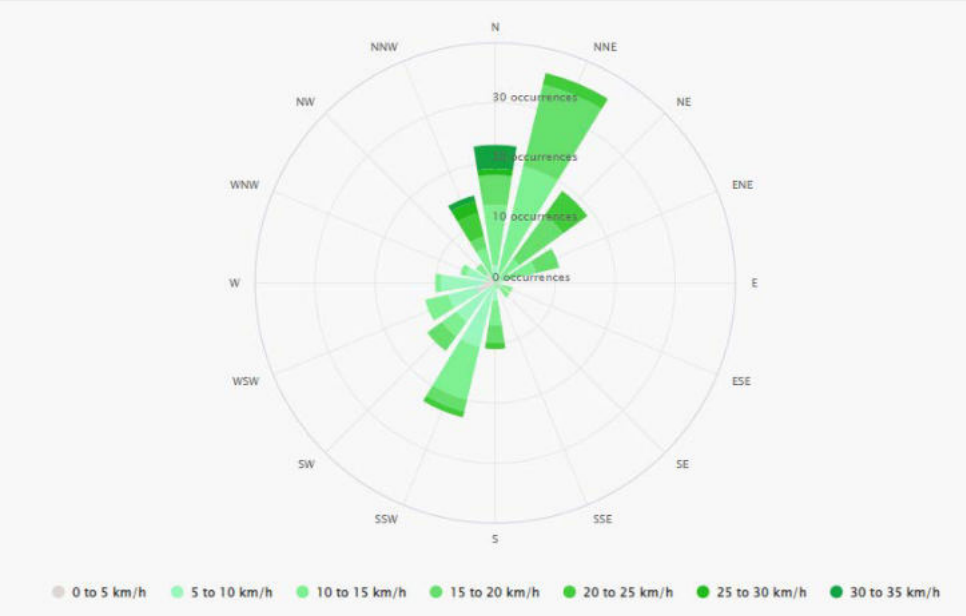

Figure 5.2 *– Windrose for Keetmanshoop* (source www.meteoblue.com)

5.2.2 TOPOGRAPHY AND HYDROLOGY

The area falls within the Main Karoo Basin. The Project Site is situated on a flat area that forms part of the Fish River Catchment area. Refer to Appendix F - Agricultural Impact Assessment Report Section 4.1 and Figure 4, 5 and 6 for drainage, contours and slope presentation of the Project Area. Elevated salt levels in the soil and groundwater are suspected for the Project Site.

5.2.3 SOIL

The dominant soil type according to Mendelson et. al. 2022 is *Eutric Leptosols*. Leptosols are either very shallow soils over continuous rock or soils that are extremely stony, with less than 20 % fine earth (soil particles < 2 mm in diameter) (*Coetzee, 2021*). Heavy rainfall events cause sheet flooding that removes topsoil, even on gentle slopes, which exposes the underlying unweathered parent material. The stoniness and shallowness of Leptosols decrease their water holding capacity and mean that they have poor agronomic properties. However, shallow-rooted grasses and forbs effectively utilise these soils, Refer to Appendix F - Agricultural Impact Assessment Report Section 4.5 for a description of the soil of the Project Area.

5.2.4 ARCHAEOLOGY

The proposed project site is situated on the Karoo Basin to the west of the Weissrand plateau, which was formed by recent calcareous deposits on top of the Karoo Super group sediments. It is located on relatively featureless sloping plains characterized by shales and other sediments forming the lower parts of the Dwyka and Ecca formations, while dolerite outcrops occur within the surrounding area.

Sites of archaeological interest were identified by palaeontologists approximately 14 km north-east of Keetmanshoop along the C17. These include fossil remains of Mesosaurus, the well-known Giant's Playground as well as the Kokerboom forest.

In the precolonial era the general area was not suitable for permanent fixed settlement due to its aridity. Low density shifting settlement has ensured that the archaeological signature of human occupation is both meagre and subtle.

During the colonial era, a railway was established at the start of the 20th century. Regular communication between the coast at Lüderitz and interior centres such as Keetmanshoop sustained a series of small farming and mercantile enterprises. The remains of railway settlement and limestone-processing dominate the visible heritage-related character of the area today (*Nakale, 2022*). Refer to Appendix E for the Archaeological Impact Assessment Report.

5.3 BIO-PHYSICAL ENVIRONMENT

The bio-physical environment was studied through a comprehensive literature review (i.e. desktop study) by the Ecologist, as presented in the Ecology Report (Appendix D). The ecological study was undertaken to determine the flora (e.g. trees/shrubs >1m in height, grasses and herbs, etc.) and vertebrate fauna (e.g. reptiles, amphibians, mammals and birds) that could potentially occur in the general Keetmanshoop (Kokerboom) area and to determine the possible impact the Project development might have on the biodiversity of the area.

The Project Site is located in the arid *Nama Karoo* of south-central Namibia and consist of a sparse layer of grass and low shrubs

South-central Namibia in general is regarded as "low" in overall (all species) terrestrial diversity and "low to average" in terrestrial endemism. (*Mendelsohn et. al., 2002*).

Refer to Appendix F - Agricultural Impact Assessment Report Section 3 Photo 1 to 7 for a visual overview of the Project environment.

5.3.1 FLORA

The vegetation of the area can be described as *Sparse shrubland* (*Giess 1971*) or *Karas Dwarf Shrubland*. The average plant production is "low to very low" with "medium to high"

variation in green vegetation biomass depending on the location. The overall plant diversity (all species - "higher" plants) in the general area is "low" with an estimated 100-149 species. Plant endemism is very low with 2-5 species expected from the general area. (*Cunningham, 2022*)

Photo 5.3 *– View of the vegetation on the Remainder of Portion 2 of Farm Klein Spitskop No. 153*

Compared to other regions the Keetmanshoop area is not viewed as a "hot spot" floristically and has the lowest species/area ratio of all the regions with very few endemic species. Grazing and browsing is thus "average" in the general area.

5.3.1.1 Trees and Shrubs

At least 64 species of larger trees and shrubs are known and/or expected to occur in the general area of which 4 species are classified as endemic (6.3%), 9 species classified as near endemic (14.1%), 12 species are protected by the Forest Act No. 12 of 2001 (18.8%), 1 species are protected by the Nature Conservation Ordinance No. 4 of 1975 (1.6%) and 5 species are classified as CITES Appendix 2 species (7.8%). 25 species (including endemic and near endemic) have some form of conservation status (39.1%). These species are listed and discussed in the Ecology Report Appendix D Chapter 3.5 and Table 5 and 6.

On the Project Site itself, trees are limited due to the absence of drainage lines here. Approximately 10 km to the south-west of the Project Site, is the Quiver Tree Forest on dolorite koppies. It was declared a national monument of Namibia in 1995.

5.3.1.2 Grass

Up to 67 (22-47 species depending on reference used) grasses are expected in the general Keetmanshoop area of which no species is viewed as endemic/near endemic. *Eragrostis* (13 species) and *Stipagrostis* (8 species) species are the dominant grasses

expected to occur in the general area. The grasses known and/or expected to occur in the Project Site area are discussed and listed in the Ecology Report in Appendix D Chapter 3.6 and Table 7.

5.3.1.3 Other Species

Aloes

Aloes are protected throughout Namibia and 4 aloe species were identified that may potentially occur in the Project area. These are *Aloe claviflora*, *A. hereroensis*, *A. littoralis* and *A. variegata* (*Cunningham, 2021*). These may not be damaged or removed without relevant consent (Forest Act No. 12 of 2001, as amended).

Ferns

Ferns in the general area include at least 8 indigenous species (*Cheilanthes marlothii, Marselia aegyptiaca, M. coromandelina, M. farinose, M. macrocarpa, M. unicornis, M. vera and Ophioglossum polyphyllum* and 2 endemic species (*Isoetes giessii and Marsilea burchellii)*. (*Cunningham, 2021*)

Lichens

Lichen diversity is related to air humidity and generally decreases inland form the Namibian coast. There is a possibility that Lichens might occur on the Project Site, mostly on rocky outcrops. (*Cunningham, 2021*) Disturbance in these areas should be kept to a minimum.

Lithops

Lithops species – all protected (See Nature Conservation Ordinance No. 4 of 1975) – are also known to occur in the general area and often difficult to observe, especially during the dry season when their aboveground structures wither. At least one species of Lithops is expected to occur in the general area (*Lithops vallis-mariae*) and is viewed as important. (*Cunningham, 2021*)

Other

Other species with commercial potential that could occur in the general area include *Harpagophytum procumbens* (Devil's claw) harvested for medical purposes and often over-exploited and *Citrullus lanatus* (Tsamma melon) which potentially has a huge economic benefit.

5.3.2 FAUNA

The overall abundance of large herbivorous mammals (big game) is viewed as "low to average" with 1-4 species, while the overall density of large carnivorous mammals (large predators) is also "low" determined at 2 species (leopard and cheetah) at "low" densities.

The area is thus not viewed as a site of special ecological importance in Namibia (*Cunningham, 2022*).

5.3.2.1 Reptiles

At least 65 species of reptiles are expected to occur in the general Keetmanshoop/Kokerboom area with 24 species being endemic – i.e. 36.9% endemic. All the endemics are classified as "secure".

The 65 species expected to occur in the general area consist of at least 25 snakes (2 blind snakes, 2 thread snakes, 1 pythons, 2 burrowing snake & 18 typical snakes), 7 of which are endemic (28%) to Namibia, 4 worm lizards, 3 tortoises, 34 lizards (11 gecko, 9 skink, 7 old world lizard, 2 girdled, 2 agama, 1 monitor & 1 chameleon), 17 (50%) of which are endemic to Namibia.

Lizards (24 species with 17 species being endemic) and snakes (25 species with 7 species being endemic) are the most important groups of reptiles expected from the general Keetmanshoop/Kokerboom area. Geckos expected and/or known to occur in the general Keetmanshoop/Kokerboom area have the highest occurrence of endemics (81.8%) of all the reptiles in this area. (*Cunningham, 2021*). Refer to the Ecology Report in Appendix D Chapter 3.1 and Table 1 for Reptile species lists.

5.3.2.2 Amphibians

At least 4 species of amphibians can occur in suitable habitat in the general Keetmanshoop/Kokerboom area. The area is under represented, with 1 rubber, 1 platanna, 1 caco and 1 sand frog known and/or expected (i.e. potentially could be found in the area) to occur in the area. Of these, 1 species is endemic (*Phrynomantis annectens*) - i.e. 25% of amphibians of conservation value from the general area. Although *P. annectens* is viewed as the most important species occurring in the Keetmanshoop/Kokerboom area, it occurs widespread in Namibia and not exclusively associated with the Keetmanshoop area in particular. Refer to the Ecology Report in Appendix D Chapter 3.2 and Table 2 for Amphibian species lists.

5.3.2.3 Mammals

At least 60 species of mammals are known and/or expected to occur in the general Keetmanshoop/Kokerboom area of which 2 species (3.3%) are classified as endemic and 2 species as rare (*Cistugo seabrae*, *Felis nigripes*). The Namibian legislation classifies 1 species as specially protected game, 7 species as protected game, 7 species as vulnerable, 4 species as insufficiently known, 1 species as indeterminate, 3 species as huntable game, 4 species as problem animals, 1 species migrant and 6 species as peripheral. At least 36.7% (22 species) of the mammalian fauna that occur or are expected to occur in general Keetmanshoop area are represented by rodents of which 1 species (4.5%) are endemic. This is followed by carnivores 28.3% (17 species) of which 6 species (35.3%) are vulnerable

The most important species expected to occur in the general area are viewed as those classified by the IUCN (2021) as vulnerable (*Acinonyx jubatus*, *Panthera pardus*, *Felis nigripes*) and near threatened (*Eidolon helvum*) and the species classified as rare by the Namibian legislation (*Cistugo seabrae*, *Felis nigripes*). Please refer to the Ecology Report Appendix D Chapter 3.3 and Table 3 for species list and conservation status.

5.3.2.4 Avifauna

At least 146 species of terrestrial ("breeding residents") birds occur and/or could occur in the general Keetmanshoop area (*Cunningham, 2022*). Only 2 endemic species – Rüppell's Korhaan and Rosy-faced Lovebird – (14.3% of all Namibian endemic species or 1.4% of the species expected to occur in the area) is expected or is likely to occur in the general area.

The most important species expected to occur in the Keetmanshoop area are the two endemic species (Rüppel's korhaan and Rosy-faced Lovebird) and those species classified by the IUCN (2021) and/or Simmons et. al. 2015 as:

- critically endangered (White-backed Vulture),
- endangered (Ludwig's Bustard, Lappet-faced Vulture, Black Harrier, Martial Eagle, Secretary Bird, Booted Eagle, Black Stork)
- vulnerable (Tawny Eagle)
- near threatened (Kori Bustard, Verreaux's Eagle, Peregrine Falcon, Marabou Stork). (*Cunningham, 2022*).

5.3.2.4.1 Pylon sensitive species

Pylon sensitive bird species known/expected to occur in the general area include:

- African fish-eagle;
- Black stork;
- Booted eagle;
- Cape eagle owl;
- Kori bustard;
- Lappet-faced vulture;
- Ludwig's bustard;
- Marabou stork;
- Martial eagle;
- Peregrine falcon;
- Tawny eagle;

- Verreaux's eagle; and
- White-backed vulture.

5.3.2.4.2 Nest induced faulting caused by birds includes:

- Cape crow;
- Pied crow;
- Sociable weaver;
- Eagles – large; and
- Vultures.

Please refer to the Ecology Report Appendix D Chapter 3.4 and Table 4 for species list and conservation status. None of the unique birds are expected to be exclusively associated with the proposed development site north-east of Keetmanshoop. (*Cunningham, 2022*)

5.4 LAND USE AND INFRASTRUCTURE

The land use in the surrounding area is typical of a rural area in relatively close proximity to a small urban centre, with infrastructure concentrated towards and around Keetmanshoop. Land use activities in the rural area comprise livestock and game farming, tourism ventures and mining.

Land use of the project site is limited to low density grazing activities (mostly goats and sheep) combined with electricity infrastructure development surrounding it. No farming boreholes or other farming related structures are present on the site.

5.4.1 AGRICULTURE

Keetmanshoop is situated within a strong small stock farming industry in the //Karas Region. This industry has, however, decreased over the years, mainly because of the collapse of the Karakul industry and extended drought periods.

The dominant small stock farming activity is now mostly based on sheep and goat and recently extensive cattle farming has also been introduced. The region is also suitable for wildlife farming and hunting and is known for these activities.

The communal farming sector and the commercial resettlement sector are steadily growing in the region with a total of 66 commercial farms bought under the Resettlement Scheme in 2010.

Apart from the livestock farming sector, the irrigation sector at the Orange River and Naute Dam (55 km to the south-west of Keetmanshoop) also contributes significantly to

the economy of the region. The upcoming irrigation scheme at the Neckartal Dam promises to add further to the economic livelihood in the region. (*SPC, 2011*)

The construction and operation of a solar park on agricultural land could potentially have an impact on the agricultural potential and farming activities. The consent of the Ministry of Agriculture, Water and Forestry is required prior to the start of any construction activity. To this effect an Agricultural Impact Assessment was conducted in November/December 2021. Please see attached as Appendix F.

5.4.2 TOURISM

The //Karas region is known for its tourism attractions such as the Fish River Canyon, Ai-Ais Hot springs, Orange River and the Sperrgebiet. Keetmanshoop is geographically well located within the region and on the main route to and from South Africa.

Approximately 14 km north-east of Keetmanshoop and 7.5 km south-southwest of the Project Site is the Quiver Tree Forest Rest Camp, associated with the Quiver Tree Forest that was declared as a National Monument of Namibia in 1995.

Other tourist attractions near Keetmanshoop are the Mesosaurus fossils and Giant's Playground dolomitic features as well as various hospitality service providers.

5.4.3 PROTECTED AREAS

The nearest protected area is the Naute National Park, located approximately 65 km to the south-west. The proposed project area does not fall within any of the Important Birding Areas (IBA's) as determined for Namibia.

Communal conservancies in the general area include:

- !Khob !Naub north of Keetmanshoop in the Tses area, covering 2,747km²;

- !Han/Awab west of Keetmanshoop in the Bethanie area, covering 1,923km²; and

- !Gawachab south-west of Keetmanshoop in the Naute Dam area, covering 132km².

The major wildlife resources in these communal conservancies include springbok, kudu and oryx. No, freehold (commercial) conservancies occur in the immediate area (*Cunningham, 2022*).

5.4.4 URBAN

The town of Keetmanshoop is located approximately 20 km south-west of the project site and is the regional capital of the //Karas Region. The town has an approximate population of 19,447 and is the biggest town in the region in terms of population and townlands. The Keetmanshoop townlands comprise of approximately 52,416 hectares in extent of which the already developable area roughly calculates to 1,600 hectares. There is thus sufficient townland available for further development and can also cater for a

variety of activities, from industries to low key nature estates and tourism. This places Keetmanshoop in a good position to attract investors. *(SPC, 2015*)

Keetmanshoop is a fully autonomous Municipal Council administered through the Local Authorities Act of 1992 (Act 23 of 1992). It is the only municipal council in the //Karas Region. Keetmanshoop is thus also the administrative capital of the //Karas Region, as well as the commerce, educational and healthcare hub.

The only other settlements in proximity to the Project Site are limited scattered farm dwellings, with the nearest such structure located approximately 4.5 km south of the site.

5.4.5 INFRASTRUCTURE

Service infrastructure is concentrated around Keetmanshoop. The town is situated in an important geographical location as it is on the Trans-Orange Corridor that links the harbour of Lüderitz with the eastern provinces of South Africa, via road and railway.

5.4.5.1 Electricity

The electricity network of the //Karas Region is well distributed to provide in the electricity needs of the region.

The following power provision infrastructure is present around the Project Site:

• The Kokerboom substation;

• 400 kV Kokerboom to Auas overhead transmission line (OHTL);

• 400 kV Kokerboom to Aries OHTL;

• 220 kV Kokerboom to Hardap OHTL;

• 220 kV Kokerboom to Harib OHTL;

• 66 kV Kokerboom to Nabas OHTL; and

• 66 kV Kokerboom to Keetmanshoop OHTL. Bulk electricity is provided to town by NamPower from distribution lines from the Kokerboom station roughly 25km north-east of Keetmanshoop. The main distribution line is a 66kV OHTL to the western substation. From the substation electricity is taken via the municipal network to the town.

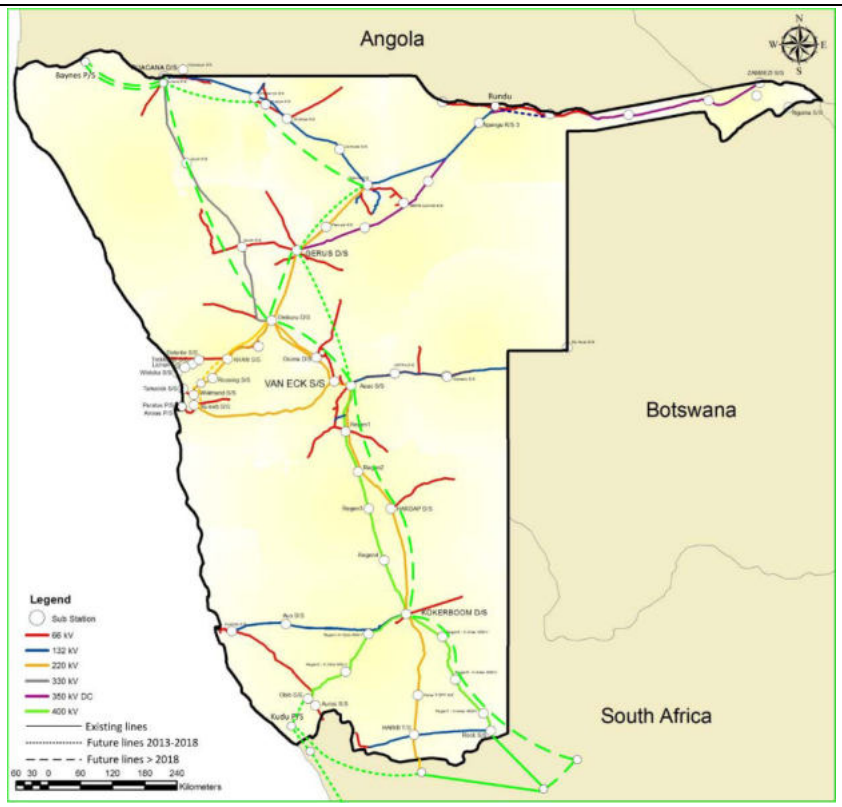

***Figure 5.3** – Electricity distribution map of Namibia (*source NamPower*)*

5.4.5.2 Roads

Keetmanshoop is well positioned within the Namibian transport corridors, namely the B1 main tarred road, the B4 main tarred road, the C16, C17 and M29 gravel roads and various farm roads. The town is located on the B1, the only main transport route from South Africa to Windhoek and the rest of the country. This means that all traffic to and from South Africa has to pass through the town.

It is also on the B4 cross-roads to Lüderitz (one of the two harbours in Namibia), Rosh Pinah and Oranjemund (two of the bigger mining towns in Namibia). This corridor further links up with the Trans-Cunene, Trans-Caprivi and Trans-Kalahari Corridors that then link up with other SADC corridors.

5.4.5.3 Airport

The Keetmanshoop Airport caters mainly for chartered flights and commercial flights do not fly there anymore. It is located approximately 25km south-west of the Project site. An application for permanent (operations building) and temporary (PV panels) structures must be submitted with the Namibian Civil Aviation Authority (NCAA).

5.4.5.4 Railway

A railway station is situated in Keetmanshoop and the railway line runs parallel to the B1 and B4 roads. The railway line links up with the north of Namibia, Lüderitz harbour and also links with South Africa through Karasburg, Upington to Johannesburg and Pretoria.

5.4.5.5 Reservoir

Keetmanshoop's bulk water is supplied by NamWater from the Naute Dam Scheme. Raw water is pumped to a water treatment plant and three terminal reservoirs in Keetmanshoop. The Naute Dam is situated about 45km south-west of Keetmanshoop and after reaching the NamWater reservoirs, water is then distributed to residents of Keetmanshoop via various municipal reticulation networks (*SPC, 2015*).

It is envisaged that the Project Site will receive its water from this scheme.

5.5 VISUAL AESTHETICS AND SENSE OF PLACE

The visual aesthetics and as a result the sense of place, correlates with the land uses and related infrastructure. In the Project area land use include extensive agriculture and tourism in large undeveloped open landscape.

The Project Site identified for Klein Spitskop Solar Energy is next to the existing Kokerboom Solar Plant and opposite the M29 from the Kokerboom Substation of NamPower. The Substation accommodates various overhead transmission lines (see Section 5.4.5.1) running east-west across the M29 as well as running north-south.

The visual aesthetics and sense of place in the abutting area is thus already altered to an extensive electricity transmission network. The envisaged solar farm will lie directly adjoining this area to the north-west. Refer to Photo 4.6 for a view of the infrastructure development around KSSE.

5.6 SOCIO-ECONOMIC ENVIRONMENT

5.6.1 REGIONAL DEMOGRAPHIC

The //Karas Region is the southernmost region of Namibia's 14 political regions. With a total land area of 161,086 km², the region is the largest, in terms of land, in the country (*NPC, 2007*). It is, however, sparsely populated and relatively underdeveloped when compared with Namibia's other regions.

With approximately 77,421 people residing in the region, it means a density of 0.5 persons per km². The population annual growth rate of 1.1% is lower than the national growth rate of 1.4%. The Project Site falls within the Keetmanshoop Urban Constituency and is the highest populated within the //Karas Region. Rural to urban migration

increased since 2001, mainly due to young adults in search of job opportunities. The town consequently had a population of 19,447 in 2011 showing an annual growth rate of 3.2%(*NSA, 2012*).

5.6.2 REGIONAL ECONOMIC ACTIVITIES

The //Karas Region is diverse in terms of economic activity with mining, agriculture, fisheries and tourism making up the largest economic sectors in the Region. The economy is largely primary sector oriented. This is mainly as a result of the arid nature of the region within the western and southern parts which makes human habitation and animal husbandry (inclusive of commercial farming) difficult to achieve (*NPC, 2007*)

The main source of income for households in the //Karas Region is from Wages and Salaries (72%), Pension (9%) and farming (5%). The main employment industry in the region is the Agriculture industry (32.4%) followed by the Mining Industry (8.9%). Wholesale and retail trade employed 6% of the workforce. The private sector provided the majority of jobs in the region (49.9%), with the government sector employing 15.8%, the parastatal sector 13.5% and commercial farming sector 8.3% (*NSA, 2012*).

The majority (32.4%) of the work force are employed in the Agricultural sector (which also includes Fishing near the coast and Forestry), followed by 'Mining and Quarrying' (8.9%). Wholesale and Retail Trade, as well as construction companies each employed about 6 % of the workforce. Unemployment within the Region (32.2%), being slightly lower than the National average (36.9%), increased with 11% since 2001. The largest source of income remains wages and salaries, representing 72% of the population within the Region (*2011 Census*). Spin-off benefits also come from trade and normal traffic to and from South Africa.

About 42 % of households in //Karas Region rely on electricity from the main grid as the main source of energy for cooking and 67.2 % for lighting. The Keetmanshoop Urban Constituency has a literacy rate of 97%. Of the population within the constituency 3% never attended school; 12 % are currently at school and 83% left school. (NSA, 2014)

6 PUBLIC CONSULTATION

Public consultation and participation are an important aspect of an EA process. During public consultation, potential impacts that the proposed project may have on the natural and/or socio-economic environments, were identified from the side of interested and affected parties. Consultation with Interested and Affected Parties (I&APs) and relevant Authorities enables transparent decision-making.

This chapter describes in detail the full extent of the public consultation process that was followed and the I&APs and authorities that were notified of the study being undertaken. It also includes the main issues and concerns raised during the public consultation process and comments received on the Background Information Document (BID) distributed during the first round of public consultation.

Public consultation for the purposes of this project was done as prescribed by Regulations 21 to 24 of the Environmental Impact Assessment Regulations (GN. 30 of 2012).

6.1 PUBLIC ENGAGEMENT

6.1.1 FIRST ROUND OF CONSULTATION

Engagement with the public and authorities as part of the first round of public consultation commenced on the 06th of April 2022 and concluded on the 30th of April 2022. During the first round of consultation, I&APs and authorities were given an opportunity to register and submit comments and/or concerns on the proposed project.

6.1.1.1 Activities of Public Engagement

Activities undertaken to date to ensure effective and adequate I&AP involvement, are as follows:

- A list of predetermined I&APs and authorities was compiled. A total of 48 I&APs were included on the database (Appendix G1).
- A notification email (Appendix G2) with Background Information Document (BID) (Appendix G3) was send to all pre-identified I&APs and authorities (Appendix G1) on 06 April 2022.
- Notification letters (Appendix G4) with BID (Appendix G3) was hand delivered on 05 April 2022 (Appendix G5) to line ministries (Appendix G1) and State Owned Enterprises situated in Windhoek.
- Notification letters with BID (Appendix G3) was sent via courier (Appendix G6) to the Regional and Local Authorities (Appendix G7) on 01st April 2022.

- Notification letters (Appendix G8) with BID (Appendix G3) was sent via registered post (Appendix G9) to the neighbouring farm/property owners on the 01st of April 2022.
- Public notices announcing the commencement of the EA and an invitation to register as an I&AP were placed in the 'New Era' and 'Namibian' newspapers on 05 April 2022 and 12 April 2022 (Appendix G10).
- A notice board (with the dimensions 60cm x 42cm) was placed at the //Karas Regional Council (Appendix G11) and at the Keetmanshoop Rural Constituency office notice board (Appendix G11). An On-site notice was placed at the Farm Spitskop No. 153 gate entrance area (Appendix G12).

6.1.1.2 Comments Received and Responses Provided

All comments and feedback received from I&APs and Authorities are summarised in Table 6-1 below, while a copy of the original correspondence is attached as Appendix G13 and Appendix G14. A total of 3 I&AP were registered (Appendix G15).

***Table 6-1**: Comments received during the first round of public consultation*

NO.	NAME	COMMENTS	NAME	RESPONSE
1.	Ministry of Urban and Rural Development – Control Administrative Officer Frieda Sindano (06/04/2022)	Dear Mr. van Zyl We acknowledge, with thanks, receipt of your letter dated 05 April 2022 on the above-captioned subject matter. Your letter has been forwarded to the office of the Director: Habitat and Housing Development for his required attention and action. Mr. Kondunda can be reached at 061 297 5062 and email hsecretary@murd.gov.na. Thank you. Frieda Sindano Control Administrative Officer Tel: 061 – 227 880/297 5283 / Fax: 061 – 258131/ Email: fsindano@murd.gov.na / www.murd.gov.na	Urban Green cc	
2.	NamWater (06/04/2022)	Dear Julia, Thank you for the BID. NamWater has no comments on the project at the moment. Please register NamWater as an I&AP with the following contact details: NP du Plessis Plessisn@namwater.com.na	Urban Green cc	

NO.	NAME	COMMENTS	NAME	RESPONSE
		081 127 9040 Jolanda Kamburona KamburonaJ@namwater.com.na 081 144 1528 And please forward all relevant documents to us. Regards, Jolanda		
3.	Namibian Civil Aviation Authority (NCAA) Safety: Aerodromes and Ground Aids: Aerodrome Safety Inspector Rauna Mungonena (06/04/2022)	Dear Brand 1. I trust this email finds you well. 2. Reference is made to your application for an environmental clearance certificate for the proposed Klein Spitskop solar energy park and 66kV power transmission line, Keetmanshoop District, //Karas Region. 3. NCAA acknowledges receipt of your correspondence. 4. Kindly consider the below regulatory provisions as referenced in the Namibia Civil Aviation Regulations (NAMCARs) and Namibia Civil Aviation Technical Standards – Aerodromes and Heliports (NAMCATS -AH) Part 139 during your environmental assessment. 1. Obstacle Limitation Surfaces	Urban Green cc (08/04/2022)	Dear R. Mungonena, Your email communication below refers. We confirm receipt of your communication and take note of the requirements. Regards Brand van Zyl

NO.	NAME	COMMENTS	NAME	RESPONSE
		Subparts 11 of the NAMCARs and NAMCATS of 2018, stipulate the requirements for Obstacle Restriction and Removal. Kindly note that these requirements are applicable to erection of objects both within 15km radius and outside the vicinity of the nearest aerodrome. Erection of obstacles (1) 139.11.2 A person may not cause or permit the erection or growth of an obstacle at, or in the vicinity of, an aerodrome, where the obstacle may prevent an aircraft operation from being conducted safely or the aerodrome from being usable. (2) The erection of buildings or other objects in the navigable airspace or in the vicinity of an aerodrome or navigation aid must be in accordance with standards prescribed in Document NAM-CATS-AH. (3) A person may not cause or permit any object, including new or extension of existing objects to penetrate the obstacle limitation surface, established in accordance with regulation 139.11.3, without the written permission of the Executive Director. 139.11.2 Erection of obstacles (1) The erection or growth of an obstacle at or in the vicinity of an aerodrome, must not be permitted where the obstacle may prevent an aircraft operation from being conducted safely or the aerodrome from being usable. (2) Buildings or other objects which will constitute an obstruction or potential hazard to aircraft moving in the navigable air space in the vicinity of an aerodrome, or		

NO.	NAME	COMMENTS	NAME	RESPONSE
		navigation aid, or which will adversely affect the performance of the radio navigation or instrument landing systems, may not be erected or allowed to come into existence without the prior written approval of the Executive Director and if erected in the absence of approval are liable to forced removal without right of compensation. (3) No building or object higher than 45 metres above the aerodrome elevation, or in the case of a water aerodrome, the normal level of the water, maybe erected within a distance of 15 kilometres measured from the aerodrome reference point without the written approval of the Executive Director. (4) A person must not cause or permit any object, to penetrate the obstacle limitation surface, without the written permission of the Executive Director, where the object may cause an increase in an obstacle clearance altitude or the height for an instrument approach procedure or of any associated visual circling procedure. (5) The object referred to in sub-regulation (4) includes a new object or an extension of an existing object above the obstacle limitation surface. (6) In the event of a conflict of interest between land-use authorities and air space users, air safety must be regarded as predominant and not to be compromised by land development projects or other obstacles. Actions required by Interested party: 1. Hence, an entity with the interests of erecting structures with the features mentioned in the requirements of the regulatory and technical standard, must seek approval from the Executive Director, prior to the erection of the structures.		

NO.	NAME	COMMENTS	NAME	RESPONSE
		2. The interested party must complete for evaluation the following application forms; FSS-AGA-FORM-032 (permanent structures) and/or FSS-AGA-FORM-033 (temporary structures), as may be required, prior to the erection of the structure(s). 3. Thereafter, the application(s) is evaluated, and a response is provided to the applicant by the Namibia Civil Aviation Authority. 2. Glint & Glare Part 139.01.13 of NAMCARs and NAMCATS-AH of 2018, stipulate the requirements for lights which endanger safety of aircraft. Furthermore, NCAA has not yet published technical guidance material for glint and glare assessments, however, industry best practice should be followed. Kindly note that these requirements are applicable to erection of objects within the vicinity of 15km radius of the nearest aerodrome. 139.01.13 Lights which endanger safety of aircraft (1) The operator of an aerodrome must extinguish, screen or otherwise modify so as to eliminate the source of danger or cause to be extinguished, screened or otherwise modified any non-aeronautical ground light near an aerodrome which might endanger the safety of aircraft. (2) Whenever any light or pattern of lights is exhibited – (a) in the vicinity of an aeronautical light or system of aeronautical lights which by reason of the possibility of it being mistaken for such aeronautical light or lights, is		

NO.	NAME	COMMENTS	NAME	RESPONSE
		likely to endanger the safety of aircraft; or (b) which, being in the vicinity of a certified or licensed aerodromes, is liable by its glare to endanger the safety of aircraft arriving at or departing from such aerodrome, the Executive Director may serve a notice on the owner of the place where the light is exhibited or on the person having charge of the light or on the person owning or having charge of the pattern of lights or any portion of such pattern, directing such owner or person within the period specified in such notice to extinguish or screen effectively the light or lights under his, her or its control and in the future to prevent the exhibition of any light or particular type of light either at all or when ineffectively screened. 139.12.7 Lights (1) An aerodrome operator must ensure that any lights or emissions that may endanger the safety of aircraft or cause confusion to aircraft operating at an aerodrome are extinguished, screened or otherwise modified so as to eliminate the source of the danger or confusion. 1.1.1 A non-aeronautical ground light near an aerodrome which might endanger the safety of aircraft must be extinguished, screened or otherwise modified so as to eliminate the source of danger. Compliance Note. See also NAMCARs Part 139.01.13. Actions required by Interested party: 1. Therefore, a glint and glare assessment will be required prior to the construction of a Solar PV Plant. This assessment is to be conduct by the entity interested in constructing the plant in conjunction with all the relevant stakeholders (e.g aerodrome operator, pilots, etc.).		

NO.	NAME	COMMENTS	NAME	RESPONSE
		2. Thereafter, the assessment should be submitted to the NCAA for review. I hope you find the above in order and kindly feel free to contact us for any further clarification or information. Kind regards, Rauna Mungonena Safety: Aerodromes and Ground Aids: Aerodrome Safety Inspector | Namibian Civil Aviation Authority (NCAA) (Tel) +264 83 2352367 | Web: http://www.ncaa.com.na Namibia Civil Aviation Authority Building, Number 4 Rudolf Hertzog Street, Windhoek Namibia Private Bag 12003 Windhoek, Namibia		
	Namibian Civil Aviation Authority (NCAA) Safety: Aerodromes and Ground Aids: Aerodrome Safety Inspector Rauna Mungonena (19/04/2022)	Dear Brand, Kindly see the response below: 1. Refer to the attachments of application forms for permanent and temporary structures as requested. 2. The glint and glare content stated the below and the highlighted indicates the applicability. Provided the erection of the PV solar farm is outside the 15km aerodrome radius, a glint and glare assessment will not be required. “Glint & Glare” Part 139.01.13 of NAMCARs and NAMCATS-AH of 2018, stipulate the requirements for lights which endanger safety of aircraft. Furthermore, NCAA has not yet published technical guidance material for glint and	Urban Green cc (19/04/2022)	Dear Rauna, Your email communication below refers. Given your email below, the following please. 1. Given the distance of almost 25km between the Keetmanshoop aerodrome and the Klein Spitskop site, no assessment is required, but an application for screening by NCAA is however necessary? For this we will complete the application forms for

NO.	NAME	COMMENTS	NAME	RESPONSE
		glare assessments, however, industry best practice should be followed. Kindly note that these requirements are applicable to erection of objects within the vicinity of 15km radius of the nearest aerodrome. I hope you find the above in order. Kind regards, Rauna Mungonena | Safety: Aerodromes and Ground Aids: Aerodrome Safety Inspector | Namibia Civil Aviation Authority (NCAA) (Tel) +264 83 2352367 | Web: http://www.ncaa.com.na Namibia Civil Aviation Authority Building, Number 4 Rudolf Hertzog Street, Windhoek, Namibia Private Bag 12003 Windhoek Namibia		permanent structures and for temporary structures. Can you please forward me the application forms for permanent structures (Operations Building) and for temporary structures (UV panels)? See below Google map indicating the distance and locality. 2. You indicate in the email below that a glint and glare assessment should be undertaken, yet the Klein Spitskop site is located outside of the required 15km? The distance between the Keetmanshoop aerodrome and Klein Spitskop site is almost 25km. In addition to the distance of almost 25km, the approach and departure angles of the Keetmanshoop aerodrome are such that the Klein Spitskop site is not located within the approach and/or departure angle of the Keetmanshoop aerodrome. Can you please clarify on the basis of what a glint and glare assessment is required? See below Google map indicating the distance and locality. Thank you for your assistance in this regard, it is appreciated.

NO.	NAME	COMMENTS	NAME	RESPONSE
				Regards Brand van Zyl
	Ministry of Agriculture, Water and Land Reform Johanna Aipanda-Nambala (11/04/2022)	Dear Van Zyl The above subject heading bears reference, and we acknowledged receipt of your letter dated 05 April 2022 with thanks. Kindly note that this letter has been forwarded to Ms Mildred Kambinda, therefore contact her for all queries at 0812447891 or 061 208 7691. Thanks and Kind regards, Johanna Aipanda - Nambala	Urban Green cc (11/04/2022)	Dear Johanna, Your email below refers. Thank you and noted. Regards Brand van Zyl
	Roads Authority Elina Lumbu (21/04/2022)	Good morning The Roads Authority wishes to submit their comments, but no information is provided regarding the locality plan map, indicating how far the structure will be from the national road. Should we have information, if will be interesting to know how the site will be accessed from the nearby road. We will await your information. Best Regards Elina Lumbu	Urban Green cc	

NO.	NAME	COMMENTS	NAME	RESPONSE
	Quivertree Forest Rest Camp Coenraad Barend Nolte (26/04/2022)	Dear Julia Reply on negative impact During construction the trucks and extra vehicles traveling on the road will make so much dust and it will affect the quiver trees in the Quiver tree forest extremely negative as well as our camping site that are situated next to the road and our accommodation. We had this experience with the building of the previous plants. We insist on a full environment study. More than 50 trees died because of the dust created when the previous solar plants that were build. Due to the negative impact on the Quiver trees, a protected plant in Namibia and a National Monument, as well as the Rest Camp, we request that you use another road and NOT the M29 during construction and afterwards maintenance. We recommend you to build a road form the B1 if you decide to build the plant on the farm Klein Spitzkop. Another alternative to tar the M29 to the solar plant. Another big negative is the light pollution of such a big village, 60 people to live there and 400 during construction. We do a lot of star photographing in the forest and the lights will have a big negative impact on this night/star photographing, thus the tourism industry. We have a lot of foreign tourist that specially come to Namibia for this opportunity to be able to photograph the	Urban Green cc (11/05/2022)	Dear Mr Nolte, Your email below refers. You have been registered as an I&AP and will be kept informed. Thank you for your feedback, your comments will be included into the report to be submitted with the environmental commissioner. We are in the process of finalising the Scoping Report and the draft will be made available for further input. Should there be any questions, please let us know? Kind regards Julia L. Bashir

NO.	NAME	COMMENTS	NAME	RESPONSE
		Quiver trees during the night. Please register us as and Affected Party of Interested. We can offer you an alternative piece of land closer to town where you do not have to pass the Quivertree Forest. You are welcome to meet me and inspect possibilities on the farm Gariganus 157. Please let me know Yours sincerely Coenraad Barend Nolte Quivertree Forest Rest Camp		

6.1.2 SECOND ROUND OF CONSULTATION

Engagement with the public and authorities as part of the second round of public consultation commenced on the 14th of November 2022 and concluded on the 28th of November 2022. During the second round of consultation, I&APs and authorities were given an opportunity to submit comments for consideration and inclusion.

6.1.2.1 Activities of Public Engagement

Activities undertaken to date to ensure effective and adequate I&AP involvement, are as follows:

- A notification email (Appendix G16) with Draft Scoping Report was send to all I&APs and authorities on 14 November 2022.

6.1.2.2 Comments Received and Responses Provided

No further comments were received during the second round of consultation and the Scoping Report was thus finalised.

7 ASSESSMENT OF ENVIRONMENTAL ISSUES, POTENTIAL IMPACTS AND MITIGATIONS

This chapter provides a description and assessment of the key issues of concern and potential impacts associated with the construction of the solar farm. Mitigation measures relevant to the planning, design, construction, operational and decommissioning phases of the development as appropriate are recommended. These measures are aimed at avoiding, minimising, or rehabilitating negative impacts or enhancing potential benefits. The significance of potential impacts without and with mitigation is also provided.

The Environmental Assessment Process consisted of two phases, the first being the screening phase and the second the scoping phase, as explained below.

7.1 SCREENING PHASE METHODOLOGY

Each of the potential impacts identified during public consultation and the scoping assessment was screened according to a set of questions (Figure 7.1), which resulted in highlighting the key impacts requiring further assessment.

This list of impacts that were subjected to a scoping assessment is presented in Table 7.2, 7.3, and 7.4, below, as per the evaluation criteria presented in Table 7.1.

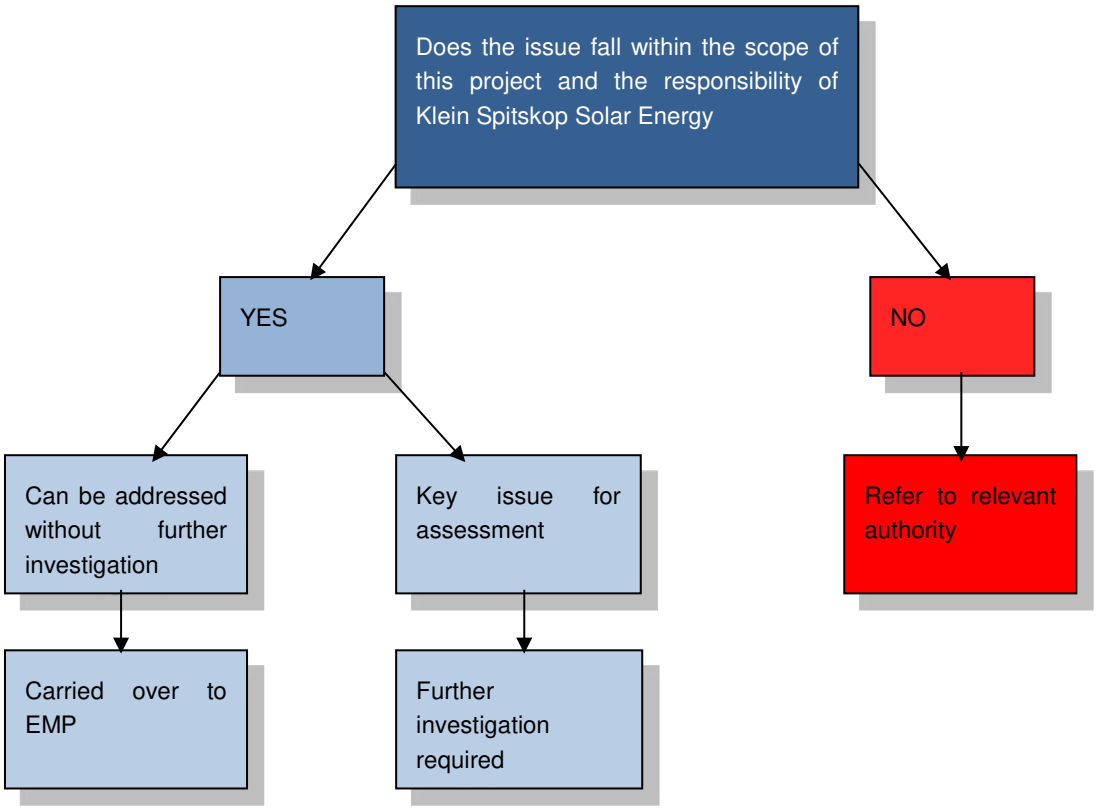

Figure 7.1: *Screening process for determining key impacts*

7.1.1 POSITIVE IMPACTS

The following positive impacts were identified during the screening process and should be mentioned for consideration during the Environmental Assessment:

7.1.1.1 Positive Impact on National Energy Supply Strategy

Please refer to Section 4.1.1 where the National Energy Supply Strategy of Namibia is examined. This project is in line with the strategy to diversify and decentralise electricity supply of low energy levels required across long distances. The use of renewable energy resources such as solar and wind is encouraged. The project will also contribute to the security of electricity supply of Namibia.

7.1.1.2 The project will provide a means for Climate Change Adaptation

//Karas Region is listed amongst Namibia's most vulnerable regions to Climate Change. Climate Change Adaptation is recommended for arid areas that are predicted to become more prone to draught and flood conditions. Acknowledging that change towards a more resilient lifestyle is required will help vulnerable regions to better cope with changing environmental conditions. A Solar Park will enhance economic development in an environment that is changing to become less suitable for livestock, especially cattle farming. (*MET, 2018*)

7.1.1.3 Reduction in Green House Gas Emissions

KSSE will reduce the annual GHG's emitted in the production of utility supplied power in the region by 331 973 t CO^2 compared to conventional energy generation. The project will contribute positively to the increased use of green energy, whilst decreasing the GHG emissions in Namibia.

7.1.1.4 New Solar Technology

Please refer to Appendix H - J for the technical details of the equipment that will be installed in KSSE. The aim is to make maximum use of the abundant sunlight available, whilst reducing the use of limited water available in Namibia.

7.1.1.5 Socio-economic Benefits

The proposed Project holds various direct and indirect socio-economic benefits for both the local people of Keetmanshoop area and the //Karas Region. (see section 4.5.1)

During construction large numbers of unskilled labour, as well as skilled labour although to a lesser extent, will be required. This will contribute to income generation and better livelihoods and also contribute to skills transfer and training. The real impact thereof depends on the size of the workforce required and duration of the construction phase. It is important that local people be employed and that the necessary opportunities exist for unskilled labour to undergo on the job training and skills enhancement.

7.1.2 IMPACTS NOT REQUIRING FURTHER ASSESSMENT

The following impacts were identified as to not have any negative impact (i.e. positive impacts) or minor impacts not of any significance not requiring further assessment.

7.1.2.1 National and International Strategies and Policies

This project is in line with the mentioned strategies and policies (see section 4.1) to give energy access and promotion of economic development by increasing the availability of clean energy via the SAPP to southern Africa.

7.1.2.2 Loss of Agricultural Land

The Agricultural Impact Assessment concluded that the portion of land (i.e. of the Farm Klein Spitskop No. 153) is insignificant with respect to the total size of the farm, and that impact on farming activities is negligible (see Appendix F and Section 5.4.1).

7.1.2.3 Loss of Protected Areas

None of the region's protected areas are affected by the activities or location of the proposed Project. (see section 5.4.3)

7.1.2.4 Impact of glare from Solar PV Panels on aeroplane pilots

It was confirmed by the Namibia Civil Aviation Authority that an assessment of solar glare from the solar farm onto landing planes are not required, since the KSSE is approximately 25 km from the aerodrome of Keetmanshoop.

7.1.2.5 Impact of lights from Construction Camp Site on nearby night star gazing activities

No accommodation for construction personnel or labourers will be set up on the Project Site during the Construction Phase. Lightning at night will be site specific, focusing to the ground for security purpose only.

7.2 SCOPING ASSESSMENT METHODOLOGY

The key impacts, identified after carrying out screening (see Section 7.1 above), were evaluated in terms of extent (spatial scale), duration (time scale), intensity (magnitude) and probability. The means of arriving at the different significance ratings is explained in Table 7.1 below.

These criteria are used to ascertain the *significance* of the impact, firstly in the case of no mitigation and then with the most effective mitigation measure(s) in place. The significance of an impact is derived by considering the temporal and spatial scales and magnitude. Such significance is also informed by the context of the impact, i.e., the character and identity of the receptor of the impact.

Table 7.1: *Criteria for impact evaluation*

CRITERIA	CATEGORY
Impact	This is a description of the expected impact
Nature	**Positive** – environment overall will benefit from the impact **Negative** – environment overall will be adversely affected by the impact **Neutral** – environment overall will not be affected
Extent	**Site Specific:** Expanding only as far as the activity itself *(onsite)* **Local:** Restricted to immediate environment within 5 km of the site **Regional:** Within the //Karas region **National:** Within Namibia
Duration	Reviews the lifetime of the impact, as being - **Very short** – days, <3 days **Short** - days, <1 month) **Medium** - months, <1 year **Long** - years, 1 -10 years **Permanent** - >10 years
Intensity	Establishes whether the magnitude of the impact is destructive or innocuous and whether it exceeds set standards, and is described as – **None** (No environmental functions and processes are affected); **Low** (Environmental functions and processes are negligibly affected); **Medium** (Environment continues to function but in a noticeably modified manner); **High** (Environmental functions and processes are altered such that they temporarily or permanently cease and/or exceed legal standards/requirements).
Probability	Considers the likelihood of the impact occurring and is described as – **Improbable** (low likelihood), **Probable** (distinct possibility), **Highly probable** (most likely) or **Definite** (impact will occur regardless of prevention measures).
Significance (no mitigation)	**None** (A concern or potential impact that, upon evaluation, is found to have no significant impact at all) **Low** (Any magnitude, impacts will be localised and temporary. Accordingly, the impact is not expected to require amendment to the project design) **Moderate** (Impacts of moderate magnitude locally to regionally in the short term. Accordingly, the impact is expected to require modification of the project design or

CRITERIA	CATEGORY
	alternative mitigation) **High** (Impacts of high magnitude locally and in the long term and/or regionally and beyond. Accordingly, the impact could have a "no go" implication for the project unless mitigation or re-design is practically achievable)
Mitigation	Description of possible mitigation measures
Significance (with mitigation)	**None** (A concern or potential impact that, upon evaluation, is found to have no significant impact at all) **Low** (Any magnitude, impacts will be localised and temporary. Accordingly, the impact is not expected to require amendment to the project design) **Moderate** (Impacts of moderate magnitude locally to regionally in the short term. Accordingly, the impact is expected to require modification of the project design or alternative mitigation) **High** (Impacts of high magnitude locally and in the long term and/or regionally and beyond. Accordingly, the impact could have a "no go" implication for the project unless mitigation or re-design is practically achievable)
Confidence level	The degree of confidence in the predictions, based on the availability of information and specialist knowledge. **Low** (based on the availability of specialist knowledge and other information) **Medium** (based on the availability of specialist knowledge and other information) **High** (based on the availability of specialist knowledge and other information)

The decision as to which combination of alternatives and mitigation measures to apply lies with the proponent, and their acceptance and approval ultimately with the relevant Competent Authority.

7.3 MITIGATION APPLICATION METHODOLOGY

There is a hierarchy of actions which can be undertaken to respond to any development or activity. These cover avoidance, minimisation and compensation. It is possible and considered sought after to enhance the environment by ensuring that positive gains are included in the development. If negative impacts occur then the hierarchy, as a guiding philosophy, recommends the following steps.

Impact avoidance: This step is most effective when applied at an early stage of project planning. It can be achieved by:

1. not undertaking certain actions or elements that could result in adverse impacts;
2. avoiding areas that are environmentally sensitive; and
3. putting in place preventative measures to stop adverse impacts from occurring.

Impact minimisation: This step is usually taken during impact identification and prediction to limit or reduce the degree, extent, magnitude, or duration of adverse impacts. It can be achieved by:

4. scaling down or relocating the proposal;
5. redesigning elements of the project; and
6. implementing mitigation measures to manage the impacts.

Impact compensation: This step is usually applied to remedy unavoidable residual adverse impacts. It can be achieved by:

7. rehabilitation of the affected site or environment, for example, by habitat enhancement;
8. restoration of the affected site or environment to its previous state or better; and
9. replacement of the same resource values at another location (off-set), for example, by wetland engineering to provide an equivalent area to that lost to drainage or infill.

7.4 POTENTIAL IMPACTS IDENTIFIED AND ASSESSED

The information presented in this section has mainly been drawn from the information received from the Proponent regarding the proposed Project, specialist studies and public engagement that was undertaken as part of this phase of the EIA process.

For this assessment's purpose the issues and impacts identified are grouped according to the main development phases – i.e. construction phase, operational phase and decommissioning phase.

7.4.1 POSSIBLE IMPACTS DURING CONSTRUCTION PHASE

Table 7.2 presents the potential impacts that might occur during the construction phase of the Project, while Table 7.2.1 to Table 7.2.12 presents each potential impact and outcome in detail. All impacts can be viewed as negative, unless otherwise mentioned. Positive impacts have been listed in Section 7.1 above, during the screening exercise.

Table 7.2 *Potential impacts to consider during Construction phase:*

IMPACT	CAUSE	
Loss of Biodiversity and Habitat Destruction - Flora	Vegetation Clearing	Tracks and roads on site
		Construction of 3 Buildings
		Drilling of steel posts for solar module mounting

		Trenching to lay cables
		Erection of field transformers and substation
		Erection of power line
		Illegal removal of protected plants
	Dust on sensitive vegetation	Traffic on M29
Loss of Biodiversity and Habitat Destruction - Fauna	Interference with small animal movement & electrocution	Security fence
	Forced relocation	Increased human activity
	Noise and vibration	
	Poaching	
IMPACT	**CAUSE**	
Loss of Biodiversity and Habitat Destruction - Avifauna	Collision and electrocution	Overhead Transmission Line
	Heat and glare	PV Modules
Archaeological and Heritage Resources	Removal and/or disturbance	Tracks and roads on site
		Construction of 3 Buildings
		Drilling of steel posts for solar module mounting
		Trenching to lay cables
		Erection of field transformers and substation
		Erection of power line
Ground and Surface Water Pollution	Construction wastewater (concrete batching)	
	Temporary sewage	
	Construction waste disposal (solid wastes)	

	Hazardous material & liquid disposal	
Waste Management	General waste	
	Building rubble	
	Hazardous waste	
Natural Resource Usage (water)	Consumption for concrete works and dust suppression	
Socio-economic	Health, Safety & Security	Dust and Emissions
		Noise and vibration
		Traffic & pedestrian safety
		General

7.4.1.1 Loss of Biodiversity and Habitat Destruction

As all developments have potential negative environmental consequences, identifying the most important faunal species including high risk habitats beforehand, coupled with environmentally acceptable mitigating factors, lessens the overall impact of such development.

(a) Vegetation Clearing

Removal of some of the natural vegetation cover are inevitable to make way for the roads, buildings, steel poles, cables, field transformers, substation and powerline. The **permanent shadow under the PV solar panels** might also have an influence on the vegetation beneath. The negative impacts on flora would depend on the scale and intensity of the proposed development and sensitivity of the environment.

The general area is not viewed as a site of special ecological importance in Namibia and has the lowest species/area ratio of all the regions with very few endemic species. Refer to Section 3.5, 3.6 and 3.7 of the Ecological Baseline Assessment Report in Appendix D.

In relation to the whole farm Klein Spitskop No. 153, of 10 454 ha, vegetation clearing would affect a relatively small area (less than 200ha) over a short/limited period of time. Farm Klein Spitskop No. 153 has previously been impacted by current/past small stock farming activities, fencing, development of the NamPower Kokerboom Substation and transmission lines as well as the development of another two solar parks and the Project Area is not in a pristine condition anymore.

Endemic and protected trees of significance do occur in the area, but are associated with drainage lines and outcrops and not present on the Project Site itself (see Appendix F Section 3 and 4).

Shrub species of significance might occur on the Project Site and site lay-out should be done within a carefully planned and responsible manner to avoid unnecessary removal of ground cover or shrub species. For protected species, as per the Forest Act (No. 12 of 2001, as amended) lay-out, site demarcation and search and rescue of flora species must be undertaken in consultation with a Botanist/Ecologist.

Mitigation measures are suggested in Table 7.2.1.

Table 7.2.1: *Impact assessment pertaining to loss of biodiversity and habitat destruction (flora)*

CRITERIA	DESCRIPTION
Risk Event	**Loss of Biodiversity and Habitat Destruction - Vegetation Clearing**
Nature of Impact	Negative
Extent	Local
Duration	Long
Intensity	Low
Probability	Highly probable
Significance (no mitigation)	Low
Mitigation	Draft a Search and Rescue Management Plan inclusive of a monitoring section; Avoid removing protected species not directly affected by the proposed development area; If any *Aloe* and *Lithop* species should be removed, they must be relocated elsewhere to similar habitat in the area; Obtain permit from Ministry as per Forest Act if protected plant species must be removed. Nobody may enter possible sensitive habitat areas (rocky areas, ephemeral drainage lines) outside of the project area as indicated in Figure 1 of the Ecological Baseline Assessment Report Appendix D; Do not clear the entire area, but rather only the areas directly required for the PV Project (i.e. leaving strips of indigenous vegetation would prevent soil erosion and dust pollution issues. The vegetation structure is generally <1m in height and would not obstruct the solar panels, etc.); Maintain connectivity of habitats, especially linking the sensitive areas (i.e. rocky areas and ephemeral drainage lines); Implement erosion control measures where applicable – e.g. cross drains on slopes, do not make tracks along drainage lines and cross

CRITERIA	DESCRIPTION
	these at a right angle, etc.; Avoid introducing ornamental plants, especially potential invasive alien species, but rather use localised indigenous species, should landscaping be attempted, which would also require less maintenance (e.g. water); Remove all invasive alien species on site – e.g. *Prosopis* and *Cactus* spp., etc. – should these occur. This would not only indicate environmental commitment, but actively contribute to a better landscape; Avoid construction on slopes and soils prone to erosion; Inform contractors/workers regarding the above mentioned issues prior to construction activities and monitor for compliance thereof throughout; Ensure that all hydrocarbon spills are avoided and/or dealt with adequately and quickly; Use sheep to maintain vegetation cover low, rather than chemicals (even approved chemicals) and avoid HHP Highly Hazardous Pesticides at all costs – see www.fsc.org; Employ an environmental officer to ensure compliance, especially of the rehabilitation of all the affected areas; Rehabilitate all areas disturbed by the construction activities – i.e. construction camp sites, etc.; Ensure that adequate fire-fighting equipment is available (e.g. fire beaters; extinguishers, etc.); Make use of existing tracks/roads as much as possible on the project area; Do not drive randomly throughout the area (could cause damage to unique flora, accidental fires or erosion related problems, etc.); Implement and maintain off-road track discipline with maximum speed limits (e.g. 30km/h) as this would limit dust pollution; Where new tracks have to be made off the main routes, the routes should be selected causing minimal damage to the environment – e.g. use the same tracks; cross drainage lines at right angles; avoid placing tracks within drainage lines; avoid collateral damage (i.e. select routes that do not require the unnecessary removal of trees/shrubs, especially protected species). Draft a Post Construction Rehabilitation and Management Plan, which should include monitoring;

CRITERIA	DESCRIPTION
	Implement erosion control measures where applicable; Inform all contractors/workers regarding the above mentioned ecological issues prior to construction activities and monitor for compliance thereof throughout.
Significance (with mitigation)	Low – Very low
Confidence level	Medium
Legal Implications	Nature Conservation Ordinance No. 4 of 1975, as amended Forest Act No. 12 of 2001, as amended

(b) Impact of dust on vegetation (specifically Aloe dichotoma)

The **impact of dust on vegetation**, generated by construction vehicles on the M29, was investigated during the Scoping Study. The concern raised by an I&AP is especially regarding dust impact on the near-endemic and protected quiver tree (*Aloe dichotoma*) forest present on dolerite outcrops directly west of the M29, 14 km north-east of Keetmanshoop. This forest was declared a National Monument in 1995.

Photo 7.4 – *Quiver trees on the dolerite ridges of Quiver Tree Rest Camp* **(***source GoogleEarth***)**

It was argued that dust created from previous construction phases of the existing two solar farms might have caused the death of a substantial number of quiver trees in the Quiver Tree Forest.

The extent to which a nuisance will have an effect on a receptor is determined by the (i) the nature and scale of the nuisance, (ii) the distance in between the nuisance and the receptor, and (iii) the sensitivity of the receptor to the nuisance.

(i) Nature and scale

The dominant soil type in the Project area is *Eutric Leptosols*, which are either very shallow soils over continuous rock or soils that are extremely stony, with less than 20 % fine earth (soil particles < 2 mm in diameter) (*Coetzee, 2021*) and appears to be less susceptible to dust.

During the construction phase, dust generated from construction vehicles to and from the Project Site on the M29, will increase for a period of one and a half years. Looking at the construction by Emesco of other solar farms in Namibia, it is envisaged that approximately 300-400 truckloads will be required to transport equipment to the Project Site (*Pers. Comm. Louise du Preez, Emesco Logistics Manager*). In addition, 400 construction labourers will be transported to and from the Project Site on a daily basis, which would be approximately 6 bus loads per day there and back. It is thus concluded that the nature and scale of dust generation on the M29 will increase substantially from current traffic.

(ii) Distance between the nuisance and the receptor

The M29, on which the loaded trucks will travel, passes directly south-east, east and north-east within less than 1 km of the dolerite ridges on which the quiver trees occur.

Figure 7.2 – *Locality Map of the Quiver Tree Forest next to the M29*

Prevailing wind direction for the area is north-northeast (see Section 5.2.1.5), which means that dust from the M29 will mostly be blown in the direction of the Quiver Tree Forest. North, north-eastern and eastern slopes of the dolerite ridges will be in the direct way of windblown dust.

(iii) Sensitivity of the receptor to the nuisance

The accumulation of dust particles on plant leaves may affect photosynthesis, respiration and transpiration of some flora species. Leaves covered with dust receive less light for photosynthesis; which can interfere with gas exchange between the leaf and air. The reduction of leaf stomatal conductance can influence plant biomass formation (growth), yield, flowering and reproduction (*Farmer, 1993*).

It was, however found, that the effects of dust deposited on plant surfaces are more likely to be linked to their chemistry (i.e. dust from mine/factories of a chemical nature), rather than simply the mass of deposited particles (*Watkinson, 2021*). Dust is a natural phenomenon in arid areas and the formation of a natural cementitious layer on plant leaves caused by dust are reversed during rainfall incidences, whereby leaves are washed and recovered by rainwater.

The sudden mortality of a large number of quiver trees are not restricted to the Quiver Tree Forest and it has instigated a number of studies and published papers in Namibia and South-Africa in recent years.

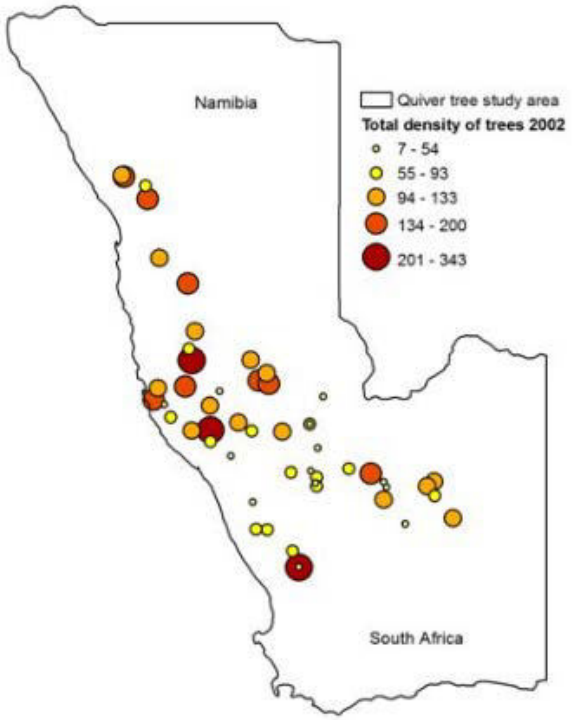

Figure 7.3 – *Distribution map for Aloe dichotoma (source Guo. et. al 2016)*

The main conclusion was that climate change and consequent rainfall patterns, gusts of wind and disease could all have contributed to this phenomenon (*Guo, et. al., 2016*). Quiver trees also only seem to have spurts of establishment related to above average rainfall events - thus often found in similar size populations - and would then also show similar mortality events. It is thus highly unlikely that death of plants can be caused by natural dust (*Pers. comm. Peter Cunningham, Namibian Ecologist, 2022*).

It is however clear that dust would cause a nuisance to the Quiver Tree Forest Rest Camp and the impact assessment for dust nuisance is done in Section 7.4.1.6.1 under Socio-economic impacts.

The impact assessment for dust on *Aloe dichotoma* are done in Table 7.2.2 below as well as mitigation measures suggested.

Table 7.2.2: *Impact assessment pertaining to dust on vegetation (flora)*

CRITERIA	DESCRIPTION
Risk Event	**Loss of Biodiversity and Habitat Destruction - Dust**
Nature of Impact	Negative
Extent	**Local**
Duration	Medium
Intensity	Low to Medium
Probability	Probable
Significance (no mitigation)	Moderate
Mitigation	Appropriate dust suppression methods as discussed in Section 7.4.1.6.1 must be investigated and considered by the Proponent, Contractors and Contracted Transport Agencies in consultation with Roads Authority. Appropriate cost-effective dust suppression measures should be directed towards sensitive areas close to the Quiver Tree Forest Rest Camp on the M29 for approximately 3 – 5 km. A Method Statement for Dust Control should be formulated and presented by the Contractor and Contracted Transport Agencies. Appropriate speed limits must be implemented for construction vehicles and busses at sensitive sections of the M29 road. Appropriate signs must be erected indicating speed limit of 40 km/h in the sensitive areas around the Quiver Tree Forest. This will have to be done in consultation with Roads Authority.
Significance (with mitigation)	Medium to Low during Construction Phase
Confidence level	Medium
Legal Implications	Nature Conservation Ordinance No. 4 of 1975, as amended Forest Act No. 12 of 2001, as amended Atmospheric Pollution Prevention Ordinance No 11 of 1976, as amended

(c) Fauna

Important species and habitat are discussed in the Ecological Baseline Assessment Report in Appendix D section 3.8 and 3.9.

The impact during construction on reptiles and small mammals associated with the affected area/habitat are expected to be detrimental. This would, however, affect a relatively small area (~200ha) over a short/limited period of time.

During construction there will be an increased movement and damage by people and vehicles to the natural habitat of these species. Track discipline must be strictly adhered to as far as possible to act as mitigation measure for important slow moving, especially nocturnal, reptiles, amphibians and mammals.

Some mammals – e.g. small-spotted genet, mongoose – are attracted to the substations and on-pole-mounted switching gear probably for foraging and heat and may cause problems at these structures. This could be mitigated by electrostatic animal and/or squirrel guards on the bushings. Other mammals that could be affected by the electrical infrastructure are baboons, which often get electrocuted by various types of infrastructure. Pole mounted transformers and bushings can be insulated and/or substations could be equipped with electric fencing to prevent baboons entering such areas.

The impact assessment for loss of fauna biodiversity and habitat destruction are done in Table 7.2.3 as well as mitigation measures suggested.

Table 7.2.3: *Impact assessment pertaining to loss of biodiversity and habitat destruction (fauna)*

CRITERIA	DESCRIPTION
Risk Event	**Loss of Biodiversity and Habitat Destruction - Fauna**
Nature of Impact	Negative
Extent	Local
Duration	Long
Intensity	Low
Probability	Highly probable
Significance (no mitigation)	Low
Mitigation	<u>Fauna</u>: Draft a Search and Rescue Management Plan for slow moving vertebrate fauna (e.g. tortoises, chameleon, snakes, etc.) prior to construction; Obtain the necessary permits from the Ministry of Environment, Forestry and Tourism prior to the collection, removal and relocation of protected

CRITERIA	DESCRIPTION
	species; Select storage site for building material, temporary ablution, office building and/or camp sites and other temporary lay over sites with care to avoid important habitats; Select the same site for all of the above to make the footprint of damage as small as possible; Identify vulture and other raptor nesting trees and avoid these areas; Most birds nest are associated with rainfall, therefore avoid construction during the nesting (breeding) season; Use portable toilets to avoid faecal pollution around camp sites; Initiate a suitable and appropriate refuse removal policy as littering could result in certain animals becoming accustomed to humans and associated activity and result in typical problem animal scenarios – e.g. baboon, black-backed jackal, crows, etc.; Do not drive randomly throughout the area (could cause mortalities to vertebrate fauna); Avoid off-road driving at night as this increases mortalities of nocturnal species; Avoid and/or limit the use of lights during nocturnal exploration activities as this could influence and/or affect various nocturnal species – e.g. bats and owls, etc. Use focused lighting for least effect; Prevent the killing of species viewed as dangerous – e.g. various snakes – when on site; Prevent the setting of snares for ungulates (i.e. poaching), collection of veld foods (e.g. tortoises, chameleon, etc.) and or any form of illegal hunting activities; Avoid introducing dogs and cats as pets to office/camp sites as these can cause significant mortalities to local fauna (cats) and even stock losses (dogs); Liaise with MET staff and Ecologist regarding ecology related problems/questions on the Project Site; Introduce genet and baboon mitigation measures (e.g. cover bushings and/or electrify perimeter fence although not lower than 20cm from the ground so as to avoid tortoise mortalities, etc.);

CRITERIA	DESCRIPTION
	Initiate a mammal electrocution monitoring programme after construction to determine "high risk" areas so as to mitigate these areas as well once identified; Remove and relocate slow moving vertebrate fauna (e.g. tortoises, chameleon, snakes, etc.) to suitable habitat elsewhere in area; Do not electrify strands around the solar plant lower than 30cm from the ground as this could result in tortoise mortalities.
Significance (with mitigation)	Low - None
Confidence level	Medium
Legal Implications	Nature Conservation Ordinance No. 4 of 1975, as amended Forest Act No. 12 of 2001, as amended

(d) Avifauna

Bird species, especially *ground nesting species* associated with the affected area/habitat can be detrimentally affected during construction of the solar park.

Loss of avifauna through collision with power lines is a reality that accompanies power lines. The effect of aboveground transmission line infrastructure is expected to be detrimental to "pylon sensitive species" mentioned in Chapter 5.3.2.4 and also include:

- Birds flying at pylon height – e.g. bustards, swifts, sandgrouse, ravens and raptors species.
- Birds with nocturnal transients – e.g. Palaearctic migrants and wetland birds towards riverine areas.
- Birds attracted to the area during rainfall events – e.g. bustards – and temporary water sources in ephemeral rivers/drainage lines – e.g. aquatic/marine species.
- Other potential transmission line issues related to birds would be species that typically nest on such structures.

The following factors influence the collision risk for birds:

- Voltage levels – i.e. correlation between physical size of bird and collision risk;
- Horizontally configured designs experience more problems with bird streamers than vertically configured designs probably due to birds perching/roosting closer to the conductors increasing the probability of flashovers;
- Body size and flight behaviour – i.e. birds with a heavy body size and small wing surface are more prone to collisions;

- Flight height and habitat use – i.e. short distance, low altitude, frequency of overhead structures;
- Age (i.e. young birds more prone to collisions);
- Resident versus migratory birds (i.e. movement into unfamiliar terrain increases collisions);
- Weather (i.e. inclement weather increases collisions);
- Time of day (i.e. nocturnal movement increases collisions);
- Land use (i.e. cultivated areas attract birds); and
- Topography (i.e. mountains/rivers/shorelines act as corridors).

The Ecology study determined that the proposed development site is not expected to fall within a major bird flyway (see Appendix D Section 3.4). The Project Site and associated overhead power line form part of the existing electricity infrastructure in the area that should make the obstacle more visible and reduce incidence.

The Ecology study concluded that none of the unique/important species are exclusively associated with the proposed development area.

Table 7.2.4 below presents the comprehensive assessment outcome.

Table 7.2.4: *Impact assessment pertaining to loss of biodiversity and habitat destruction (avifauna)*

CRITERIA	DESCRIPTION
Risk Event	**Loss of Biodiversity and Habitat Destruction - Avifauna**
Nature of Impact	Negative
Extent	Local
Duration	Long
Intensity	Low
Probability	Highly probable
Significance (no mitigation)	Low
Mitigation	Avifauna: Introduce bird avoidance mechanisms – e.g. bird flight diverters such as flappers, coils, etc. – at bird collision risk areas and along movement corridors; Powerline design – e.g. vertical figured designs have less "flashover" problems from bird streamers (faeces) than horizontally figured designs; Initiate a bird collision monitoring programme after construction to

CRITERIA	DESCRIPTION
	determine "high collision" areas so as to mitigate these areas as well once identified.
Significance (with mitigation)	Low
Confidence level	Medium
Legal Implications	Nature Conservation Ordinance No. 4 of 1975, as amended Forest Act No. 12 of 2001, as amended

The actual development area (footprint) will be relatively small and therefore only have localised negative impacts to the environment and associated flora and fauna during a short period of time. The impact associated with habitat destruction and loss of biodiversity is expected to have a ***low*** significance rating prior to mitigation and ***low – none*** after mitigation.

7.4.1.2 Archaeological and Heritage Resources

The Archaeology Baseline Assessment (see Appendix E) concluded that there are no known archaeological sites on the proposed solar plant site. It is, however, possible that site work might reveal previously unknown archaeological remains. In the event that buried archaeological remains are detected, which are not visible to surface survey, it must be handled in accordance with the provisions of Part V Section 46 of the National Heritage Act (27 of 2004). The "chance finds" procedure covers the actions to be taken from the discovery of a heritage site or item, to its investigation and assessment by a trained archaeologist or other appropriately qualified person.

This process involves the following:

Responsibility:

Operator	To exercise due caution if archaeological remains are found
ESM	To secure site and advise management timeously
Contractor	To determine safe working boundary and request inspection
Archaeologist	To inspect, identify, advise management, and recover remains

Procedure:

Action by person identifying archaeological or heritage material:

a) If operating machinery or equipment stop work;

b) Identify the site with flag tape;

c) Determine GPS position if possible;

d) Report findings to foreman.

Table 7.2.5 below presents the assessment and suggested mitigation.

Table 7.2.5: *Impact assessment pertaining to Archaeological and Heritage Resources*

CRITERIA	DESCRIPTION
Risk Event	Archaeological and Heritage Resources
Nature of Impact	Neutral
Extent	Site specific
Duration	Medium
Intensity	Low
Probability	Improbable
Significance (no mitigation)	Low
Mitigation	Caution should be exercised during the construction phase if archaeological/heritage remains are discovered during the excavations. The Environmental Site Manager should receive training by a suitably qualified archaeologist with respect to the identification of archaeological/heritage remains and the procedures to follow should such remains be discovered during construction. Any archaeological materials found should be reported to the Environmental Site Manager and the National Monuments Council, and all on-site activities stopped immediately. Details with regards to the procedure to follow is defined in the EMP
Significance (with mitigation)	None
Confidence level	High
Legal Implications	National Heritage Act (Act 27 of 2004), as amended

The probability of locating important archaeological/heritage remains during the construction phase of the development is unlikely. The impact rating associated with such an event is therefore considered to be ***low*** before mitigation and ***low-none*** after mitigation.

7.4.1.3 Ground and Surface Water Pollution

Prominent drainage lines or erosion gullies are not present on the Project Site. The latter is the result of the low rainfall, gentle slope and relatively high infiltration rate of the soil, thus inducing little to no runoff during most rainfall events. (*Knight, 2022*)

Construction activities are, however, associated with a variety of potential pollution sources (i.e. cement, oils, diesel, chemicals, paints, etc.), either having a direct and immediate impact or indirect and longer-term impact. As a single incident, for the downstream ground water to be contaminated, exceptionally large quantities of pollutants will have to be released into the

environment, of which the volumes are not associated with this type of development. Although, however small these potential sources of pollution might be, it still requires special attention (i.e. planning, control and management) to avoid any potential pollution of the immediate environment and contributing to the cumulative pollution impacts on downstream resources. Consideration should be given to controlling potentially harmful impacts on surface and groundwater while 'best' practice measures are applied to minimise the potential for discharges of pollutants to nearby receiving drainage channels to the south of the project site.

Table 7.2.6 below presents the comprehensive assessment outcome.

Table 7.2.6: *Impact assessment pertaining to Ground and Surface Water Pollution*

CRITERIA	DESCRIPTION
Risk Event	**Ground and Surface Water Pollution**
Nature of Impact	Negative
Extent	Local
Duration	Short
Intensity	Low
Probability	Improbable
Significance (no mitigation)	Low
Mitigation	Draft and implement a Construction Waste Management Plan to be maintained for the duration of the construction phase. Waste should be stored in appropriate containers in an appropriately constructed area protected against exposure to high intensity rainfall. Waste should be frequently disposed of. Storage and service areas must be sited in areas away from the alluvial sediments and / or drainage channels. Storage of any material or substance that may cause pollution to water sources should be safely handled and stored in accordance with appropriate legislation. Contractor should submit a Method Statement for the purpose of handling and storage of hazardous materials on-site. A Storm Water Management Plan should be drafted to be maintained for the duration of the construction time frame. Ensure proper maintenance of all construction vehicles and equipment and conduct continuous maintenance and check-ups. Draft and implement a Detailed Preparedness and Emergency Plan for all construction related spillages.

CRITERIA	DESCRIPTION
	Ensure that oil/ fuel spillages from construction vehicles and machinery are minimised and that where these occur, that they are appropriately dealt with. Polluted soil and building rubble must be transported away from the site to an approved and appropriately classified waste disposal site. Polluted soil must be remediated where possible. Drip trays must be placed underneath construction vehicles when not in use to contain all oil that might be leaking from these vehicles. All fuel tanks must be bunded to 120% of the capacity of the tank to contain any spillages that might take place. Washing of equipment should not be allowed on site. Should it be necessary to wash construction equipment these should be done at an area suited and prepared to receive and contain polluted waters. These polluted waters should be transported and disposed at a waste site for hazardous materials. Appointing qualified and reputable contractors is essential. Proper training of construction personnel would reduce the possibility of the impact occurring. 'Best' practice measures should be applied to minimise the potential discharge of pollutants onto open soil. Method Statements are compulsory for this aspect of the Construction Phase and should be closely monitored by the Environmental Control Officer (ECO). Various Method Statements (e.g. bunding; camp establishment and fencing; concrete batching; bulk earthworks; demolition; fuels and fuel spills; solid waste management; wash areas; storm water management) are required to combat any potential surf/ace and underground water pollution.
Significance (with mitigation)	None
Confidence level	High
Legal Implications	Water Act No. 54 of 1956, as amended /Soil Conservation Act 76 of 1969 / Hazardous Substances Ordinance No. 14 of 1974, as amended / Public Health Act No. 36 of 1919, as amended

Given the environment's natural characteristics and nature of the development, construction pollution is expected to have a ***low*** significance before mitigation and a ***none*** significance following proper mitigation measures and continues monitoring.

7.4.1.4 Waste

The kind of construction to be undertaken for the solar park, should not generate excessive waste. It is, however, important that a proper waste management system be introduced to accommodate general domestic waste (i.e. plastic, paper, etc) as well as some construction waste, including hazardous waste.

This will require a temporary on-site storage facility for domestic-, construction- and hazardous waste. The existence of a temporary waste facility, however, poses the potential of contributing to surface pollution, unpleasant smells and attracting vermin. It is thus important that the system be planned and managed in an effective manner by the Proponent/Contractor. It must also be undertaken in consultation with the Keetmanshoop municipality to determine appropriate procedures that might be integrated into the municipal waste management services.

Table 7.2.7 below presents the assessment and suggests mitigation for the outcome.

Table 7.2.7: *Impact assessment pertaining to Waste*

CRITERIA	DESCRIPTION
Risk Event	**Waste**
Nature of Impact	Negative
Extent	Local
Duration	Short
Intensity	Low
Probability	Probable
Significance (no mitigation)	Low
Mitigation	Draft and implement a Construction Waste Management Plan to be maintained for the duration of the construction phase. Waste management must be planned and undertaken in consultation with Keetmanshoop municipality. Waste bins with scavenger-proof lids to be distributed on the Project Site at strategic points. Waste bins to be emptied into a waste container that is removed on a scheduled basis to the Keetmanshoop registered dump site. Hazardous waste containers must be made available for construction and hazardous waste. Hazardous waste containers must be removed on a scheduled basis to the nearest registered hazardous waste dump site. Method Statements are compulsory for this aspect of the Construction

CRITERIA	DESCRIPTION
	Phase and should be closely monitored by the Environmental Control Officer (ECO).
Significance (with mitigation)	None
Confidence level	Medium
Legal Implications	Public Health Act No. 36 of 1919, as amended Health and Safety Regulations GN 156/1997 (GG 1617)

Construction waste and littering is expected to have a ***low*** significance before mitigation and a ***none*** significance following proper mitigation measures and continued monitoring.

7.4.1.5 Natural Resources (water)

The construction phase requires both water and energy of which water is currently the source under pressure.

Construction activities requiring water are for the cement and concrete mixing for the 3 buildings and plinths (for field transformers and substation), as well as road compaction. Water for the general construction purpose must be obtained in consultation with the Landowner and/or NamWater.

These potential impacts hold ***moderate*** significance and can with appropriate mitigations reduce its impact to ***low*** (see Table 7.2.7).

Table 7.2.8: *Impact assessment pertaining to Natural Resources (Water and Energy)*

CRITERIA	DESCRIPTION
Risk Event	**Natural Resources (Water and Energy)**
Nature of Impact	Negative
Extent	Local
Duration	Medium
Intensity	Low to Medium
Probability	Probable
Significance (no mitigation)	Moderate
Mitigation	There should be no tolerance towards water wastage. Water should be recycled where possible.
Significance (with mitigation)	Low

CRITERIA	DESCRIPTION
Confidence level	High
Legal Implications	Water Act No. 54 of 1956, as amended

7.4.1.6 Socio-Economic

Construction activities are associated with a variety of impacts that has either a direct or indirect implication on the surrounding residents' living conditions and/or socio-economic status, as covered below. Positive Socio-Economic impacts are listed in Chapter 4.5.1 and 7.1.1.5. Other negative Socio-Economic impacts associated with construction are:

7.4.1.6.1 Dust & Emissions

The air quality in the rural area is considered very good. Dust and emissions are associated with construction activities (i.e. digging; drilling, clearing; transport of materials) of which the severity is related to the extent of the development (determining the nature and scale of the nuisance) and the nature of the receiving environment (determining the distance in between the nuisance and the receptor and the sensitivity of the receptor to the nuisance).

The amount of dust to be generated on the Project Site's soil type during digging, drilling and clearing is unlikely to have an adverse effect, due to its location away from any receptor. It is not envisaged that dust suppression on the Project Site will be necessary.

The dust impact assessment undertaken in Section 7.4.1.1(b) above, determined it highly likely that dust from the M29 towards the Quiver Tree Forest Rest Camp will increase substantially from the amounts currently experienced in the area. In addition to farmers, tourists and existing electricity infrastructure service vehicles, it is estimated that heavy load traffic will increase with 300-400 truckloads over the construction period of one and a half years as well as 6 bus loads per day.

The M29 passes directly to the east of this tourist attraction and dust from increased heavy vehicle transport was experienced by the campsite management during the construction periods of the existing two solar farms. It will most likely be the same during the planned year and a half construction period for KSSE.

Mitigation suggested during Public Participation to use the B1 National Road with a newly constructed access road to Farm Klein Spitskop was found not economically feasible and will pose an increase threat to traffic safety on a national road.

It is recommended that appropriate dust suppression options be considered for sensitive areas on the M29 during construction. Dust control using water is not recommended in this arid region where water is such a scares naturel resource. A single application has a very short-lasting effect, so watering only lasts for a short period.

Latest research on road technology has come up with several environmentally friendly and cost-effective dust control options for mining and construction companies such as:

- Salts and brines
- Bitumen emulsions
- Surface active agents
- Lignosulfonates
- Liquid polymers
- Polymer emulsions
- Petroleum derivatives
- Vegetable oils; and
- Highly refined synthetic fluids that are the latest environmentally friendly dust control products, which works through adsorption onto the treated surface, making dust particles too heavy to be airborne. The benefits of using *highly refined synthetic fluid* include its ability to be immediately effective, non-hazardous, environmentally friendly, clear, odourless and water-resistant.

These should be investigated and considered by the Proponent, Contractors and Transport Agencies in consultation with Roads Authority for use during the Construction Phase on identified sensitive areas of the M29.

Transport used for the construction period (i.e. busses for labour and trucks for materials) must further adhere to appropriate speed limits in the sensitive areas (approximately 3 - 5 km) around the Quiver Tree Campsite and Forest.

Speed limits must be clearly indicated by appropriate signboards provided by Roads Authority.

Table 7.2.9: *Impact assessment pertaining to dust and emissions*

CRITERIA	DESCRIPTION
Risk event	**Dust and emissions**
Nature of Impact	Negative
Extent	Small
Duration	Medium
Intensity	Low to Medium
Probability	Probable
Significance (no mitigation)	Medium
Mitigation	Appropriate dust suppression methods as discussed in Section 7.4.1.6.1 must be investigated and considered by the Proponent, Contractors and Contracted Transport Agencies in consultation with Roads Authority. Appropriate cost-effective dust suppression measures should be directed

CRITERIA	DESCRIPTION
	towards sensitive areas close to the Quiver Tree Forest Rest Camp on the M29 for approximately 3 – 5 km. A Method Statement for Dust Control should be formulated and presented by the Contractor and Contracted Transport Agencies. Appropriate speed limits must be implemented for construction vehicles and busses at sensitive sections of the M29 road. Appropriate signs must be erected indicating speed limit of 40 km/h in the sensitive areas around the Quiver Tree Forest. This will have to be done in consultation with Roads Authority. Construction activities during high winds should be limited to those activities not generating dust. Handling and transport of erodible materials should be avoided under high wind conditions. Removal of vegetation should be restricted to the minimum and what is necessary. Where possible, topsoil stockpiles should be in sheltered areas and covered. No fires should be allowed on-site for any what purpose and construction waste are not allowed to be burned on-site. It is imperative that all machinery and vehicles on site is road worthy and do not give rise to excessive smoke or emissions. The contractor's personnel are to be provided with access to dust masks if required during the Construction Phase.
Significance (with mitigation)	Low
Confidence level	High

Given the expected scale of dust generation on the M29 and the distance to the nearest receiver, dust and emissions from construction transport activities are expected to have a ***moderate*** pre-mitigation impact significance rating and ***low*** post-mitigation.

7.4.1.6.2 Construction Noise & Vibration

Noises and vibrations are synonymous with the construction phase, as heavy construction vehicles and machinery operates. The scale of the construction activities and type of construction activity, as well as the locality of the surrounding receptors determine the significance there of. Accept for

the on-site workforce, there are no receptors close enough to the construction site to be affected by noise and vibration.

The nature of the construction activities for this Project is not associated with any large scale or high intensity noise activities. No blasting is intended as part of the construction phase. The noises expected from the construction phase are to be very similar to other existing noises.

Workers exposed to loud noises during construction should be issued with the necessary protective gear, as required by the Public Health Act (No. 36 of 1919) and Labour Act (No. 11 of 2007).

Table 7.2.10: *Impact assessment pertaining to noise and vibration*

CRITERIA	DESCRIPTION
Risk event	**Noise and Vibration**
Nature of Impact	Negative.
Extent	Small
Duration	Medium
Intensity	Low
Probability	Improbable
Significance (no mitigation)	Low
Mitigation	Appropriate directional and intensity settings are to be maintained on all hooters and sirens. No amplified music should be allowed on site. Inform immediate neighbours of construction activities to commence and provide for continuous communication between the neighbours and residents engineer. The contractor shall not use sound amplification equipment on site unless in emergency situations. Limit construction times to acceptable daylight hours. The World Health Organization (WHO) guideline on maximum noise levels (guidelines for Community Noise, 1999) to prevent hearing impairment can be followed during the construction phase. This limits noise levels to an average of 70db over a 24-hour period with maximum noise levels not exceeding 110db during the period. All construction vehicles and machinery should be kept in good working condition. If any noise-related complaints are registered the applicable construction vehicles and machinery should be fitted with noise reduction

CRITERIA	DESCRIPTION
	devices. Personnel working in noisy environments must be issued with hearing protectors.
Significance (with mitigation)	None
Confidence level	High

Given the small scale of the development and resulting construction activities; the construction period being temporary and absence of receptors other than on-site labour, the potential impact is regarded as having ***none*** significance after mitigation.

7.4.1.6.3 Traffic & Safety

Construction activities are associated with an increase in vehicles of different kinds (i.e. delivery and construction vehicles and trucks) to and from the site.

The significance of this risk and conflict is expected to increase inevitably, due to the substantial increase in heavy vehicles on the M29 needed to service the project site for the scheduled year and a half of the construction period.

All intersections and junctions should be considered dangerous and requires caution from both the construction vehicle drivers and other road users. Strict road safety measures will have to be applied during the construction phase.

Table 7.2.11: *Impact assessment pertaining to traffic and safety*

CRITERIA	DESCRIPTION
Risk event	**Traffic and Safety**
Nature of Impact	Negative.
Extent	Small
Duration	Medium
Intensity	Low
Probability	Probable
Significance (no mitigation)	Low
Mitigation	Contractor's personnel should adhere to speed limits. Appropriate signs should be in place along the roads being used by construction vehicles notifying road users of the construction activity and roads used by construction vehicles. Drivers of construction vehicles should have valid driver's licenses with

CRITERIA	DESCRIPTION
	ample experience on proper road usage and manners on-site as well as when making use of public roads. Construction vehicles' need to be in a road worthy condition and maintained throughout the construction phase. Make use of predetermined roads to the site and refrain from creating new roads. Provide traffic signals and road markings where necessary to ensure safe traffic movement.
Significance (with mitigation)	None
Confidence level	High

The pre-mitigation impact is regarded as ***low***, which can be reduced to ***none*** after appropriate mitigation measures have been implemented.

7.4.1.6.4 Health, Safety & Security

Areas within which construction activities takes place is usually associated with criminal activity, posing a security risk to those residing in the area. It is not to say that these criminal activities are because of the construction staff, but it is known to happen in the vicinity of construction sites.

Open trenches and other constructions during the construction phase may also pose a safety and health implication and should be properly mitigated for the duration of the construction phase.

Construction of the development has the potential for accidental injury, either minor or major accidents to construction workers or visitors to the Project Site. On-site safety of all personnel is an important responsibility of the appointed contractor and should be adhered to in accordance with the requirements of the Labour Act (No 11 of 2007) and the Public Health Act (No. 36 of 1919). The contractor's site and construction site should be properly secured to prevent any injury or harm to the residents and/or any local fauna.

The significance is directly related to the duration of the construction period, nature of associated activities and general accessibility of the site, which in this case is considered small, while the site will be fenced-off and access control.

Table 7.2.12: *Impact assessment pertaining to health, safety, and security*

CRITERIA	DESCRIPTION
Risk event	**Health, Safety and Security**
Nature of Impact	Negative.
Extent	Small
Duration	Short
Intensity	Low
Probability	Probable
Significance (no mitigation)	Low
Mitigation	Ensure that all construction personnel are trained depending on the nature of their work. Provide for a first aid kit and trained person to apply first aid when necessary. A wellness program should be initiated to raise awareness on health issues, especially the impact of sexually transmitted diseases. Restrict unauthorised access to the site and implement access control measures. Clearly demarcate the construction site boundaries, dangerous and no-go areas on site along with signage of no unauthorised access. Staff and visitors to the site must be fully aware of all health safety

CRITERIA	DESCRIPTION
	measures and emergency procedures. The contractor must comply with all applicable occupational health and safety requirements. The workforce should be provided with all necessary Personal Protective Equipment including earplugs. All affected landowners should be notified at least one month in advance who the appointed contractor is and provided with details about the proposed construction activities and timeline.
Significance (with mitigation)	None
Confidence level	High

These potential impacts hold ***low*** significance and can with appropriate mitigations reduce its impact to ***none***.

7.4.2 POSSIBLE IMPACTS DURING OPERATIONAL PHASE

The operational phase of the proposed Project entails predominantly daily monitoring and management of the solar system. Replacement of a faulty component is done, if and when required. Daily operations include a set of activities to be performed by the staff on a daily basis, as presented in the Project's O&M Plan. The operational activities associated with the proposed Project are presented in section 4.3.7.

Details with regards to the potential impacts expected during the operational phase are listed in Table 7.3, below. These impacts are usually more permanent in nature or at least until decommissioning of the development. Mitigation measures and environmental requirements having direct relevance to the expected operational phase impacts are presented in Tables 7.3.1 to 7.3.4 below. Detailed mitigation measures and environmental requirements having direct relevance to the expected operational phase impacts are presented in the Environmental Management Plan (Appendix K).

Different from the construction related impacts, no Management Plan is provided for the operational phase, but rather recommendations are made to existing policies or plans to be applied.

Table 7.3 *Potential Impacts during Operational Phase:*

IMPACT	CAUSE
Loss of Biodiversity and Habitat Destruction	Shading
	Removal of flora & fauna as part of site maintenance

	Heat and glare from solar farm
	Avifauna collision to powerline
	Increase human activity
Visual Impact	Buildings and solar farm infrastructure
Ground and Surface Water Pollution	Usage of water for sporadic cleaning of panels and generation of waste water
	Waste disposal
	Sanitation
	Hazardous material & liquid disposal
Natural Resources (water & energy)	Water usage for cleaning of PV panels
	Wastage
Socio-Economic	Health and Safety around electricity
	Security
Change in land use	Loss of Agricultural Land

7.4.2.1 Loss of Biodiversity and Habitat Destruction

(a) Shading

Given that some areas will not be cleared of vegetation, i.e. areas underneath the PV panels and in between the sections of PV panels (see Section 4.3.7), it can be expected that some species of high value will remain on-site. These species will be partially or entirely shaded from time to time or throughout the day, which might affect their survival.

It is recommended to have a monitoring plan in place according to which the well-being of these shaded species is monitored. Should any of the species show negative signs, these should be relocated in accordance with the Search and Rescue Management Plan.

(b) Removal of flora and fauna during management

Vegetation management applicable to the Project Site basically entails keeping vegetation clear to interfere with the operation of equipment (see section 4.3.7).

Considering the vegetation type expected on the Project site, mostly low perennial shrubs (see section 5.3.1.1), very low interference is expected from the side of vegetation on equipment. As with Emesco's other solar farms, grazing should be applied to keep natural vegetation under control (see section 4.3.7). Vegetation management by means of chemical sprays are not allowed.

Day-to-day activities, i.e. inspections requiring access into and in between the equipment should preferable done by foot or small quad bike. It is important that a Vegetation and Habitat Management Plan be drafted, which should form part of the Project's O&M Plan, according to which external operational monitoring will be done.

Irresponsible behaviour (e.g. uncontrolled access to sensitive areas; collecting of plants or animals; killing of snakes, use of general poison, setting of fires, littering, pollution, destructive driving with quad and/or vehicles, etc.) should not be allowed and/or tolerated and included within the Vegetation and Habitat Management Plan.

(c) Heat and Glare from Solar Farm

The impact of aboveground PV plant infrastructure is not expected to be detrimental to birds – i.e. would not impede their movement, etc. Other problems such as "reflective surfaces" and "mirror collisions", etc. are not applicable here – i.e. does not pose the same avifaunal impact as CSP (Concentrated Solar Power) (*Cunningham, 2022*). However, the collision mortality impacts of birds with PV panels may be underestimated (*Jenkins et al. 2017*) and ongoing long term monitoring is viewed as imperative to determine local bird mortalities.

Considering Emesco's support towards sustainable practises within the solar industry, it is recommended that this solar farm, together with Emesco's other, be used as a case study for purpose of further research to study the mentioned effects on bird mortalities, with the aim of proposing mitigations.

7.4.2.1.1 Avifauna collision to Powerline

Loss of avifauna through collision with power lines is a reality that accompanies power lines. The effect of aboveground transmission line infrastructure is expected to be detrimental to "pylon sensitive species". These are listed as pylon sensitive species in Section 5.3.2.4.1) and the impact of OHTLs on avifauna are assessed in Section 7.4.1.1 (d).

Species at risk would be larger species flying at pylon height (e.g. kori and Ludwig's bustard, various large eagles and vultures); nocturnal travellers (e.g. flamingos and Palaearctic species) and species potentially visiting the area for roosting/foraging (e.g. bustards, eagles, vultures). None of the unique/important species are, however, exclusively associated with the proposed development area.

The Ecological Baseline Assessment study determined that the proposed Project is not expected to fall within a major bird flyway. It is recommended that a Bird Collision Monitoring programme be introduced to monitor and mitigate impacts to determine whether anti-collision mechanisms – e.g. bird flight diverters such as coils, flappers, etc are required. Although not the responsibility of this

Project's Proponent, it is equally important that NamPower take similar action in mitigating and monitoring bird collisions along their OHTL within the area.

Mitigation measures are suggested in Table 7.3.1 to show environmental sensitivity and commitment regarding the fauna.

7.4.2.1.2 Increase Human Activity

The introduction of human daily activities can place an increased strain on the fauna and flora species if not managed sensitively. Impacts during the operational phase are predominantly associated with the daily operations of humans and poor management practices (e.g. improper waste management, uncontrolled fires, etc.) and irresponsible behaviour (e.g. uncontrolled access to sensitive areas; collecting of plants or animals; killing of snakes, use of general poison, etc.).

Table 7.3.1: *Impact assessment pertaining to the loss of biodiversity and habitat destruction*

CRITERIA	DESCRIPTION
Risk event	**Loss of Biodiversity and Habitat Destruction**
Nature of Impact	Negative
Extent	Site Specific or Local
Duration	Long Term
Intensity	Low
Probability	Probable
Significance (no mitigation)	Moderate
Mitigation	<u>Flora:</u> No collection, removal and/or damaging of unique/protected plants (e.g. various *Aloe* and *Lithop* species); Avoid introducing ornamental plants, especially potential invasive alien species, but rather use localised indigenous species, should landscaping be attempted, which would also require less maintenance (e.g. water); Remove all invasive alien species on site – e.g. *Prosopis* and *Cactus* spp., etc. – should these occur. This would not only indicate environmental commitment, but actively contribute to a better landscape; Ensure that adequate firefighting equipment (e.g. fire beaters; extinguishers, etc.) is available; Implement and maintain track discipline with maximum speed limits (e.g. 30km/h) and do not drive randomly throughout the area as this

CRITERIA	DESCRIPTION
	would result in fewer faunal mortalities and limit dust pollution; Implement erosion control measures where applicable. <u>Fauna</u>: Initiate a suitable and appropriate refuse removal policy as littering could result in certain animals becoming accustomed to humans and associated activity and result in typical problem animal scenarios – e.g. baboon, black-backed jackal, crows, etc.; Do not drive randomly throughout the area (could cause mortalities to vertebrate fauna) Avoid off-road driving at night as this increases mortalities of nocturnal species; Avoid and/or limit the use of lights during nocturnal exploration activities as this could influence and/or affect various nocturnal species – e.g. bats and owls, etc. Use focused lighting for least effect; Prevent the killing of species viewed as dangerous – e.g. various snakes – when on site; No setting of snares for ungulates (i.e. poaching), collection of veld foods (e.g. tortoises, chameleon, etc.) and or any form of illegal hunting activities; Avoid introducing dogs and cats as pets to office/camp sites as these can cause significant mortalities to local fauna (cats) and even stock losses (dogs); Maintain a mammal electrocution monitoring programme to determine “high risk” areas so as to mitigate these areas as well once identified. <u>Avifauna</u>: Maintain a bird collision monitoring programme after construction to determine “high collision” areas so as to mitigate these areas as well once identified. Mark PV panel so that birds can distinguish them as solid surfaces. Minimise the use of bright lights to reduce the number of insects (and therefore birds) attracted to the facility. Discouraging roosting and perching on nearby infrastructure, and

CRITERIA	DESCRIPTION
	managing habitat, could help prevent birds being attracted to an area
Significance (with mitigation)	Low
Confidence level	Medium

Given the limited information on heat and glare impact of solar farms on birds and the uncertainty of bird collisions in powerlines, the impacts and significance thereof are rated ***moderate*** before mitigations and ***low*** following mitigation measures and continuous monitoring. Transparent, systematic monitoring and research are required to better understand the impacts and to test the value of these mitigation measures.

7.4.2.2 Visual Impact

The extent to which the proposed Project will have an effect on the visual aesthetics and/or sense of place is determined by the (i) developed/undeveloped status of the site and the area in between the site and the receptor; (ii) larger topography; (iii) density and type of vegetation on-site and in between the site and the receptor; (iv) distance between the site and the receptor; and (v) the nature and scale of the development.

The land use and visual aesthetics in the Project area include extensive undeveloped open landscape covered in low shrubs and some grass. The unique desolate sense of place has been disturbed by the NamPower Kokerboom Substation, two existing solar farms and associated electricity transmission development. These electricity infrastructures are visible from the M29.

Photo 7.5 – *View of the sense of place with electricity infrastructure in the background*

The proposed KSSE solar farm will also be visible from the M29, which passes directly next to the south-eastern side of the solar farm. The distance between passing travellers (receptors) on this road and the solar farm will thus be minimal. The landscape is flat with low vegetation cover and

topography will not hide the solar farm from passers-by. The solar park will be visible directly adjacent to the left of the road for approximately 5 km.

The visual impact is thus very significant, but forms part of the electricity infrastructure already developed here.

Table 7.3.2: *Impact assessment pertaining to visual aesthetics and sense of place*

CRITERIA	DESCRIPTION
Risk event	**Visual aesthetics and sense of place**
Nature of Impact	Negative.
Extent	Local
Duration	Permanent
Intensity	High
Probability	Definite
Significance (no mitigation)	Moderate
Mitigation	The only mitigation that exits is that the proposed KSSE solar farm will form part of the existing electricity infrastructure development around the Kokerboom Substation.
Significance (with mitigation)	Remains Moderate
Confidence level	High with assistance of aerial photos

The significance of the pre-mitigation visual impact of the solar farm on the area during the construction phase is expected to be ***moderate*** and will remain ***moderate*** during project life. Mitigation measures for full rehabilitation exist to reduce the significance of the impact after project life to ***none.***

7.4.2.3 Ground and Surface Water Pollution

The larger area surrounding the Project site does not contain any surface water bodies. Ground water potential in the area is rated as 'low and limited potential', resulting in poorly developed underground water resources (see section 5.2.2).

The daily operational activities of the proposed Project that might have a potential pollution risk is limited to sewage waters originating from the office (i.e. 15 people), which hold a very small risk and could be properly managed (i.e. timely pumping of septic tank to prevent overflow).

Transformers and other equipment holding oils can also be potential sources of pollution. Routine inspections to ensure timely observation of leakage should form part of the day-to-day activities and included into the O&M Manual. Other sources of potential pollution, however small include but are not limited to hazardous liquids (i.e. diesel/petrol/cleaning liquids) stored at the Project Site; improper storage of general waste and dumping of waste within open areas. Increased run-off

during rainy seasons could enhance pollutant transportation. Storm water will follow the natural relief of the ephemeral line in a southern direction.

Care should be taken that no nutrients or pollutants be discharged or be able to enter the ground and the groundwater system from any operational activity.

Mitigation measures are suggested in Table 7.3.3 to show environmental sensitivity and commitment regarding the ground and surface water.

Table 7.3.3: *Impact assessment pertaining to ground and surface water pollution*

CRITERIA	DESCRIPTION
Risk event	**Ground and Surface Water Pollution**
Nature of Impact	Negative.
Extent	Local
Duration	Medium
Intensity	Low
Probability	Improbable
Significance (no mitigation)	Low
Mitigation	Draft and implement an Operational Waste Management Plan to be maintained for the duration of the operational phase. Storage of any material or substance that may cause pollution to water sources should be safely handled and stored in accordance with appropriate legislation. Ensure proper maintenance of all vehicles and equipment and conduct continuous maintenance and check-ups. Draft and implement a Detailed Preparedness and Emergency Plan for all operational related spillages. Drip trays must be placed underneath vehicles when serviced or not in use to contain all oil that might be leaking from these vehicles. Continued 'policing' from the side of the Proponent. Continued awareness of harmful practises and storage of hazardous liquids should be undertaken by the proponent. No pesticides or herbicides to be stored or used on site.
Significance (with mitigation)	Low - None
Confidence level	Medium

Possible pollution and the significance rating by way of wastewater (and others) is initially considered to be ***low*** but has proven to increase in risk over the years as the infrastructure and equipment degrade. Should proper management, policing and/or monitoring be done from the side of the proponent, the risk factor can remain ***low - none***.

7.4.2.4 Natural Resources (water & energy)

The operation phase requires water to clean the PV solar panels and water is currently the source under pressure. KSSE plans to use new technology robotic cleaners that do not use water. In case of excessive dirt, water will have to be used, but this is only envisaged during the rainy season from Feb. to April. Water can be sourced from the borehole on the Project Site and collected in tanks for these cleaning periods.

Table 7.3.4: *Impact assessment pertaining to Natural Resources (Water and Energy)*

CRITERIA	DESCRIPTION
Risk Event	**Natural Resources (Water and Energy)**
Nature of Impact	Negative
Extent	Regional
Duration	Medium
Intensity	Low
Probability	Probable
Significance (no mitigation)	Moderate
Mitigation	Use compressed air or robotic cleaners to clean panels. Ad hoc cleaning of panels should make use of available water sources. Should water be required for cleaning of excessive dirt, there should be no tolerance towards water wastage.
Significance (with mitigation)	Low
Confidence level	High
Legal Implications	Water Act No. 54 of 1956, as amended

Potential impact on natural resources (water) hold ***moderate*** significance, given the scarcity of water. The solar farm will, however, not require excessive water usage during most of the year and water usage can be managed with appropriate mitigations to have a ***low*** significance.

7.4.2.5 Socio-economic Implication

Socio-economic impacts as a result of a project can have either positive or negative impact on the receiving community. These impacts can be of a financial nature (i.e. employment and income),

an educational nature (i.e. education and skills transfer), a health nature (i.e. HIV/AIDS or dust nuisance), a safety nature (i.e. traffic; crime), etc.

The positive socio-economic impacts associated with the proposed Project have been covered in section 4.5.1.

7.4.2.6 Change in Land use from Agriculture to Industrial

According to the Agricultural Impact Assessment the impact of the proposed solar farm on the agricultural potential or agricultural activities can be caused by:

(i) a reduction in the area available for farming,
(ii) the interference with farming activities,
(iii) the use of groundwater for cleaning of solar panels and
(iv) cumulative impacts from similar development

Positive impacts include

(v) the contribution to general farm security;
(vi) raised farm income.

Please refer to Section 5.4.1 for a description of the agricultural land use of the area and Farm Klein Spitskop No. 153 as well as Appendix F for the Agricultural Impact Assessment Report.

It was concluded that the impact potential of the proposed KSSE on the agricultural resources or agricultural activities of Farm Klein Spitskop No. 153 is regarded as negligible (See Appendix F). The proposed solar park will occupy an area of 1.9% of the total farm area and will cause a change in land use from agriculture to industrial.

It can be expected that land value will be increased because of the proposed solar farm and associated product. The ecotourism value of the general area might, however, be negatively affected.

The change in land use is expected to have a ***low*** impact, that stays ***low*** until project life has been completed and decommissioning has taken place.

7.4.3 DECOMMISSIONING AND CLOSURE

The Project's life is envisaged to be 30 years where after a new agreement will be negotiated with the land owner whether the permanent buildings and fence should be removed (along with other infrastructure) or whether it can be re-used for other purposes by the owner.

In case a full rehabilitation is requested, it will be the responsibility of the Proponent to undertake the decommissioning. Given the nature of the activities associated with decommissioning (see section 4.3.8), the expected impacts are very similar to that of the construction phase (see section 7.4.1), as is the case with the required mitigations to be applied.

The decommissioning phase should include a detailed Decommissioning & Rehabilitation Plan, which should include rehabilitation monitoring for a period of at least 5 years after date of decommissioning completion. This must be included into the rehabilitation budget and allocated to this particular component of the Project's financial liability.

7.5 CUMULATIVE IMPACTS

Any development introduced is expected to place an additional load on existing natural resources and infrastructure and have both positive and negative impacts on the immediate and surrounding environment (natural and social). Cumulative impacts are defined as *"those that result from the successive, incremental, and/or combined effects of an action, project, or activity (collectively referred to in this document as developments") when added to other existing, planned, and/or reasonably anticipated future ones"*.

The significance thereof is determined by the nature and the scale of the proposed development and the sensitivity of the receiving environment. From this scoping assessment conducted, seven potential cumulative impacts can be expected, as outlined below –

- Security in supply of energy (P);
- Reduced carbon footprint in generation of electricity (P);
- Economic benefits to an area with limited economic opportunities (P);
- Employment creation & skills transfer (P);
- Increased visual impact (N);
- Increased dust generation (N); and
- Increased bird mortalities (N).

The greatest negative cumulative impacts of KSSE is expected to be the visual impact and dust creation on the M29.

Limited mitigation exists for the visual impact of the solar park combined with the Kokerboom Substation, two other solar farms and related powerlines, given the flat topography and low vegetation. The cumulative visual impact will thus remain ***'moderate'*** during Project Life.

Cumulative impact of dust created by increased traffic to KSSE, together with existing traffic for the electrical infrastructure in the area, farmers and tourists, the cumulative impact of dust will be **'moderate'**, but can be reduced to **'low'** with appropriate dust suppression mitigation measures. These measures must be undertaken in consultation with the Roads Authority to address overall increase traffic in the area.

Considering the evaluation and assessment (i.e. nature and the scale of the proposed Project's activities and the sensitivity of the receiving environment) that was done for each of the negative (N) impacts (see section 7.4), as listed above in bullet format, the cumulative impacts are expected

to be of a ***'low'*** significance, with appropriate mitigation and continues monitoring, as recommended.

8 CONCLUSIONS & RECOMMENDATIONS

This chapter of the report presents the assessment conclusion following the scoping phase, as well as the key recommendations and the environmental statement for consideration by the authorities. The conclusion and recommendations as presented in this chapter have been drawn from the assessment outcome, as presented in Chapter 7.4.

8.1 CONCLUSIONS

It is the conclusion of the Environmental Scoping Assessment that this project has the potential to contribute positively to the country's electricity supply in a manner that compliments the National Energy Strategy of Namibia (see Chapter 4.1.1 and 7.1.2.1). The project has the potential to assist NamPower in replacing some of its fossil fuel consumption with clean renewable energy at an affordable rate. It can provide socio-economic benefits to the //Karas Region and specifically Keetmanshoop (see Chapter 4.5.1 and 7.1.1.5).

As all developments have potential negative environmental consequences, it is important to identify possible adverse impacts beforehand, coupled with environmentally acceptable mitigating factors to lessen the overall impact of such development. These are addressed in Chapter 7.4 and Appendix K.

The project site is selected next to the existing Kokerboom Substation and associated overhead transmission network, which make it convenient to connect to the national electricity grid. It is situated in one of the lower population density areas in Namibia. The vegetation is low and sparse, which allows the solar park to be developed with minimum vegetation removal. Singular protected species can be relocated with the assistance of an ecologist/botanist where necessary. Uncertainty exists around the impact that the solar farm will have on birds, but according to the Ecological study no major bird fly paths exist over the project area. The study determined that the project will not have a significant negative effect on the *Nama Karoo Biome* as a whole, neither on any of the endemic or endangered fauna or flora species in specific in the area. Other impacts identified have mitigation measures that can be put into place.

For the **visual impact**, no mitigation exists, since the solar farm will be located directly next to the M29 on a flat area with low vegetation. It will, however, form part of the electricity infrastructure around the Kokerboom Substation and will be seen as part of the electricity distribution development that already exists here.

Increased traffic on the M29 will cause **dust nuisance** to the Quiver Tree Rest Camp and Quiver Tree Forest and dust suppression measures must be implemented as recommended in Section 7.4.1.6.1.

It is the conclusion that the project may go ahead on the grounds that the nature of the project is subtle, will form part of NamPower's existing electricity infrastructure development and the receiving environment is not exceptionally sensitive.

Given this, it is not to say that there will be no further impact/s and potential threats as highlighted by the study. Construction, operations, decommissioning and closure activities need to be strictly controlled by the Proponent and Contractor/s, and monitored by the appointed specialist and applicable Competent Authority to ensure that all potential impacts identified in this study and other impacts that might arise during implementation are properly identified in time and addressed in an effective manner.

8.2 RECOMMENDATIONS

Recommendations are provided in the tables in Chapter 7.4 and incorporated in the EMP in Appendix K. This must be undertaken by the Developer, Proponent and Contractor and monitored by the Ministry of Environment, Forestry and Tourism. All potential impacts identified in this study and other impacts that might arise during implementation must be properly identified in time and addressed in an effective manner.

Mitigation measures must be enforced and Monitoring Programmes on bird mortalities due to heat and glare from the solar park and collision in powerline must be undertaken to address the uncertainties around these impacts. Timeous management practices must be put in place if any detrimental impacts are detected.

It is the opinion of the EAP that further information is not required for a full EIA. This environmental scoping assessment concludes that the intended project should proceed under the following recommendations:

1. All required permits, licenses and approvals (see section 3.4) for the development be obtained.

2. All mitigations listed in Tables 7.2.1 to 7.2.12 and 7.3.1 to 7.3.4 and the Environmental Management Plan (Appendix K) be implemented prior and during construction.

3. A well-qualified and experienced (i.e. minimum 10 years) Environmental Control Officer should be appointed during the construction- and operational phase of the Project to make sure all the requirements within the Scoping Report and Environmental Management Plan (Appendix K) are adhered to.

4. A well-qualified and experienced (i.e. minimum 5 years) Environmental Site Manager should be appointed during the course of the construction phase to make sure that all the requirements as listed within this scoping report and the EMP (Appendix K) are adhered to. Furthermore, the Environmental Site Manager should receive training by a suitably qualified archaeologist with respect to the procedures to follow in the event that such remains are discovered during construction.

5. A well-qualified and experienced (i.e. minimum 15 years) Ecologist should be appointed to undertake the required investigations, site-layout and demarcation to ensure that all protected species are handled according to best practices.

6. The vegetation should not be cleared under PV panels for construction (like other solar farms), since the low vegetation that exist on site allows for this. It should be done as per the information provided by the Developer (Section 4.3.6.3 (i).

7. Continued on-site monitoring and evaluation be conducted during the construction and operational phases to be authorised by the DEA.

8.3 ENVIRONMENTAL STATEMENT

Based on the information presented in this scoping report, the Environmental Assessment Practitioner is of the opinion that, accept for the visual impact, the immediate and larger environment will not be significantly impacted if the above recommendations as proposed in this report are implemented and monitored, and responsible environmental practises are applied by the proponent, appointed contractors and sub-consultants.

Urban Green cc, the independent environmental assessment practitioner, recommends to the relevant authorities that the application for the listed activities associated with Klein Spitskop Solar Energy be approved on condition that the above recommendations (Section 8.2) are met and that continuous monitoring be conducted in accordance with the Environmental Management Act (Act No. 7 of 2007), its EIA Regulations and this scoping report. It is important that proof of monitoring is submitted to the office of the Environmental Commissioner to be used as part of the review process pertaining to the 3-yearly ECC renewal

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APPENDIX A

APPLICATION FOR ENVIRONMENTAL CLEARANCE CERTIFICATE

APPENDIX B

CURRICULUM VITAE ENVIRONMENTAL ASSESSMENT PRACTITIONER

APPENDIX C

EMESCO SCHONAU SOLAR ENERGY

PROJECT INFORMATION MEMORANDUM

AS EXAMPLE OF A SIMILAR200 HA SOLAR FARM

APPENDIX D

ECOLOGICAL BASELINE ASSESSMENT REPORT

APPENDIX E

ARCHAEOLOGICAL BASELINE ASSESSMENT REPORT

APPENDIX F

AGRICULTURAL IMPACT ASSESSMENT REPORT

APPENDIX G

PUBLIC PARTICIPATION PROCESS

APPENDIX H

KLEIN SPITSKOP SOLAR ENERGY

DETAILS ON CANADIAN SOLAR PV MODULES

APPENDIX I

KLEIN SPITSKOP SOLAR ENERGY

DETAILS ON THE IDEEMATEC HORIZON L:TEC PV TRACKER

APPENDIX J

KLEIN SPITSKOP SOLAR ENERGY

DETAILS ON THE SG125HX MULTI-MPPT STRING INVERTER

APPENDIX K

KLEIN SPITSKOP SOLAR ENERGY

ENVIRONMENTAL MANAGEMENT PLAN