



CRRENEWABLES

Draft BAR

The Proposed Steynsrus 10MW PV Solar Facility and Storage, Free State



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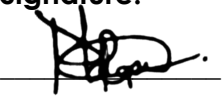
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Project Title	Basic Assessment Report (BAR)
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EXECUTIVE SUMMARY

Contrarians Capital (Pty) Ltd proposes the establishment a commercial energy facility to be called Steynsrus 10MW PV Solar Facility and Storage, located on the farms Arbeid 2154 and Weltevrede 2151. The site is located approximately 5 km north-west of the town Steynsrus within the Free State Province.

Where possible, the project could potentially participate in the Department of Energy's Small Projects Renewable Energy Independent Power Producer Procurement Programme (RE-IPPP). According to NEMA EIA regulations, the proposed facility is subject to a Basic Assessment Report.

Contrarians Capital (Pty) Ltd has submitted an application to the Provincial Department of Environmental Affairs (DESTEA) for a Basic Assessment Reporting (BAR) processes.

1.1 PROJECT DESCRIPTION AND BACKGROUND

The proposed development was previously proposed with a capacity of 5MW per PV, and further approved by the competent authority, DESTEA, unfortunately due to unforeseen circumstances the Environmental Authorisation lapsed. The resubmission is now covering the 10 MW capacity but is still located at the same property as indicated in section 1 above.

The project will have the following description:

- Steynsrus 10 MW PV Solar Facility, located on the farms Arbeid 2154 and Weltevrede 2151.
- The Basic Assessment Report will assess the environmental impacts of the proposed development, called "Steynsrus 10MW PV Solar Facility and Storage".

The facility development footprint will be approximately 30ha within which the following infrastructure will be established:

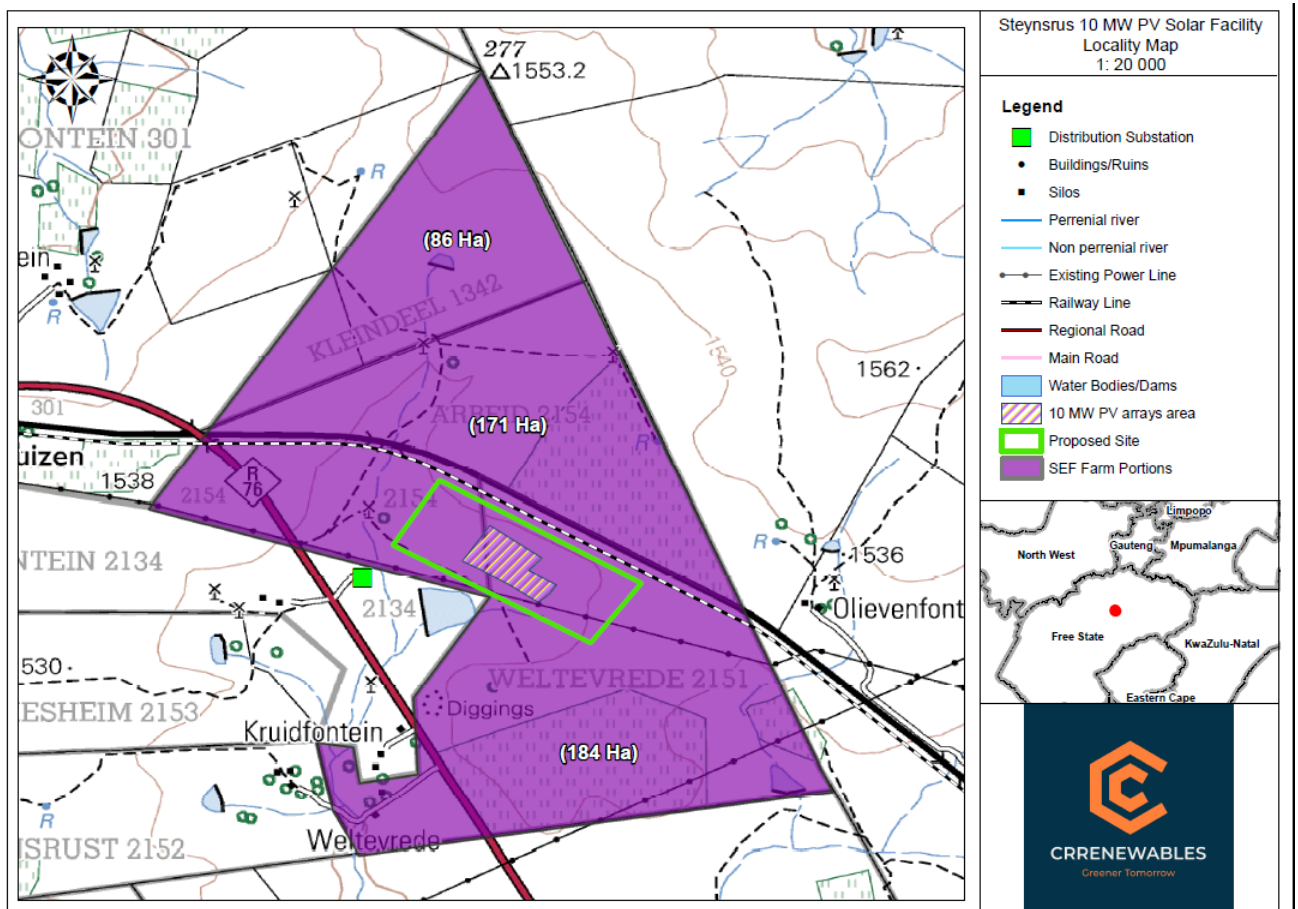
- Photovoltaic (PV) panels up to 5m in height (using tracking technology) with a capacity of up to 10 MW.
- An on-site substation as part of the PV Facility.
- An overhead power line that will tie into the existing power line on site (Oosthuizen Traction-Komspruit Traction) including the associated switching station which is located on the southern boundary of the site, or an overhead power line that will tie into the existing power line on site (Oosthuizen Traction-Komspruit Traction) including the associated switching station which is located at the eastern boundary of the site, or alternatively construct a new power line (approximately 155m) to connect to the existing Steynsrus Rural 132 kV Substation.
- Extension/upgrade of the existing Steynsrus Rural 132kV substation and associated connection infrastructure associated with the substation and PV plant.
- Cabling between the project components, to be laid underground where practical.
- Mounting structures (either rammed steel piles or piles with pre-manufactured concrete footings to support the PV panels).
- Internal access roads of 4 to 5 m wide
- Property Fence of not more than 2.5 m high.
- Workshop area (20 m x 30 m) for maintenance, storage and offices
- Small modular water filtration or di-ionisation unit of approximately (10m X 10 m)
- Parking and water storage tanks
- Laydown area extent 200 m²
- BESS

1.2 PROJECT LOCATION

The proposed development site falls within the jurisdiction of Moqhaka Local Municipality, in the Orange Free State Province. The project will be referred to as “Steynsrus 10MW PV Solar Energy Facility and Storage”.

Please refer to the locality map below.

Figure 1: Locality Map



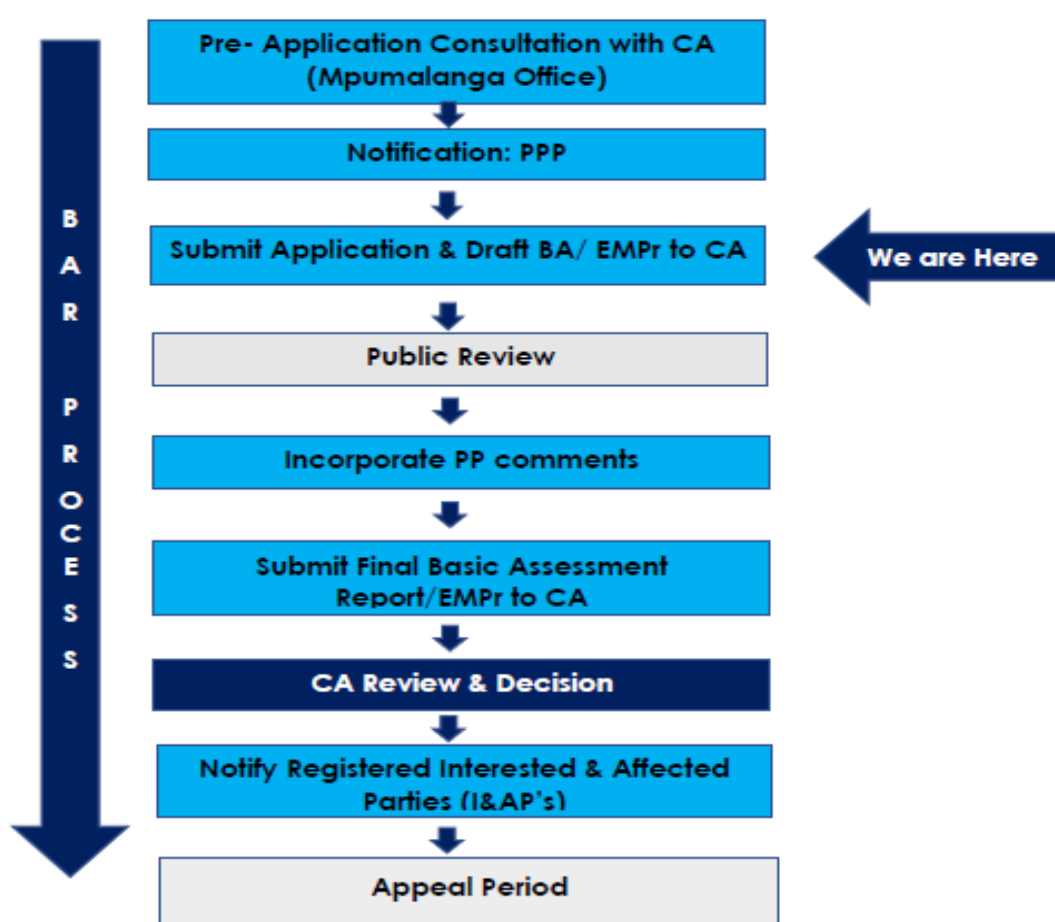
1.3 ENVIRONMENTAL LEGAL REQUIREMENTS

1.3.1 APPLICATION FOR ENVIRONMENTAL AUTHORISATION

The development of a 10 MW PV Solar Facility, outside an urban edge, require the Basic Assessment Process as contemplated in GNR. 327, Section 1(ii), of Environmental Impact Assessment Regulations Listing Notice 1 of 7 April 2017

Figure 2: Basic Assessment Process & Status

Overview of Basic Assessment Process



	Competent Authorities (CA)
	Environmental Assessment Practitioner (EAP)
	Interested & Affected Parties

1.3.2 LEGISLATION CONSIDERED

The following legislation was considered in the assessment process. The manner in which sections of the legislation affect the proposed development will be outlined in detail, in the body of the report:

- National Environmental Management Act (No. 107 of 1998)
- National Environmental Management: Waste Act (Act No. 59 of 2008)
- National Water Act (Act No. 36 of 1998)
- National Environmental Management Air Quality Act (Act No. 39 of 2004)
- National Environmental Management: Biodiversity Act (Act No. 10 of 2004); and
- National Heritage Resources Act (Act No. 25 of 1999).

1.4 PROJECT ALTERNATIVES

The following alternatives were assessed in relation to the proposed development:

- **Location Alternative:** Four site locations were assessed for the proposed PV Solar Facility, please refer to Site 1 (preferred) , Site 2, Site 3, and Site Option 4 on figure 10 and three route options were assessed for the proposed 155 m long 132/22 KV powerline.
- **Technology Alternative:** The Photovoltaic (PV) panels up to 5m in height with a single tracking technology, is the preferred option at this stage.

1.5 THE RECEIVING ENVIRONMENT

The receiving environment has been described in the Basic Assessment Report based on the following:

- Socio-Economic Environment
- Topography
- Climate
- Surface Water
- Terrestrial Biodiversity (Flora & Fauna)
- Land Use and land cover
- Geology
- Soils
- Planning
- Existing Structures and Infrastructure
- Transportation
- Air quality
- Noise
- Cultural Heritage & Palaeontological Features

1.6 SPECIALIST STUDIES CONDUCTED

The following studies were triggered by the DFFE Screening done, based on the outcome and the receiving environment and the type of development proposed.

- Aquatic Impact Assessment
- Terrestrial Biodiversity Study (Fauna, Flora and Avifaunal)
- Agricultural Impact Assessment
- Phase 1: Cultural Heritage Impact Assessment
- Desktop Paleontological Assessment
- Social Impact Assessment
- Visual Impact Study (Was conducted during the previous study)

The information acquired from the respective specialist studies is integrated into the Basic Assessment Report. The information will further used to inform the proposed PV Solar Facility Site development and all supportive infrastructures.

1.7 ENVIRONMENTAL IMPACT ASSESSMENT

The Basic Assessment Report investigated the appropriate potential environmental impacts that could result during the following phases of the development, during the pre-construction phase, construction phase and operational phase of the Project. The identified Impacts are listed below:

- Impacts associated with listed activities contained in NEMA Government Notice No. R. 327, No. R 324, No. R 325, of 7th April 2017, for which Environmental Authorisation have been applied for;
- An assessment of the Project's activities;
- An assessment of the receiving social, economic, biophysical and built environments;
- Findings from specialist studies;
- Comments gathered during the public participation process; and
- Requirements by the environmental authorities

Based on the impacts associated with the proposed project, mitigation measures were established which took cognisance of measures identified by various environmental specialists, environmental legislation requirements and environmental best practices. The Environmental Management Programme (EMP) provides a broad list of mitigation measures for specific elements of the Project. The “no-go option” and its implications was also assessed, details are provided in the Basic Assessment Report. The cumulative impacts associated with the proposed development were addressed in the report.

1.8 PUBLIC PARTICIPATION PROCESS

The PPP was conducted based on the requirements of Chapter 6 of GN No. 326 of the 2017 EIA Regulations of the NEMA (As amended)

The process involved the following:

- Placing site notices at noticeable and strategic points.
- Placing notices at the earmarked site and around the study area, in English and Afrikaans.
- Notices were e-mailed to all identified Interested and affected parties, including ward councillors of the area, authorities and relevant state departments
- Notice was placed in the local newspapers (VrystaatKroon)
- The African speaking community and those disadvantaged were informed of the EIA notice through site notices.
- Other younger generation / class of the community was also informed through social media Platforms such as Facebook.

1.9 CONCLUSION

Based on the specialist studies conducted, assessment of the project life-cycle's possible or potential impacts and the implementation of mitigation measures aimed at either preventing, reducing and minimising possible significant impacts, It is the opinion of the EAP that the project be considered for authorisation. Further, looking at the cumulative impacts, it is unlikely that any of the assessed impacts would result in spatial and temporal cumulative change. With mitigation measures, all the envisaged and assessed cumulative impacts can be regarded as marginal or minimal. The significance of cumulative impacts can be further reduced should existing powerline Infrastructure servitudes and access roads /tracks used.

Based on alternatives assessed, alternative 1 site and option 1 Powerline are recommended to be granted Environmental Authorisation to satisfy the purpose and need of the proposed Steynsrus 10MW PV Solar Facility, on condition that an EMPr and applicable mitigation measures recommended by the Environmental Specialists in their reports are implemented. The services of an Independent ECO to audit compliance at all project phases should be mandatory. All necessary Environmental Authorisations in terms of NEMA legislation and other applicable legislations such as, but not limited to SAHRA, NWA regulations, NEMBA regulations and NFA regulations for vegetation are complied with, prior to development establishment.

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LIST OF ABBREVIATIONS & ACRONYMS

AC	Alternating Current
AEL	Atmospheric Emission Licence
AoI	Area of Interest
ASAPA	Association for Southern African Professional Archaeologists
APPA	Atmospheric Pollution Prevention Act; Act No. 45 of 1965
BAR	Basic Assessment Report
BPEO	Best Practicable Environmental Option
BESS	Battery Energy Storage System
CBAs	Critical Biodiversity Areas
CR	Critically Endangered (CR), (EN), (VU) or (LC),
DFFE	Department of Forestry, Fisheries and the Environment
DEL	Department of Employment and Labour
DESTEA	Department of Small business, Development, Tourism and Environmental Affairs
DMRE	Department of Mineral Resources and Energy
DPRT	Department of Police, Roads and Transport
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EHS	Environmental, Health, and Safety
EMPr	Environmental Management Programme
EN	Endangered
ESAs	Ecological Support Areas
NHRA	National Heritage Resources Authority

GHG	Greenhouse Gas
GIS	Geographical Information System
GN	Government Notice
HIV	Human Immunodeficiency Virus
HV	High Voltage
IAPs	Interested and Affected Parties
IBAs	Important Bird & Biodiversity Areas
IDP	Integrated Development Plan
SDF	Spatial Development Framework
SEF	Solar Energy Facility
ToR	Terms of Reference
WMA	Water Management Area
ESA	Ecological Support Areas
FEPA	Freshwater Ecosystem Priority Areas
HPA	High Priority Area
VIS	Visual Impact Assessment

LIST OF UNIT MEASURES

°C	Degrees Celsius
ha	Hectare
km	Kilometre
km²	Square kilometre
km/h	Kilometres per hour
kV	Kilovolt
m	Metre
m²	Square metre
m³	Cubic metre
m/s	Metre per Second
mm	Millimetre
MVA	Megavolt ampere
MW	Megawatt
MWh	Megawatt hour
TWh	Terawatt Hours

1 INTRODUCTION

1.1 Project background and motivation

In pursuit of promoting the country's Renewable Energy development imperatives, the Government has been actively encouraging the role of Independent Power Producers (IPPs) to feed into the national grid. Through its Renewable Energy IPPs Procurement Programme, the DoE has been engaging with the sector to strengthen the role of IPPs in renewable energy development. The use of solar energy for power generation can be described as a non-consumptive use of natural resources which emits no greenhouse gas emissions during the electricity generation process. The generation of renewable energy contributes to South Africa's electricity generating market which has historically been dominated by coal-based power generation.

To participate in the abovementioned programme, Contrarians Capital (Pty) Ltd is proposing the establishment of a commercial photovoltaic (PV) solar energy facility with a capacity of up to 10MW to be established on farms Arbeid 2154 and Weltevrede 2151. The site is located approximately 5 km north-west of Steynsrus within the Free State Province. As indicated in the Introduction section of this report, the project was approved previously unfortunately the authorisation lapsed. This application seeks to re-apply for a new authorisation as required by the law.

1.2. Objectives of the study

The study seeks to outline steps followed in conducting the environmental assessment, in this case, the Basic Assessment Report (BAR) of the proposed Steynsrus 10MW PV Solar Facility and Storage, Free State Province.

The objective of the basic assessment process is to, through a consultative process—

- determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;

- identify the alternatives considered, including the activity, location, and technology alternatives;
- describe the need and desirability of the proposed alternatives through the undertaking of an impact and risk assessment process, inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites determine the nature, significance, consequence, extent, duration, and probability of the impacts occurring to the degree to which these impacts—
 - (a) can be reversed;
 - (b) may cause irreplaceable loss of resources; and
 - (c) can be avoided, managed or mitigated;

Through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—

- (a) identify and motivate a preferred site, activity and technology alternative;
- (b) identify suitable measures to avoid, manage or mitigate identified impacts; and
- (c) identify residual risks that need to be managed and monitored

2 LOCATION OF THE ACTIVITY

2.1 Geographic Location

The earmarked site of the development is located approximately 5km north-west of Steynsrus, Free State Province, within the boundaries of Moghaka Local Municipality

Figure 3: Locality Map

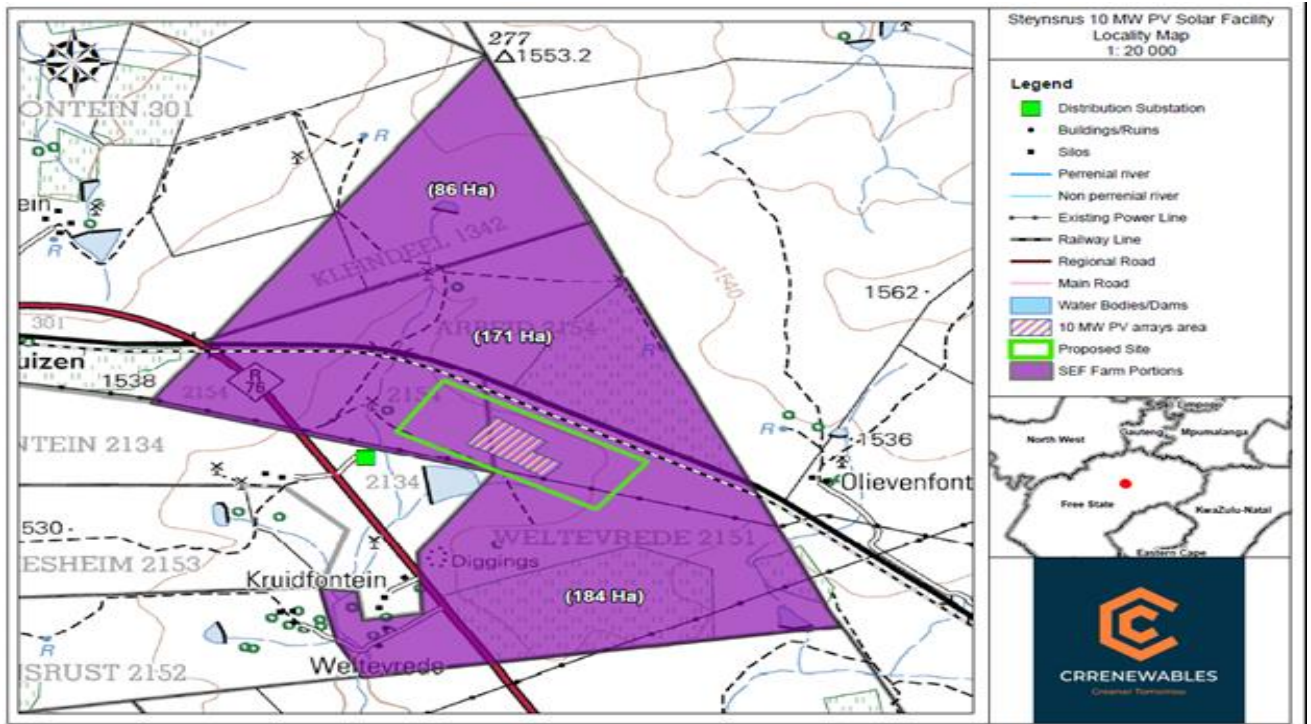


Figure 4: Topographical Map (1: 50,000 Scale)

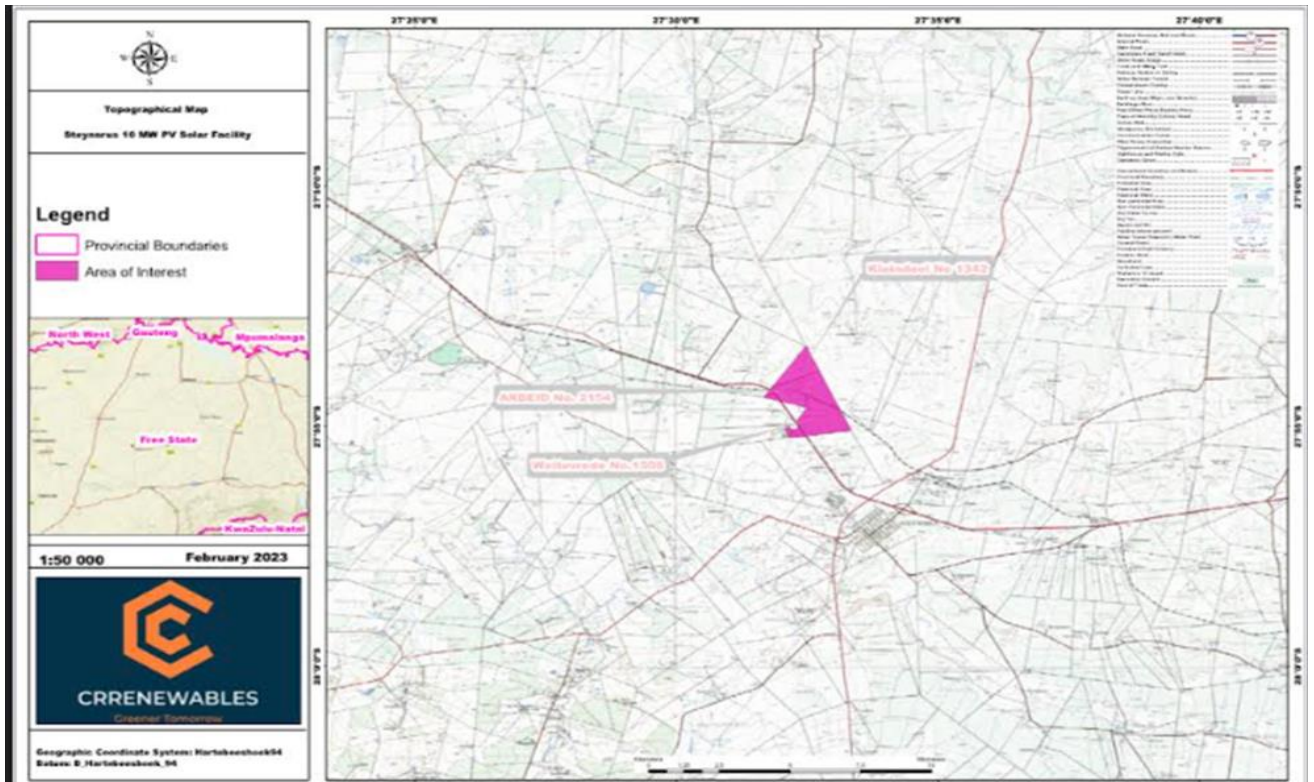
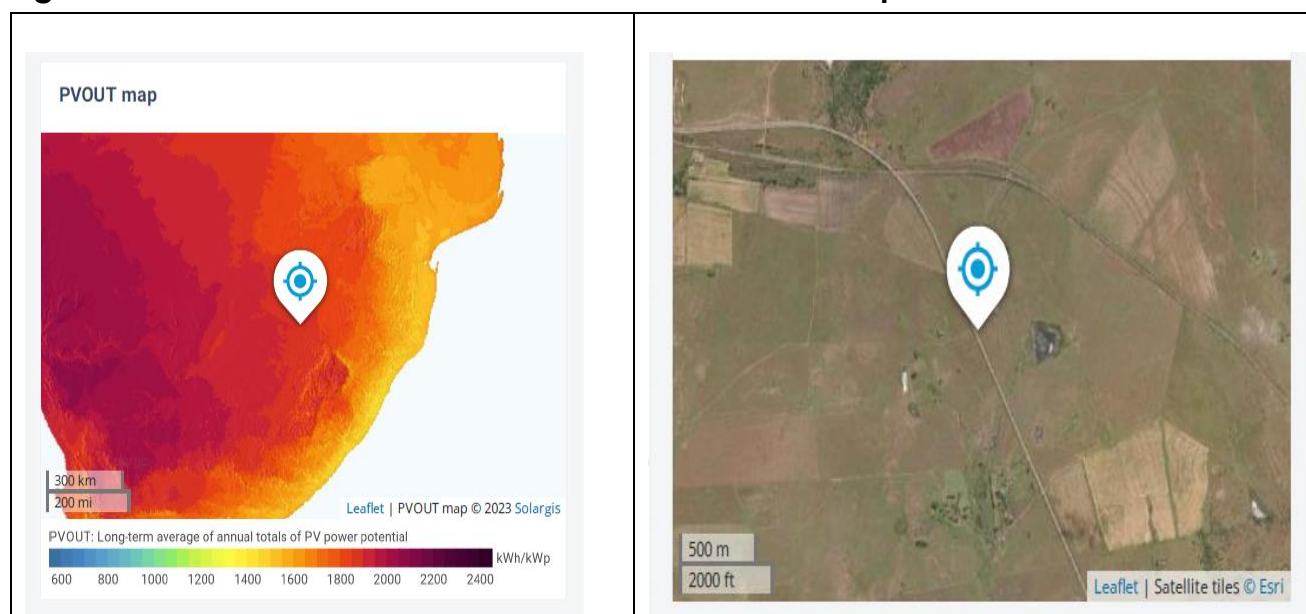


Figure 5: The earmarked site in relation with the Solar Map



Sources: Solar database and PV software © 2021 Solargis

3 PROJECT DESCRIPTION

3.1 Project Scope

The proposed Steynsrus 10MW PV Solar Facility and Storage, will be located on the farms Arbeid 2154 and Weltevrede 2151, and will have the following description:

- The facility development footprint will be approximately 25-30ha within which the following infrastructure will be established:
- Photovoltaic (PV) panels up to 5m in height (using tracking technology) with a capacity of up to 10 MW.
- An on-site substation as part of the PV plant.
- Grid connection: An overhead power line that will tie into the existing power line on site (Oosthuizen Traction-Komspruit Traction) including the associated switching station which can be located on the southern boundary of the site, or an overhead power line that will tie into the existing power line on site (Oosthuizen Traction-Komspruit Traction) including the associated switching station which can be located at the

eastern boundary of the site, or alternatively construct a new power line (approximately 155m) to connect to the existing Steynsrus Rural 132 kV Substation.

- Extension/upgrade of the existing Steynsrus Rural 132kV¹ substation and associated connection infrastructure associated with the substation and PV plant.
- Cabling between the project components, to be lain underground where practical.
- Mounting structures (either rammed steel piles or piles with pre-manufactured concrete footings to support the PV panels).
- Internal access roads of 4 to 5 m wide
- Property Fence of not more than 2.5 m high.
- Workshop area (20 m x 30 m) for maintenance, storage and offices
- Small modular water filtration or di-ionisation unit of approximately (10m X 10 m)
- Parking and water storage tanks
- Laydown area extent 200 m²
- BESS

An estimated 2 million litres of water would be required for the construction of the PV Solar Facility. Water will be trucked from the nearest licenced water user, municipality, or suitable borehole.

In addition to standard water use for the office and toilets, the PV panels will need to be maintained twice a year to ensure better performance. An amount of 500,000 litres (half a million or 500 cubes) of water would be required annually for operational activities. Water will be trucked in from the nearest water source as per a water purchase agreement from a local authorised user. Depending on the quality of water, it is not expected that this water would need to be treated and thus this water will not accumulate any chemicals or hazardous materials and therefore would not be regarded as wastewater. Should the water quality of the purchased water be poor and or needs deionising for panel cleaning then, a small salt rich residue will remain and disposed of at the appropriate municipal depot. It is envisaged that the

volume of salt residue would not exceed half a cubes per cleaning event and would be deposited at the nearest authorised facility. Such a volume would not trigger the need for a waste license.

The overall aim for the design and layout of the proposed facility is to maximise electricity production through exposure to the solar radiation, while minimising infrastructure, operation and maintenance costs, and social and environmental impacts.

Components of the PV Facility

The proposed PV facility will be comprised of the following:

PV Panels

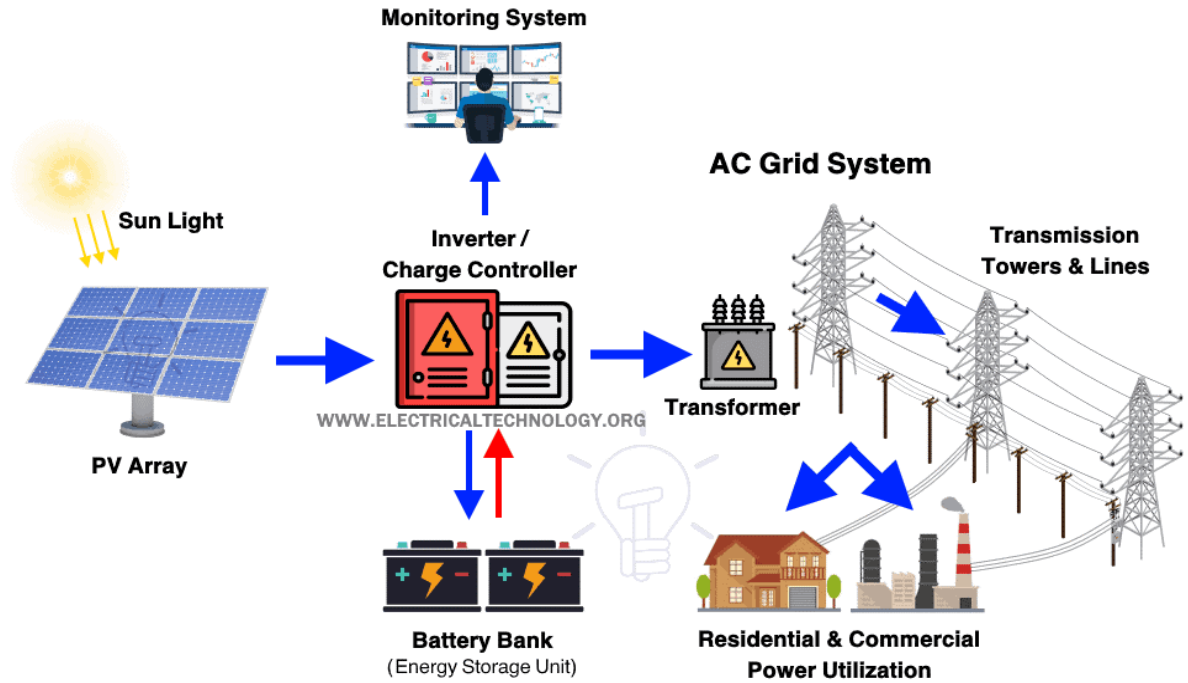
Solar energy facilities, such as those using PV panels, use the energy from the sun to generate electricity through a process known as the Photovoltaic Effect. This effect refers to photons of light colliding with electrons, and therefore placing the electrons into a higher state of energy to create electricity.

A photovoltaic (PV) cell is made of silicone which acts as a semiconductor used to produce the photovoltaic effect. Individual PV cells are linked and placed behind a protective glass sheet to form a photovoltaic panel. The PV cell is positively charged on one side and negatively charged on the other side and electrical conductors are attached to either side to form a circuit.

This circuit then captures the released electrons in the form of an electric current (direct current). An inverter must be used to change the direct current (DC) it to alternating current (AC). The electricity is then transmitted through a power line for distribution and use.

Figure 6: Schematic diagram of a PV plant

Components of Solar Power Plant



(Source: www.electricaltechnology.org)

The PV panels will be fixed to a support structure (as illustrated in Figure 6 below) set at an angle so to receive the maximum amount of solar radiation. The height of the PV panels is expected to be up to 5 m.



Figure 7: Example of PV Panels installed

The angle of the panel is dependent on the latitude of the proposed facility and the angles may be adjusted to optimise for summer or winter solar radiation characteristics. The PV panels are designed to operate continuously for more than 20 years, unattended and with low maintenance.

Photovoltaic Cells

An individual photovoltaic cell is made of silicon which acts as a semiconductor. The cell absorbs solar radiation which energises the electrons inside the cells and produces electricity. Individual PV cells are linked and placed behind a protective glass sheet to form a photovoltaic panel. A single cell is sufficient to power a small device such as an emergency telephone. However, to produce 10 MW of power, the proposed facility will require numerous cells arranged in multiples/arrays which will be fixed to a support structure.

Panels and mounting structure for Tracking.

The adopted mounting structure proposed for this project is a mono-axial tracking frame with:

- Direction of rotation axis North – South
- Sun path direction tracking East – West
- Maximum allowed tracking angle, from +45° to -45°
- Maximum modules surface for frame, about 36 m²

This technology ensures, in term of energy production, an advantage of about 25% compared to the horizontal fixed one.



Figure 8: Frame, structural details of a tracking PV technology

Description of how the technology works:

A 'single axis tracker' will track the sun from east to west, while a dual axis tracker will in addition be equipped to account for the seasonal waning of the sun. These systems utilise moving parts and complex technology, including solar irradiation sensors to optimise the exposure of PV panels to sunlight.

The systems result in a higher efficiency of the facility but are more complex as:

- A high degree of maintenance is required due to the nature of the machinery used in the system, which consists of numerous components and moving parts. A qualified technician is required to carry out regular servicing of these parts, which places a question on the feasibility of this system given the remote location of the proposed project site.
- The costs of the system are necessarily higher than a fixed mounted system due to the maintenance required for its upkeep and its complex design.
- A larger project site is required for this system given that the separate mountings need to be placed a distance apart to allow for their tracking movement.
- A power source is needed to mechanically drive the tracking system and this would offset a certain portion of the net energy produced by the plant.



Figure 9: An Example of a Substation Picture



Figure 9: An Example of Powerline Picture (Monopole Structure)

3.2 Listed activities triggered

The table below provides the description of listed activities associated with the project as applied for.

Table 1: Listed activities relevant to the proposed development

Listed Activity Number	Listed Activity Description	Description of the project activity that potentially triggers the relevant listed activity
NEMA GN R325		
GN R325; Listing Activity 15	<p>The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for:</p> <p>(i) the undertaking of a linear activity; or</p> <p>(ii) Maintenance purposes undertaken in accordance with a maintenance management plan.</p>	<p>The proposed 10 MW solar PV facility (i.e. Steynsrus PV Solar Facility) will have an estimated footprint of approximately 30 ha.</p> <p>As a result, more than 20 ha of indigenous vegetation would be removed for the construction of the proposed Solar PV facility.</p> <p>More information regarding the presence of indigenous vegetation on site will be provided in the Ecological Impact Assessment/ Terrestrial Bio-diversity study.</p>
GN R325; Listing Activity 14	<p>The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.</p>	<p>A utility scale battery storage facility, which consist of dangerous goods, up to 1120 cubic metres of batteries will be installed for certain alternatives. This activity will thus be triggered. The battery storage facility will cover an area of up to 1ha and will be assessed through an risk assessment during the EIA phase.</p>

NEMA: GN R327		
GN R327; Listing Activity 11	<p>The development of facilities or infrastructure for the transmission and distribution of electricity-</p> <p>(i) outside urban areas or industrial complexes</p> <p>with a capacity of more than 33 but less than 275 kilovolts;</p>	<p>Onsite infrastructure including underground cabling for collection of electricity, with a capacity of up to 132/22Kv would be required to connect the proposed PV facility to the proposed onsite central 132 kV substation. The proposed facility is situated outside of the urban edge. This activity would therefore be triggered.</p>
GN R327; Listing Activity 1	<p>The development of facilities or infrastructure for the generation of electricity from a renewable resource where—</p> <p>(i) the electricity output is more than 10 megawatts but less than 20 megawatts;</p> <p>or</p> <p>(ii) the output is 10 megawatts or less but the total extent of the facility covers an</p> <p>area in excess of 1 hectare; excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs—</p> <p>(a) within an urban area;</p> <p>or</p>	<p>The proposed 10 MW solar PV facility (i.e.Steynsrus PV Solar Facility and storage will have an estimated footprint of approximately 30ha.</p> <p>It is taking place outside an urban edge / area</p> <p>It is renewable</p>

	(b) on existing infrastructure.	
GN R327; Listing Activity 19 (i)	<p>The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving</p> <p>a) will occur behind a development setback;</p> <p>b) is for maintenance purposes undertaken in accordance with a maintenance management plan;</p> <p>c) falls within the ambit of activity 21 in this Notice, in which case that activity applies.</p> <p>d) Occurs within an existing ports or harbour's that will not increase the development footprint of the port or harbour; or</p> <p>e) Where such development is related to the development of a port or harbour in which case</p>	<p>The proposed project will entail the excavation, removal and moving of more than 10 m³ of soil, sand, pebbles or rock from the nearby watercourses.</p> <p>The proposed project would also entail the infilling /or removal of soil of more than 10 m³ of material into the nearby watercourses.</p> <p>Based on the preliminary sensitivity screening undertaken for the site, watercourses occur on the farm.</p> <p>Construction of the internal gravel access road and/or the construction of infrastructure within drainage lines will require the removal of material.</p> <p>Additional information regarding the presence of watercourses on site will be provided in the Ecological Impact Assessment, more information may be added.</p>

	activity 26 in Listing Notice 2 of 2014 applies.	
GN R327; Listing Activity 24 (ii)	<p>The development of a road–</p> <p>(ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;</p> <p>but excluding a road–</p> <p>a) which is identified and included in activity 27 in Listing Notice 2 of 2014; or</p> <p>b) where the entire road falls within an urban area.</p>	<p>Existing roads will be used to gain access to the preferred site. The existing roads can be accessed from the R76</p> <p>An internal gravel road may be constructed from the existing roads to the proposed project site.</p> <p>The internal gravel road of 8 m in width. The length of the internal gravel road will be confirmed as the location, design and layout of the facility progresses. The proposed project will take place outside of an urban area.</p>
GN R327; Listing Activity 28 (ii)	<p>Residential, mixed, retail, commercial, industrial or Institutional developments where such land was used for agriculture or afforestation on or after 01 April 1998 and where such development:</p> <p>(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for</p>	<p>The earmarked site is currently used for agricultural purposes (mainly grazing).</p> <p>The proposed 10 MW solar PV facility, which is considered to be a commercial/industrial development, will have an estimated footprint of approximately 30 ha.</p>

	residential, mixed, retail, commercial, industrial or institutional purposes.	
NEMA GN R324		
GN R324, Listing activity 4	<p>The development of a road wider than 4 metres with a reserve less than 13,5 metres.</p> <p>b. Free State</p> <p>i. Outside urban areas:</p> <p>(aa) A protected area identified in terms of NEMPAA, excluding disturbed areas;</p> <p>(bb) National Protected Area Expansion Strategy Focus areas;</p> <p>(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</p> <p>(dd) Sites or areas identified in terms of an international convention;</p> <p>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p>	<p>This on site farm road, may need to be widened by more than 4 m, and in some instances within 100m of onsite drainage features (where required). The proposed project will take place outside of an urban area.</p> <p>The length of the internal gravel road will be confirmed as the location, design and layout of the facility progresses. The proposed project will take place outside of an urban area.</p>

	<p>(ff) Core areas in biosphere reserves; or</p> <p>(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas; or</p> <p>ii. Inside urban areas:</p> <p>(aa) Areas zoned for use as public open space;</p> <p>(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose; or</p> <p>(cc) Areas within urban protected areas</p>	
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Important to note: Please note that a precautionary approach was followed when identifying above mentioned listed activities (for inclusion in the Application for EA and to be assessed as part of the BAR Process), i.e. if the activity potentially forms part of the project, it is listed. However, the final project description will be determined by the findings of the BAR Process and certain activities may be added or removed from the project proposal.

3.3 Feasible and Reasonable Alternatives

3.3.1 Site Alternatives

A site alternative refers to the identification of more than one potential site which may be suitable for the establishment of a proposed facility. Due to the nature of the proposed development (i.e. a renewable energy facility), the location of the project is largely dependent on technical and environmental factors such as solar irradiation (i.e. the fuel source), climatic conditions, available extent and the relief/topography of the site, and

available grid connection. The proposed site was identified by the proposed developer as being technically feasible. Four alternate sites were also assessed as part of a pre-feasibility assessment.

The following characteristics were considered in determining the feasibility of the proposed site:

Site Extent - space is a restraining factor for the development of a PV facility. An area of approximately 30 ha would be required for a facility of up to MW. The proposed entire site is approximately 441 ha in extent, will therefore be more than sufficient for the installation of the proposed facility, and should allow for the avoidance of any identified environmental and/or technical constraints in terms of the final design of the facility.

Land availability and Site access - The land is available for lease by the developer. The site can be accessed easily an existing gravel road off the R76. The site is therefore appropriately located for easy transport of components and equipment as well as labour movement to and from the site.

Climatic Conditions - the economic viability of a PV facility is directly dependent on the annual direct solar irradiation values. The site has been indicated as an area of high irradiation (refer to figure 4) which indicates that the regional location of the project is appropriate for a solar energy facility.

Gradient - a level surface area is preferred for the installation of PV panels. The slope of the proposed site is acceptable from a development perspective, which reduces the need for extensive earthworks and associated levelling activities, thereby minimising environmental impacts.

Grid Connection – the site is adjacent to the existing Steynsrus Rural Substation. Through the construction of a short power line (155m), the electricity generated at the PV facility could be evacuated from the proposed on-site substation directly into the grid to feed into the grid via the Steynsrus Rural 132kV Substation or alternatively a power will be evacuated to the Eskom existing overhead power line to associated switch yard which can be located southern or eastern boundary of the site.

Through the pre-feasibility investigations, the applicant conducted a site evaluation study to identify the most favourable site for the proposed development within the identified farm portions. The pre-feasibility investigation evaluated four (4) possible sites for the proposed development (refer to table 2 below).

Table 2: PV SOLAR FACILITY FOUR ALTERNATIVE SITES

Sites Alternatives		Lat (DDMMSS)	Long (DDMMSS)
Site 1 (Alternative 1) (Preferred)	Description: Located on Farms Arbeid 2154 and Weltevrede 2151	27°54'28.42''S	27°32'26.89'' E
Site 2	Description: Located on Farm Weltevrede 2151		
Site 3	Description: Located on farm Arbeid 2154,		
Site 4	Description: Located on farm Kleindeel 1342		

Table 3: POWERLINE ALTERNATIVES (LINEAR)

Alternative 1 (preferred) Proposed Steynsrus Power line (155m length)		
	Lat (DDMMSS)	Long (DDMMSS)
Starting point of the activity	27° 54' 29.64"	27° 32' 16.28"
Middle point of the activity	27° 54' 31.22"	27° 32' 13.94"
End point of the activity	27° 54' 32.32"	27° 32' 11.58"
Alternative 2 Connecting the existing powerline using associated switching station - Southern Boundary		
An overhead power line that will tie into the existing power line on site (Oosthuizen Traction-Komspruit Traction) including the associated switching station which is located on the southern boundary of the site.		

Alternative 3 Connecting the existing powerline using associated switching station -Eastern Boundary
An overhead power line that will tie into the existing power line on site (Oosthuizen Traction-Komspruit Traction) including the associated switching station which is located on at the eastern boundary of the site.

The site assessment conducted previously by Savannah Environmental Consultants, revealed the following findings:

Site 1: Located on farm Arbeid 2154 and Weltevrede 2151 (Preferred Alternative)

- Drainage lines and other water resources can be easily avoided.
- The existing Steynsrus Rural 132kV Substation and associated power lines are located adjacent this area, which reduces the need for a long power line, and subsequently reduces the development footprint.
- Direct access to the site exists via a gravel road off the R76, which also reduces the developmental footprint, and this allows for good site accessibility due to infrastructure.
- Site does not impact on cultivated agricultural land.
- The site has good solar resource.
- The site is characterised by flat terrain and large farm portions which can readily accommodate such a facility.
- Due to the high clay content and shallowness of the soils expected in the study area, the area is categorised as being “marginal potential arable land” and considered “not suitable for cultivation”.

Site 2: Located on farm Weltevrede 2151

- Development in this area would potentially result in impacts on drainage lines.
- The Steynsrus Rural 132kV Substation is removed from the site, which would increase the length of the power line and subsequently the development footprint.
- In addition, connection to the substation may impact on water resources (as a result of crossing of drainage lines).
- Development in this area would result in impacts on cultivated land.
- This site is currently cultivated with soybeans (Refer to figure 10 below) while maize was grown in this area in 2012, according to the landowner, Mr Boy Saaiman, these crops are grown as feed for his beef cattle.
- One of the four farm water reservoirs (located at -27.91502°S & 027.54335°E) is situated within this property. This reservoir provides water to all the adjoining grazing paddocks.
- An archaeological and cultural heritage site is located within the development footprint area – Stone cairns (possible graves).

Site 3: located on farm Arbeid 2154

- The Steynsrus Rural 132kV Substation and power lines are removed from the site which would increase the length of the power line and subsequently the development footprint.
- Development in this area would result in impacts on cultivated land. This is currently cultivated with Smuts finger grass, which is a perennial pasture used for cattle grazing.
- An archaeological and cultural heritage site is located within the development footprint area – Rectangular Stone Wall foundation.

Site 4: is located on farm Kleindeel 1342

- The Steynsrus Rural 132kV Substation is removed from the site which would increase the length of the power line and subsequently the development footprint. In addition, connection to the substation may impact on water resources (as a result of crossing of drainage lines).
- Development in this area would result in impacts on cultivated land (Refer to figure

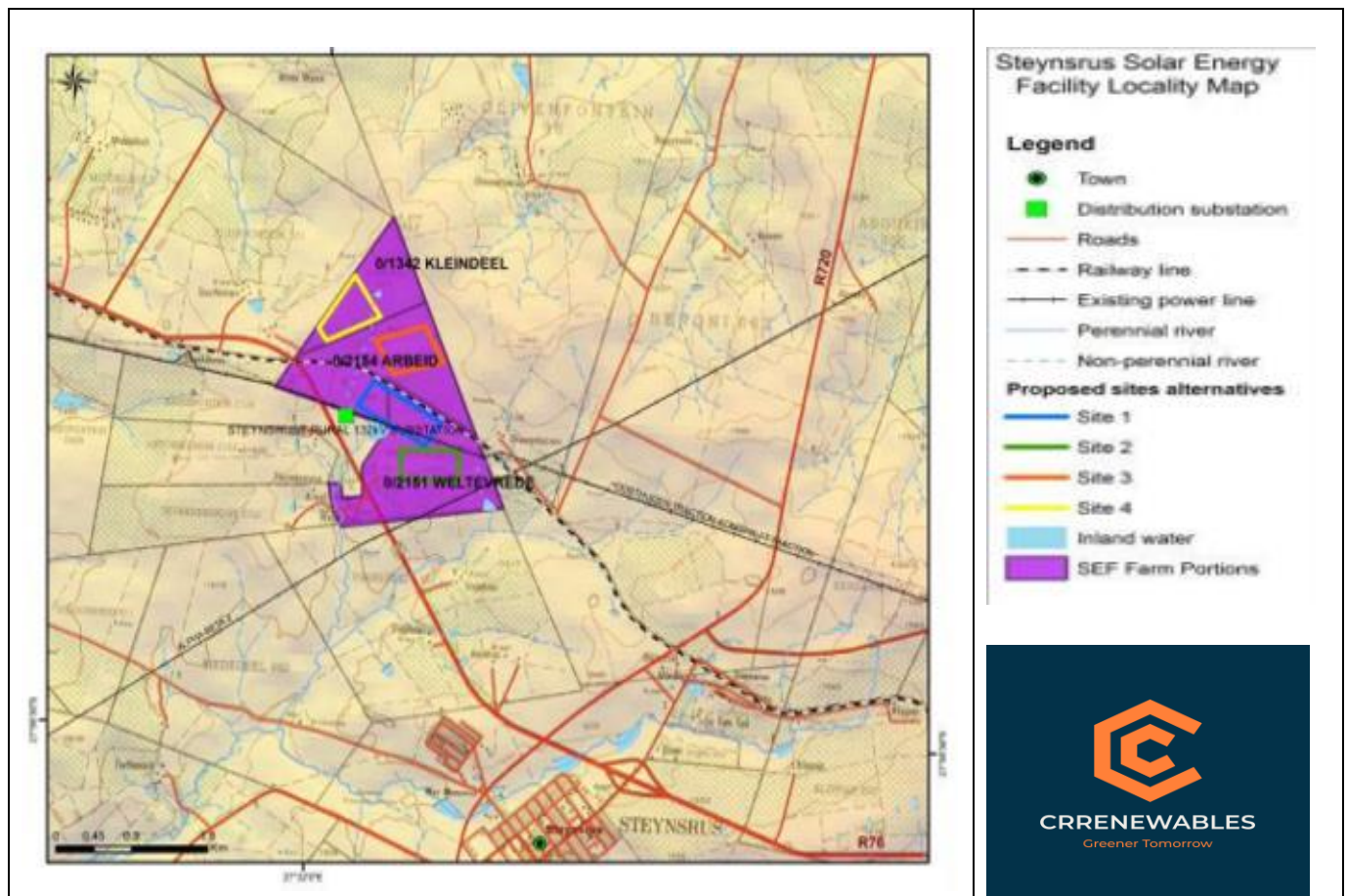


Figure 10: Map showing alternative sites for the proposed development



Figure 11: Map showing the location of the four proposed alternative sites in relation with the crops cultivated area of the study area.

Sourced: www.agis.agric.za

Based on the above-mentioned findings, it was concluded that Site 1 alternative, would be the most feasible option to take forward for consideration in the Basic Assessment Reporting Process for the proposed Steynsrus PV Solar facility. It is therefore the alternative which is considered within this Basic Assessment Report.

3.3.2 Lay-Out Alternatives.

PV Solar Facility Site	Description
Alternative 1 /Site 1 (Preferred)	The assessment is still in its design and planning stage, so no final layout designs are ready yet. After the Environmental Authorisation is received the final layout plans will be submitted to authorities accordingly (Refer to figure 10)
Powerline Routes	
Alternative 1/ Option 1 (Preferred)	The assessment is still in its design and planning stage, so no final layout designs are ready yet. After the Environmental Authorisation is received the final layout plans will be submitted to authorities accordingly.
Alternative 2 / Option 2	
Alternative 3 / Option 3	

3.3.3 Technology alternatives

PV Site 1	Description
Preferred Technology	<p>Research proves that solar energy is considered to be the most suitable renewable energy technology for this site, based on the site location, ambient conditions and energy resource availability (i.e. solar irradiation).</p> <p>Solar PV was determined as the most suitable option for the proposed site as large volumes of water are not needed for power generation purposes compared to concentrated solar power technology (CSP). PV is also preferred when compared to CSP technology because of the lower visual profile.</p> <p>Very few technological options exist as far as PV technologies are concerned; those that are available are usually differentiated by weather and temperature conditions that prevail – so that optimality is obtained by the final choice. The impacts of any of the PV technology choices on the environment are very similar. The construction, operation and decommissioning activities associated with the facility will also be the same irrespective of the technology chosen.</p> <p>There are a number of different solar PV technologies, i.e.:</p>

	<ul style="list-style-type: none"> ○ Fixed / static PV panels; ○ Tracking PV panels (with solar panels that rotate to follow the sun's movement); and ○ Concentrated PV Plants (CPV technology). <p>Based on the information provided above, Tracking PV is being considered for the proposed Steynsrus PV Solar Energy Facility.</p>
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3.3.4 No-go Alternative

This is the option of not constructing Steynsrus PV Solar Energy Facilities and Storage. This option is assessed as the “no go alternative” in this BAR. Although consideration of this alternative would result in no environmental impacts on the site or surrounding local area, as a result of the proposed facilities, the option would be failing to align with the requirements of the Department of Energy goals of encouraging renewable energy as part of the energy mix to ensure compliance with Sustainable Development Goals.

3.4 Project Lifecycle

The project lifecycle for a new substation and the distribution powerline will include the following activities:

Table 4: Project Phases Activities

The Phase	Primary Activities	Activities for a new Powerline	Activities for a new Substation
Feasibility phase	<ul style="list-style-type: none"> • This includes Investigating and selecting a suitable location for the PV site as well as corridors for the distribution powerline route. 		
Planning and design Phase	<ul style="list-style-type: none"> • The phase will only be undertaken should Environmental Authorisation be obtained, and it includes survey of the earmarked site, selection of the most appropriate solar arrays positions most appropriate technology; conduct a walk-down survey to determine the exact locations of the solar structure, based on sensitive environmental features and technical criteria. 		

	<ul style="list-style-type: none"> • Prepare relevant planning documentation, including technical and design documentation. 		
Construction Phase	<p>Construction activities include installation of the PV Facility infrastructure and equipment's.</p>	<ul style="list-style-type: none"> • Vegetation Clearance • Pegging of towers • Establishment of camps • Access Route • Excavation of tower foundations • Installation of bird flappers to ensure line visibility to bird species • Erection of steelworks • Stringing of cables/ Conductors • Concrete Works • Rehabilitation of the affected site 	<ul style="list-style-type: none"> • Site Preparation (fencing, clearing, levelling and grading, etc.) • Establishing access roads; • Establishing the site office; • Laydown areas and storage facilities; • Transporting equipment to site; • Undertaking civil (e.g. digging foundations, storm water drainage construction and concrete works), mechanical and electrical work (including the installation of Solar arrays structures with suitable panes, Inverters, battery storage facility, supportive structure to

			<p>convert DC energy to AC energy, circuit breakers, current transformers, isolators, insulators, surge arrestors, voltage transformers and earth switches);</p> <ul style="list-style-type: none"> • Connection of additional power line to the grid substation; • Reinstating and rehabilitating working areas outside of permanent development footprint; and • Testing, commissioning and hand over
Operational phase	The phase include implementation of operational activities associated with the maintenance and control of the PV Facility, Switching Station and distribution powerline.	<ul style="list-style-type: none"> • Servitude Maintenance to ensure continual supply of power • Vegetation Clearance • Soil Erosion control • Ensuring possible bird 	<p>Substation /or Switching Station Maintenance activities will include amongst other things:</p> <ul style="list-style-type: none"> • Testing, • Inspecting, • Servicing, • Examining, • Overhauling of equipment associated

		<p>nests are controlled</p> <ul style="list-style-type: none"> • Avoid electrocution of birds by placing necessary bird-flappers/guards 	<p>with the substation (e.g. circuit breakers and transformers)</p> <ul style="list-style-type: none"> • Inspecting Fire detection system • Fence repair, • Stormwater maintenance • Landscaping • Changing Oil from transformer/s (Drain old oil, flash and refill) • Maintaining Oil catchment dams • Vegetation Clearance around the substation to ensure safety. • Replacement of possible solar panels and other components of the solar system • BESS Maintenance
<p>Decommissioning</p>	<p>The phase includes dismantling all equipment's (Substation & Powerline) in trying to mitigate the sites to resemble the original status. It includes measures for complying with the prevailing regulatory requirements, rehabilitation and managing environmental impacts caused. Funds should be allocated in order to ensure decommission process is successful and complies with relevant legal requirements.</p>		

3.5 Resources and Services associated to the Construction & Operation of the proposed development.

The section outlines the resources that will be needed to execute the Project. It is important to note that the Environmental Management Plan Report (EMPr) established, has provided necessary mitigations to manage possible impacts associated with aspects listed below (Refer to Appendix G).

3.5.1 Raw Materials

Construction activities will require that following material (e.g. steel, cement, sand, aggregate, etc.). These materials will be sourced from accredited suppliers appointed by the developer.

3.5.2 Water

During construction phase, portable water will be required for construction activities. According to the National Water Act, the user of water must not waste water. Necessary steps will be taken to ensure that water is not wasted and acquired illegally. Necessary permit will be obtained where necessary, and arrangements with nearby land users will be made to ensure water is used appropriately.

3.5.3 Sanitation

Sanitation services, such as chemical toilets will be needed for construction workers. Approved suppliers in this regard will be used to ensure construction workers are not inconvenienced.

3.5.4 Waste

Different types of waste will be generated. Waste will be temporarily stored at suitable locations (e.g. demarcated areas at construction camp in labelled bins and containment) and will be removed and disposed of at approved landfill sites.

Liquid Waste will include the following:

Sewage;

- Grey water: water used for washing purposes (e.g. equipment, staff);
- Drainage contaminated water from (e.g. workshop, equipment storage areas), stormwater run-off.

Solid waste from construction activities and material such as cement contaminated papers, broken bricks, concrete etc

Domestic and biological waste, generated during the operational phase

It must be noted that appropriate measures will be implemented to manage all waste and wastewater generated during the construction and operational phases.

3.5.5 Roads

Where necessary temporary access roads will be created during the construction phase. The areas affected by temporary roads will be reinstated, if they would not be used as permanent, in the operational phase. The site will be easily accessible via the surrounding road network, such as R76.

3.5.6 Stormwater

An on-site stormwater drainage system will be established in line with best practices. Appropriate controls will be implemented to ensure that sediments, oils and chemicals are controlled and contained in the catchment dam. No liquid / solid waste will be released from the substation site.

3.5.7 Electricity

Electricity will be obtained or generated using diesel generators or temporary electricity connections during the construction phase will be arranged to ensure development runs uninterrupted.

3.5.8 Laydown Areas

A laydown area will be required during the construction phase. Care must be taken to ensure negative impacts are minimised.

3.5.9 Construction Workers

The appointed contractor will mostly use services of skilled labour for the construction of the substation and distribution powerline. In instances where casual labour is required, the developer will request that such persons are sourced from local communities, as far as possible.

4 PROJECT NEED AND DESIREBILITY

Due to the exploitation of and large-scale reliance on non-renewable resources and the potential subsequent impacts on climate, there is increasing pressure globally to increase the share of renewable energy generation. South

Africa currently depends on fossil fuels for the supply of approximately 90% of its primary energy needs. With economic development over the next several decades resulting in an ever-increasing demand for energy, there is some uncertainty as to the availability of economically extractable coal reserves for future use. Furthermore, several of South Africa's coal-fired power stations are nearing the end of their economic life, require refurbishment, or have been recently returned to service (re-commissioned) at great expense (i.e. the Camden, Komati, and Grootvlei Power Stations).

The current electricity imbalances in South Africa highlight the significant role that renewable energy can play in terms of power supplementation. Given that renewables can generally be deployed in a decentralised manner close to consumers, they offer the opportunity for improving grid strength and supply quality, while reducing expensive transmission and distribution losses. At present, South Africa is some way off from exploiting the diverse gains from renewable energy and from achieving a considerable market share in the industry. In order to meet the long-term goal of a sustainable renewable energy industry, a target of 17.8 GW of renewables by 2030 has been set by the Department of Energy (DoE) within the Integrated Resource Plan (IRP) 2010 and incorporated in the IPP Procurement Programme.

This energy will be produced from various renewable energy technologies including solar energy facilities (i.e. such as PV or CPV technology). The proposed project is to contribute towards this goal for renewable energy.

At a provincial level, the need for the project complies with the Free State Provincial Spatial Development Framework (FS PSDF). The Free State PSDF is a provincial spatial and strategic planning policy that responds to and complies with, in particular, the National Development Plan (NDP) Vision 2030 and the National Spatial Development Perspective (NSDP).

This framework promotes a developmental state in accordance with the principles of global sustainability as is stated by, among others, the South African Constitution and the enabling legislation.

Locally, the project is in line with the Moqhaka Local Municipality (MLM) IDP, which lists the need for electricity provision, general need for job creation initiatives and programmes, need to attract any investors / industries to the town (provision of adequate infrastructure to accommodate the latter).

The MLM specifically states under Objective 3 of the Electricity Provision priority (To ensure that electricity is provided to households in the whole area of

jurisdiction of the Municipality including urban, peri-urban and rural areas) the strategic need for the investigation of alternative energy sources to meet the MLM's energy needs.

Table 5: Need and Desirability of the Project

	Question	Response
NEED ('timing')		
1.	Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved Spatial Development Framework (SDF) agreed to by the relevant environmental authority? (i.e. is the proposed development in line with the projects and programmes identified as priorities within the IDP).	The main IDP and SDP objective of Moqhaka Local Municipality is actively promoting industrial development that contributes to economic growth in the area, to upgrade and maintain electricity network, and provide continuous and quality electricity by 2017. The construction of the proposed solar energy facility will assist in meeting these objectives
2.	Should development, or if applicable, expansion of the town/area concerned in terms of this land use (associated with the activity being applied for) occur here now?	Based on the specialist studies conducted the proposed development does not pose significant risks to the environment
3.	Does the community/area need the activity and the associated land use concerned (is it a societal priority)? This refers to the strategic as well as local level (e.g., development is a national priority, but within a specific local context it could be inappropriate)	<p>The evacuation of additional power into the Eskom grid will serve to improve the stability of the grid for the immediate area, assist the government in achieving the goal of 17GW renewable energy as part of the electricity generation technology mix by 2030, and assist in the reduction in the need to mine non-renewable resources such as coal for conventional power generation.</p> <p>The proposed activity is not necessarily a societal priority</p>

		for the community; however the development will benefit the local community through job creation, skills development opportunities and training which will, in turn, assist in reducing poverty levels that the area is currently facing, and strengthen electricity supply for the area.
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4.	Are the necessary services with appropriate capacity currently available (at the time of application), or must additional capacity be created to cater for the development?	All the services needed for the project have been adequately provided for and should any need for other services arise the relevant authority will be communicated with.
5.	Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services)?	The proposed project is to be developed by a private developer (i.e. Contrarians Capital Pty Ltd) and not the municipality. It therefore does not fall within the infrastructure planning of the municipality, although the need for the promotion of alternative energy sources is contemplated in the municipal IDP. The project will not have any implications for the infrastructure planning of the municipality.

6.	Is this project part of a national programme to address an issue of national concern or importance?	<p>This project is proposed to be developed under the IPP Procurement Programme that is being run by the National Department of Energy. The evacuation of additional power into the Eskom grid will serve to improve the stability of the grid for the immediate area, assist the government in achieving the goal of 17GW renewable energy as part of the electricity generation technology mix by 2030, and assist in the reduction in the need to mine non-renewable resources such as coal for conventional power generation.</p> <p>In order to meet the long-term goal of a sustainable renewable energy industry, a target of 17.8 GW of renewables by 2030 has been set by the Department of Energy (DoE) within the Integrated Resource Plan (IRP) 2010 and incorporated in the IPP Procurement Programme. This energy will be produced from various renewable energy technologies including solar energy facilities (i.e. such as PV or CPV technology).</p> <p>The proposed project is to contribute towards this goal for renewable energy</p>
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DESIRABILITY ('placing')		
7.	Is the development the best practicable environmental option (BPEO) for this land/site?	Kindly refer to Section 4.3 for the selected BPEO for the Project alternatives.
8.	Would the approval of this application compromise the integrity of the existing approved municipal IDP and SDF as agreed to by the relevant authorities?	<p>The main IDP and SDP objective of Moqhaka Local Municipality is actively promoting industrial development that contributes to economic growth in the area, to upgrade and maintain electricity network, and provide continuous and quality electricity by 2017.</p> <p>The construction of the proposed solar energy facility will assist in meeting these objectives.</p>

9.	Would the approval of this application compromise the integrity of the existing environmental management priorities for the area (e.g. as defined in EMFs), and if so, can it be justified in terms of sustainability considerations?	The development will be addressing the most needed solution for electricity supply, which is the social leg of sustainable development.
10.	Do location factors favour this land use (associated with the activity applied for) at this place? (this relates to the contextualisation of the proposed land use on this site within its broader context).	<p>Site access</p> <p>The site is accessible via the R76 between Steynsrus and Kroonstad.</p> <p>Climatic Conditions</p> <p>Direct solar irradiation values. A study of available radiation data shows that the proposed site is uniformly irradiated by the sun.</p>

		<p>Gradient</p> <p>A level surface area is preferred for the installation of PV panels and specifically for PV technologies. This reduces the need for extensive earthworks associated with the levelling of a site, thereby minimising environmental impacts. The proposed area for the proposed PV plant is generally on a flat location with slopes less than 5 degrees.</p> <p>Grid Connection</p> <p>The proposed facility is in a proximity (approx. 100m) to the proposed Steynsrus Rural 132kv Substation. The substation will have sufficient capacity to accommodate the proposed PV Solar energy facility following the implementation of the proposed substation expansion.</p>
11.	How will the activity or the land use associated with the activity applied for, impact on sensitive natural and cultural areas (built and rural/natural environment)?	Refer to compilation of significant environmental issues associated with the proposed project, addressed in section 13.11 of the report.
12.	How will the development impact on people's health and wellbeing (e.g. in terms of noise, odours, visual character and sense of place, etc.)?	The development will enhance the wellbeing of the people of Steynsrus and the nearby community of Matlwangtlwang since some of them will get either permanent or temporary jobs. Please refer to the project's EMPr in relation with

		development aspects and impacts, and mitigation thereof.
13	Will the proposed activity or the land use associated with the activity applied for, result in unacceptable opportunity costs?	The landowners will be leasing their site for more than 20 years, this on its own add monetary value to all families involved.
14	Will the proposed land use result in unacceptable cumulative impacts?	Cumulative impacts are considered in Section 13.14 and mitigations provided

5 APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

This section provides an overview of legislation that has a bearing on the proposed PV facility.

Table 6: The legislation that has possible bearing on the proposed PV Solar Energy Facility, Powerline & Substations/ Switch Station from an environmental perspective

Name of Legislation	Purpose for the Legislation relevant to the proposed development
Constitution of the Republic of South Africa, (No. 108 of 1996)	Important sections: <ul style="list-style-type: none"> • Chapter 2 – Bill of Rights. • Section 24 – Environmental Rights.
National Environmental Management Act (NEMA) (No. 107 of 1998)	Important sections: <ul style="list-style-type: none"> • Section 24 – Environmental Authorisation (control of activities which may have a detrimental effect on the environment). • Section 28 – Duty of care and remediation of environmental damage. • Environmental management principles. • Authorities – Department of Forestry, Fisheries and the Environment (DFFE) (national) and (Province)....
NEMA: GN No. R 982 of 4 December 2014 (as amended)	Purpose - regulate the procedure and criteria as contemplated in Chapter 5 of NEMA relating to the preparation, evaluation, submission, processing and consideration of, and decision on, applications for

	environmental authorisations for the commencement of activities, subjected to EIA, in order to avoid or mitigate detrimental impacts on the environment, and to optimise positive environmental impacts, and for matters pertaining thereto.
NEMA: GN No. R. 983 of 4 December 2014 (as amended) (Listing Notice 1)	<p>Purpose - identify activities that would require environmental authorisations prior to commencement of that activity and to identify competent authorities in terms of sections 24(2) and 24D of NEMA.</p> <ul style="list-style-type: none"> • The investigation, assessment and communication of potential impact of activities must follow a Basic Assessment Process, as prescribed in regulations 19 and 20 of GN No. R 982 of 4 December 2014 (as amended). However, according to Regulation 15(3) of GN No. R 982 (as amended), S&EIR must be applied to an application if the application is for two or more activities as part of the same development for which S&EIR must already be applied in respect of any of the activities. • Activities under Listing Notice 1 that are relevant to this project follow.
National Heritage Resources Act (Act No. 25 of 1999)	<p>Important Sections:</p> <ul style="list-style-type: none"> • Section 34 – protection of structure older than 60 years. • Section 35 – protection of heritage resources. • Section 36 – protection of graves and burial grounds. • Section 38 – Heritage Impact Assessment for linear development exceeding 300m in length; development exceeding 5 000m² in extent, etc. • Authorisation type – Permit. • Authority – South African Heritage Resource Agency
Conservation of Agricultural Resources Act (Act No. 43 of 1983)	<ul style="list-style-type: none"> • Control measures for erosion. • Control measures for alien and invasive plant species. • Authority – Department of Agriculture.
Hazardous Substance Act (No 15 of 1973) and Regulations	<ul style="list-style-type: none"> • 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 the generation of pressure thereby in certain circumstances, and for the control of certain electronic products • Provides for the division of such substances or products into groups in relation to the degree of danger.

	<ul style="list-style-type: none"> Provides for the prohibition and control of the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such substances and products.
Occupational Health & Safety Act (Act No. 85 of 1993)	<ul style="list-style-type: none"> Provisions for Occupational Health & Safety. Authority – Department of Employment and Labour (DEL). Relevant regulations, such as Electrical Installation Regulations, Construction Regulations, etc.
Minerals and Petroleum Resources Development Act (Act No. 28 of 2002)	<p>Equitable access to and sustainable development of the nation's mineral and petroleum resources and to provide for matters related thereto</p> <p>Important Sections (amongst others):</p> <ul style="list-style-type: none"> Section 22 – Application for mining right. Section 27 – Application for, issuing and duration of mining permit. Section 53 – Use of land surface rights contrary to objects of Act. Authorisation type – Mining Permit / Mining Right. Note that this is not required for the Project. <p>It is possible that quarry material may be required for maintenance work on the new access roads and the s along the powerline servitude, which may require new borrow pits to be opened.</p> <p>Should this be necessary then the necessary applications will be made to the Department of Mineral Resources (DMR). In terms of the Act, the sourcing of material for road construction purposes (i.e. the use of borrow pits) is regarded as mining and accordingly is subject to the requirements of the Act.</p> <p>Only where the organ of state has obtained formal exemption from the Minister, the organ of state has to compile an EMPr per borrow pit and submit these to DMR for approval (DME, 2002). In this case, an EMPr would be appropriate for approval.</p>
National Water Act (Act No. 36 of 1998)	<p>Sustainable and equitable management of water resources</p> <p>Important sections (amongst others):</p> <ul style="list-style-type: none"> Chapter 3 – Protection of water resources. Section 19 – Prevention and remedying effects of pollution. Section 20 – Control of emergency incidents.

	<ul style="list-style-type: none"> • Chapter 4 – Water use. • Authority – Department of Water and Sanitation (DWS).
National Environmental Management Air Quality Act (Act No. 39 of 2004)	<p>Air quality management</p> <p>Important sections (amongst others):</p> <ul style="list-style-type: none"> • Section 32 – Dust control. • Section 34 – Noise control. • Authorisation type – Atmospheric Emission License. Note that this is not required for the Project. <p>Authority – DFFE (national) and provincial counterparts as well as municipalities.</p>
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	<p>Management and conservation of the country's biodiversity:</p> <ul style="list-style-type: none"> • Protection of species and ecosystems. • Authorisation type – Permit. • Authority – DFFE and provincial counterparts.
National Environmental Management: Protected Areas Act (Act No. 57 of 2003)	<p>Protection and conservation of ecologically viable areas representative of South Africa's biological diversity and natural landscapes.</p>
National Environmental Management: Waste Act (Act No. 59 of 2008)	<p>Management of waste:</p> <ul style="list-style-type: none"> • Chapter 5 – licensing requirements for listed waste activities - GN No. R. 921 of 29 November 2013 (as amended). • Authorisation type – Waste Management Licence. Note that this is not required for the Project. • Authority – DFFE (national) and provincial counterparts
National Forests Act (No. 84 of 1998)	<p>Supports sustainable forest management and the restructuring of the forestry sector, as well as protection of indigenous trees in general.</p> <p>Section 15: Authorisation required for removal and disturbing of protected trees.</p> <p>Section 7: Authorisation required for impacting indigenous trees.</p>

5.1.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT

The National Environmental Management Act, 1998 (NEMA), through the EIA regulations require the undertaking of Environmental Impact Assessment or Basic Assessments for a range of different activities identified in the listing notices. The applicable listed activities depend on the nature of the affected environment and the nature of the activity. An Environmental Authorisation (EA) has to be obtained before the commencement of construction of such an activity.

5.1.2 NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT

The main purpose of the National Environmental Management: Waste Act (NEM:WA) (Act No. 59 of 2008) includes the following:

- To reform the law regulating waste management in the country by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development;
- To provide for institutional arrangements and planning matters;
- To provide for specific waste management measures;
- To provide for the licensing and control of waste management activities;
- To provide for the remediation of contaminated land; and
- To provide for compliance and enforcement.

Some Important definitions from this Act include:

"Disposal" – the burial, deposit, discharge, abandoning, dumping, placing or release of any waste into, or onto, any land.

"General waste" means waste that does not pose an immediate hazard or threat to health or to the environment, and includes -

- domestic waste;
- building and demolition waste;
- business waste: and
- inert waste;

"Hazardous waste" – any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment.

"Storage" – the accumulation of waste in a manner that does not constitute treatment or disposal of that waste.

- "Waste" – any substance, whether or not that substance can be reduced, re-used, recycled and recovered -
- That is surplus, unwanted, rejected, discarded, abandoned or disposed of;
- Which the generator has no further use of for (he purposes of production;
- That must be treated or disposed of; or
- That is identified as a waste by the Minister by notice in the Gazette, and includes waste generated by the mining, medical or other sector, but -
- A by-product is not considered waste; and
- Any portion of waste, once re-used, recycled and recovered, ceases to be waste.

GN No. R. 921 of 29 November 2013 (as amended) contains a list of waste management activities that have, or are likely to have, a detrimental impact on the environment. If any of the waste management activities are triggered in Category A and Category B, a Waste Management Licence is required. Activities listed in Category C need to comply with the relevant National Norms and Standards.

It is important to note that no authorisation will be required in terms of NEM:WA for the Project as no listed waste management activities are triggered. The following is noted with regards to waste management for the Project:

Construction phase:

Temporary waste storage facilities will remain below the thresholds contained in the listed activities under Schedule 1 of NEM:WA; and

The EMPr makes suitable provisions for waste management, including the storage, handling and disposal of waste.

Operational phase:

Minimum waste will be generated during the operational phase;

- Waste will be sent to the relevant municipal sites; and

- Waste generated during maintenance of substations will be suitable disposal sites.

5.1.3 NATIONAL WATER ACT (ACT NO. 36 OF 1998)

National Water Act (Act No. 36 of 1998)

The purpose of the National Water Act (NWA) (Act No. 36 of 1998) is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways which take into account amongst other factors:

- Meeting the basic human needs of present and future generations;
- Promoting equitable access to water;
- Redressing the results of past racial and gender discrimination;
- Promoting the efficient, sustainable and beneficial use of water in the public interest;
- Facilitating social and economic development;
- Providing for growing demand for water use; protecting aquatic and associated ecosystems and their biological diversity;
- Reducing and preventing pollution and degradation of water resources;
- Meeting international obligations;
- Promoting dam safety; and
- Managing floods and droughts.

The Department of Water and Sanitation (DWS) is the custodian of South Africa's water resources.

Some Important definitions from this Act include:

“Pollution” – the direct or indirect alteration of the physical, chemical or biological properties of a water resource so as to make it (a) less fit for any beneficial purpose for which it may reasonably be expected to be used; or (b) harmful or potentially harmful;

“Waste” – includes any solid material or material that is suspended, dissolved or transported in water (including sediment) and which is spilled or deposited on land or into a water resource in such volume, composition or manner as to cause, or to be reasonably likely to cause, the water resource to be polluted; and

“Water resource” – includes a watercourse, surface water, estuary, or aquifer.

The proposed project may encounter the following activities that constitute water uses in terms of Section 21 of the NWA:

- Section 21(c) - Impeding or diverting the flow of water in a watercourse; and
- Section 21(i) - Altering the bed, banks, course or characteristics of a watercourse.

Should the above case be experienced (especially during the final route selection and design), a Water Use Licence Application (WULA) /GA must be submitted to DWS to seek authorisation in terms of the NWA for the abovementioned water uses.

5.1.4 National Environmental Management: Air Quality Act (Act No. 39 of 2004)

National Environmental Management: Air Quality Act (Act No. 39 of 2004)

The purpose of the National Environmental Management: Air Quality Act (NEM:AQA) (Act No. 39 of 2004) is to reform the law regulating air quality by providing measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development. This Act aims to promote justifiable economic and social development; to provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government, and for specific air quality measures.

Some key definitions from this Act include:

“Air pollution” – any change in the composition of the air caused by smoke, soot, dust (including fly ash), cinders, solid particles of any kind, gases, fumes, aerosols and odorous substances.

“Atmospheric emission” or “emission” – any emission or entrainment process emanating from a point, non-point or mobile source that results in air pollution.

“Non-point source” – a source of atmospheric emissions which cannot be identified as having emanated from a single identifiable source or fixed location, and includes veld, forest and open fires, mining activities, agricultural activities and stockpiles.

“Point source” – single identifiable source and fixed location of atmospheric emission, and includes smoke stacks and residential chimneys.

This Act provides for the listing of activities which result in atmospheric emissions that pose a threat to health or the environment. No person may without an Atmospheric Emission Licence (AEL) conduct any such listed activity, there is however, no AEL required for the proposed Project. Provision is made in the EMPr to manage impacts to air quality as a result of the Project during the construction phase.

5.1.5 National Environmental Management: Biodiversity Act (Act 10 of 2004)

National Environmental Management: Biodiversity Act (Act 10 of 2004)

The purpose of the National Environmental Management: Biodiversity Act (NEM:BA) (Act 10 of 2004) is to provide for the management and conservation of SA's biodiversity within the framework of NEMA.

The Act allows for the publication of provincial and national lists of ecosystems that are threatened and in need of protection. The list should include:

- Critically Endangered Ecosystems, which are ecosystems that have undergone severe ecological degradation as a result of human activity and are at extremely high risk of irreversible transformation.
- Endangered Ecosystems, which are ecosystems that, although they are not critically endangered, have nevertheless undergone ecological degradation as a result of human activity.
- Vulnerable Ecosystems, which are ecosystems that have a high risk of undergoing significant ecological degradation.
- Protected Ecosystems, which are ecosystems that are of a high conservation value or contain indigenous species at high risk of extinction in the wild in the near future.

Similarly, the Act allows for the listing of endangered species, including critically endangered species, endangered species, vulnerable species and protected species. A person may not carry out a restricted activity (including trade) involving listed threatened or protected species without a permit.

The Regulations on the management of Listed Alien and Invasive Species were promulgated on 1 August 2014. The Listed Invasive Species were also published on this date and were subsequently amended in GN 864 of 29 July 2016.

Some key definitions from this Act include:

“Alien species” – A species that is not an indigenous species; or

An indigenous species translocated or intended to be translocated to a place outside its natural distribution range in nature, but not an indigenous species that has extended its natural distribution range by natural means of migration or dispersal without human intervention.

“Biological diversity” or “biodiversity” – the variability among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part and also includes diversity within species, between species, and of ecosystems.

“Indigenous species” – a species that occurs, or has historically occurred, naturally in a free state in nature within the borders of the Republic, but excludes a species that has been introduced in the Republic as a result of human activity.

“Invasive species” – any species whose establishment and spread outside of its natural distribution range -

Threaten ecosystems, habitats or other species or have demonstrable potential; and may result in economic or environmental harm or harm to human health.

“Species” – a kind of animal, plant or other organism that does not normally interbreed with individuals of another kind, and includes any sub-species, cultivar, variety, geographic race, strain, hybrid or geographically separate population.

The implications of this Act for the Project inter alia include the requirements for managing invasive and alien species, protecting threatened ecosystems and species, as well as for rehabilitation. The findings from the Terrestrial Ecological and Water Resources Impact Assessments that were undertaken for the Project are included in section this report.

5.1.6 National Heritage Resources Act (Act No. 25 of 1999)

National Heritage Resources Act (Act No. 25 of 1999)

The purpose of the National Heritage Resources Act (NHRA) (Act No. 25 of 1999) is to protect and promote good management of SA's heritage resources, and to encourage and enable communities to nurture and conserve their legacy so it is available to future generations.

In terms of Section 38 of this Act, certain listed activities require authorisation from provincial agencies:

- The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
- The construction of a bridge or similar structure exceeding 50 m in length;
- Any development or other activity which will change the character of a site –
 - Exceeding 5 000 m² in extent; or
 - Involving three or more existing erven or subdivisions thereof; and
 - The re-zoning of a site exceeding 10 000 m² in extent.

The findings from the Cultural Heritage Impact Assessment and Desktop Palaeontological Impact Assessment that were undertaken for the Project and are included in section 13.

5.2 Energy Legislation in SA

5.2.1 South Africa has developed the following related legal frameworks:

- Electricity Regulation Act (Act No. 4 of 2006)
- National Energy Act (Act No. 34 of 2008); and
- Income Tax Act (1962) - tax incentive provided for Section 12

5.2.2 Policy Framework established in South Africa are listed below:

- White Paper on Energy Policy (1998);
- White Paper on Renewable Energy (2003);
- Integrated Energy Plan (2003);
- Integrated Resource Plan (IRP) 2010;
- Integrated Resource Plan (IRP) 2019
- National Climate Change Response White Paper (2011);
- Post-2015 National Energy Efficiency Strategy;
- The National Development Plan (2030);
- Climate Change Bill (2018); and
- Carbon Tax Bill (2019).

5.3 National and Regional Plans

The following plans were considered in the assessment of the proposed development:

- Municipal Spatial Development Frameworks (SDFs);
- Municipal Integrated Development Plans (IDPs);
- Relevant national, provincial, district and local policies, strategies, plans and programmes;
- Free State PSDF
- Moqhaka Local Municipality SDF 2019-2020
- National Development Plan (NDP) Vision 2030
- National Spatial Development Perspective (NSDP)

6 ENVIRONMENTAL ASSESSMENT

6.1 Environmental Assessment Authorities

In terms of the National Environmental Management Act, the lead decision-making authority for the environmental assessment is DESTEA, they are the competent authority for the proposed application.

Various other authorities with jurisdiction over elements of the receiving environment or project activities will also continue to be consulted during the course of the BAR Process. A database of Interested and Affected Parties (IAPs) is contained in Appendix N of this report, and a list of the government departments.

6.2 Environmental Assessment Practitioner

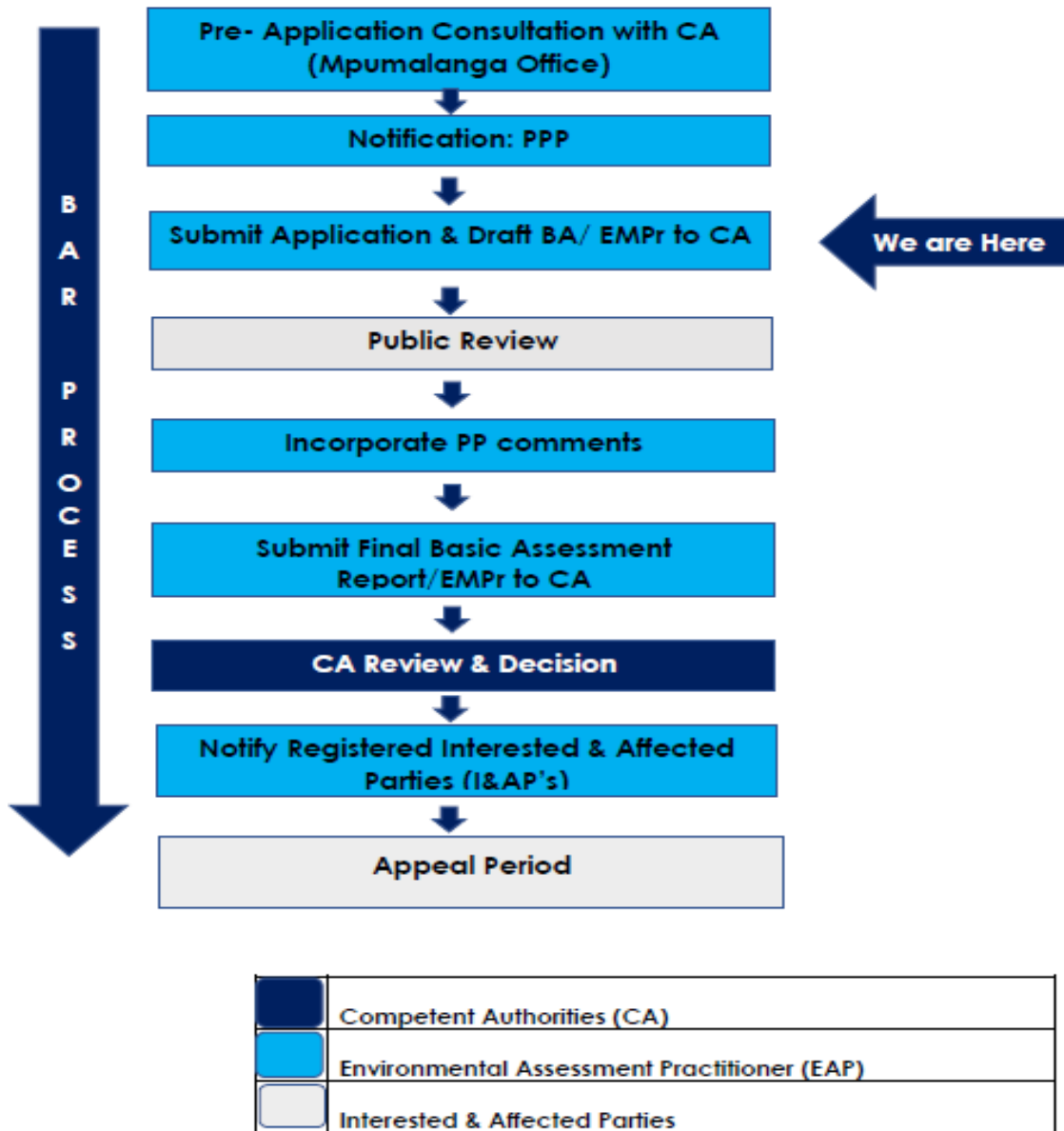
CRRENEWABLES Pty Ltd is appointed, as an Independent Environmental Practitioner (EAP) to apply for Environmental Authorisation for the proposed Powerline and supporting substation in terms of the NEMA EIA regulations.

The company is a 100% black female owned company, with a level 1 BBBEE rating. Kindly refer to Appendix E for Cv's of the team that is involved in this project and specialists.

6.3 Basic Assessment Triggers and Process

The development of a 10 MW PV Solar Facility, outside an urban edge, require the Basic Assessment Process as contemplated in GNR. 327, Section 1(ii), of Environmental Impact Assessment Regulations Listing Notice 1 of 7 April 2017

Figure 12: Overview of Basic Assessment Process



7 ASSUMPTIONS, GAPS AND LIMITATIONS

The following assumptions, gaps and limitations have been identified based on the Basic Assessment process conducted:

It is important to note that the project components are still at the feasibility stage. The dimensions, layout of the proposed infrastructure and other aspects of the proposed development may change when the final designs are established, although no major changes are expected. The methodology used to determine the potential impacts associated with the proposed projects are only predicted on a probability basis.

The accuracy of the predictions is mainly dependent on the availability of environmental data and the degree of understanding of the environmental features and their related attributes.

The following assumptions, gaps and limitation were noted as part of the Specialist Studies.

7.1 Aquatic and Flood line Assessment

The following Limitations and assumptions were noted:

Due to the scale of the remote imagery used (Google Earth Imagery), as well as the accuracy of the handheld GPS unit used to delineate wetland areas in the field, the delineated boundaries cannot be guaranteed beyond an accuracy of about 10m on the ground. Should greater accuracy of the riparian boundary mapping be required, the boundaries will need to be pegged in the field and mapped using conventional survey techniques.

7.2 Terrestrial Biodiversity Study (Fauna /Flora/Avifaunal)

The following limitations should be noted for the assessment:

- The findings, results, observations, conclusions and recommendations provided in this report are based on the author's best scientific and professional knowledge as well as available information regarding the potential impacts of solar developments on the terrestrial environment;
- It is assumed that the information contained in existing databases, reports and publications is correct;
- The assessment of impacts was based on the current state of the primary receiving environment;

- Only a single season survey was conducted for the respective studies;
- Night surveys were not performed due to safety and budgetary reasons;
- Despite these limitations, a comprehensive desktop study was conducted, in conjunction with the detailed results from the surveys, and as such there is a high level of confidence in the information provided;
- The impacts of solar developments on avifauna are not completely understood in South Africa and are hampered by good monitoring data to evaluate the effectiveness of proposed mitigations

7.3 Phase 1 Cultural Heritage Impact Assessment

No full Heritage Impact Assessment was conducted for Steynsrus since the site is low sensitive. However, a compliant statement was released. According to this statement none of the documented heritage sites are in close proximity to the proposed development and no direct impact is foreseen on the recorded site.

7.4 Desktop Paleontological Assessment

The following Assumptions and Limitations were noted:

Strategic importance of the project and no-go option

It is assumed that the strategic importance of promoting renewable energy, including solar energy, is supported by the national and provincial energy policies.

Technical suitability

It is assumed that the development site identified by CCH represents a technically suitable site for the establishment of a solar energy plant.

Fit with planning and policy requirements.

Legislation and policies reflect societal norms and values. The legislative and policy context therefore plays an important role in identifying and assessing the potential social impacts associated with a proposed development.

In this regard a key component of the SIA process is to assess the proposed development in terms of its fit with key planning and policy documents. As such, if the findings of the study indicate that the proposed development in its current format does not conform to the spatial principles and guidelines contained in the relevant legislation and planning documents, and there are no significant or unique opportunities created by the development, the

development cannot be supported. However, the study recognises the strategic importance of solar energy and the technical, spatial and land use constraints required for such facilities.

Limitations

Interviews / Site visits

Due to the timing of the study, the local municipal officials and adjacent landowners were not available, no site visit was conducted.

7.5 Agricultural Impact Assessment

The report had not listed any limitations or assumptions.

7.6 Social Impact Assessment

Assumptions Mentioned are:

- Strategic importance of the project and no-go option

It is assumed that the strategic importance of promoting renewable energy, including solar energy, is supported by the national and provincial energy policies.

- Technical suitability

It is assumed that the development site identified represents a technically suitable site for the establishment of a solar energy plant.

- Fit with planning and policy requirements.

Legislation and policies reflect societal norms and values. The legislative and policy context therefore plays an important role in identifying and assessing the potential social impacts associated with a proposed development. In this regard a key component of the SIA process is to assess the proposed development in terms of its fit with key planning and policy documents. As such, if the findings of the study indicate that the proposed development in its current format does not conform to the spatial principles and guidelines contained in the relevant legislation and planning documents, and there are no significant or unique opportunities created by the development, the development cannot be supported. However, the study recognises the strategic importance of solar energy and the technical, spatial and land use constraints required for such facilities.

- Limitations

Demographic data

The Census 2011 information presented below is at local municipal level as opposed to Ward level. The StatsSA Municipal Fact Sheet (2013) was used as key reference.

8 FINANCIAL PROVISIONS

According to Section 3(1)(s) of Appendix 1 of GN No. R. 326 of 7 April 2017 (as amended), details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts must be provided accordingly. Due to the sensitive nature of financial matters, the applicant is not able to disclose details but has confirmed the following:

The applicant will be responsible for the costs incurred in complying with the NEMA EIA Regulations, 2017 and other environmental legislation including but not limited to –

- Costs incurred in connection with the appointment of the environmental assessment practitioner or any person contracted by the environmental assessment practitioner;
- costs incurred in respect of independent reviews in terms of regulation 13(2) of GN No. R982; (as amended)
- costs incurred in respect of the undertaking of any process required in terms of the regulations;
- costs in respect of any fee prescribed by the Minister or MEC in respect of the regulations;
- costs in respect of specialist reviews, if the competent authority decides to recover costs; and
- the provision of security to ensure compliance with applicable management and mitigation measures;
- The Applicant is responsible for complying with conditions that may be attached to any decision(s) issued by the competent authority.

9 WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

9.1 Solid waste management

QUESTIONS	ANSWER (YES/ NO)	
<p>Will the activity produce solid construction waste during the construction/initiation phase?</p>	YES	
<p>The facility will generate some solid waste during construction. Waste such as cut conductors, cement waste / surplus waste from building activities, domestic waste, hazardous waste (e.g. chemicals soil contaminated by waste and spillages, oil / petrol rags). Waste generated during the construction phase will be temporarily stored at demarcated sites, removed at regular intervals and disposed-of at licenced waste disposal sites.</p>		
<p>If yes, what estimated quantity will be produced per month? To be determined during final design stage?</p>		
<p>It is unknown at this stage</p>		
<p>How will the construction solid waste be disposed of?</p>		
<p>Construction solid waste will be temporarily stored at demarcated sites, removed at regular intervals and disposed-of at licenced waste disposal sites</p>		
<p>Will the activity produce solid waste during its operational phase?</p>		
<p>If yes, what estimated quantity will be produced per month?</p>		
<p>No solid waste is anticipated during operational phased. Possible waste generated from changing of damaged panels will be collected by the maintenance company for recycling purposes.</p>		
<p>Where will the solid waste be disposed of if it does not feed into a municipal waste stream (describe)?</p>		
<p>A registered supplier will be used to collect the waste and dispose it of at registered dumping site.</p>		
	YES	

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?		
Possible hazardous waste that will be generated during the construction and operational phase will include chemicals, oils, soil contaminated by spillages, diesel /oil rags, etc. The management of this waste is catered for in the EMPr.		
Is the activity that is being applied for a solid waste handling or treatment facility?		NO
If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA?		
The EMPr makes a clear provision for waste separation and recycling.		

9.2 Liquid effluent (other than domestic sewage)

QUESTIONS	ANSWER (YES/ NO)	
Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?		NO
<p>If yes, what estimated quantity will be produced per month? No</p> <p>If yes, has the municipality confirmed that sufficient capacity exists for treating / disposing of the liquid effluent to be generated by this activity(ies)? Registered waste removal suppliers will be used were necessary</p> <p>Will the activity produce any effluent that will be treated and/or disposed of on site? No</p> <p>If yes, what estimated quantity will be produced per month? Unknown: To be confirmed after final designs</p> <p>If yes describe the nature of the effluent and how it will be disposed? Unknown: To be confirmed after final design</p>		

Note: should effluent be treated or disposed on site the applicant should consult with the competent authority to determine whether they should follow a scoping or an EIA process.

Will the activity produce effluent that will be treated and/or disposed of at another facility?		NO
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If yes, provide the particulars of the facility: N/A

Facility name:
 Contact person:
 Postal address:
 Postal code:
 Telephone: Cell:

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste-water, if any:

Unknown at this stage, it will be clear at the final design stage.
 Should it happen, the applicant should use the services of a registered supplier to collect and disposed of waste water at a legal site.

9.3 Liquid effluent (domestic sewage)

Will the activity produce domestic effluent that will be disposed of in a municipal sewage system?		NO
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If yes, what estimated quantity will be produced per month? **N/A**

If yes, has the municipality confirmed that sufficient capacity exist for treating / disposing of the domestic effluent to be generated by this activity(ies)?		NO
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Will the activity produce any effluent that will be treated and/or disposed of on site?

If yes describe how it will be treated and disposed of.

9.4 Emissions into the atmosphere

QUESTIONS	ANSWER (YES/ NO)
<p>Will the activity release emissions into the atmosphere?</p> <p>If yes, is it controlled by any legislation of any sphere of government?</p> <p>If yes, the applicant must consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.</p>	NO
If no, describe the emissions in terms of type and concentration:	
Only construction related emissions are foreseen, such as vehicle emissions.	

9.5 Water Use

Indicate the source(s) of water that will be used for the activity:					
Municipal	Directly from water board	Groundwater	River, stream, dam or lake	Other	the activity will not use water
X					

QUESTIONS	ANSWER (YES/ NO)
<p>If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:</p>	NO
<p>If Yes, please attach proof of assurance of water supply, e.g. yield of borehole, in the appropriate Appendix.</p>	NO
<p>Does the activity require a water use permit from DWS?</p>	NO

The amount of water required is within the DWS acceptable threshold. Should this be exceeded a GA/ WULA will be submitted to the competent authorities.		
If yes, have you applied for the water use permit(s)? If yes, have you received approval(s)?		NO

9.6 Energy Efficiency

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient?

- This is a development of a solar energy facility which will use solar energy to operate. Should the need arise to have back-up the site will use low noise generators as a back-up source.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any?

- This is a solar energy facility, which will use the solar energy as its primary source.

9.7 Generation of noise

QUESTIONS	ANSWER (YES/ NO)	
Will the activity generate noise?	YES	
If yes, describe the noise in terms of type and level:		
The noise associated with construction activities would include construction vehicles, drilling and stringing machinery and general construction activities. This will be managed mainly through time management _ construction activities should be limited to daytime working and adherence with noise regulations of the area. Should the need to work during late hours, affected land users should be notified accordingly. Refer to the EMPr (Annexure G) for more details.		

10 ANALYSIS OF THE RECEIVING ENVIRONMENT

General

This chapter provides a general description of the status quo of the receiving environment of the project area. The chapter allows for the appreciation of sensitive environmental features and possible receptors of the proposed Project. The potential impacts to the receiving environment will be discussed below, together with the Specialists Studies conducted, and their findings have been discussed below to provide a better understanding of the study area.

10.1 Land Use & Land Cover

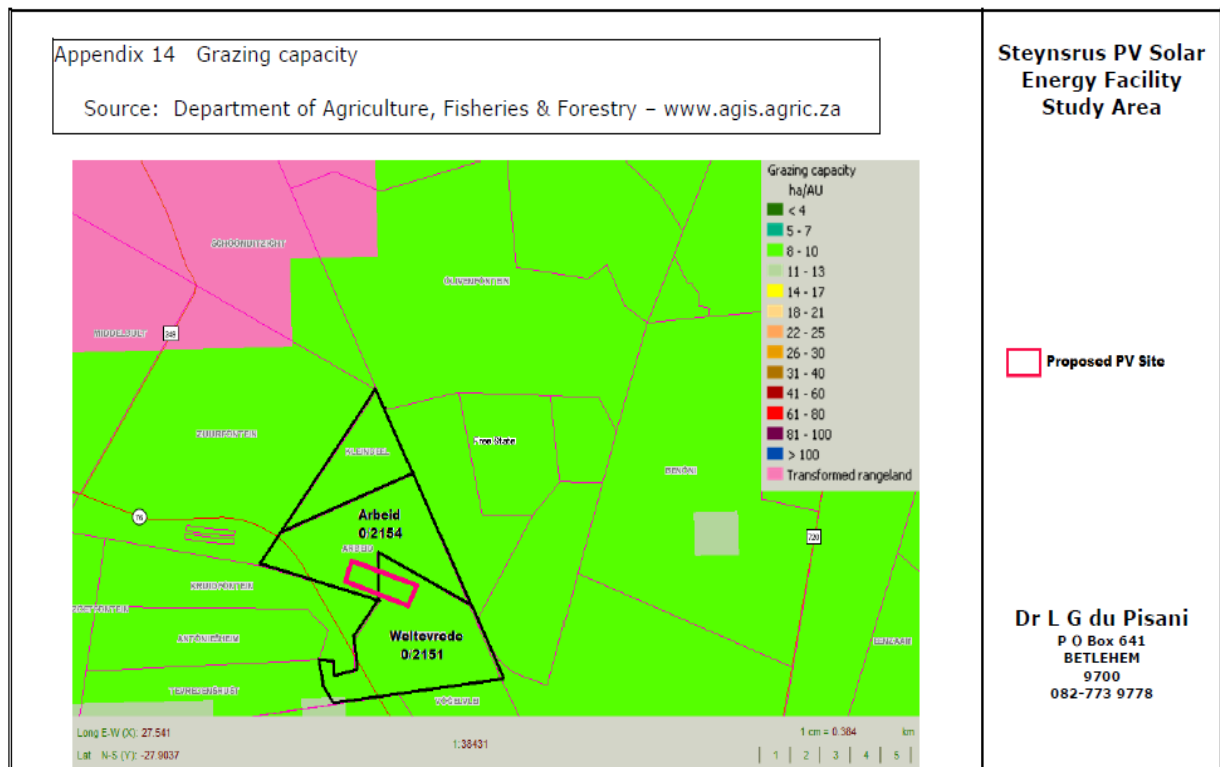
The study area falls within Veld Type 49 (Transitional *Cymbopogon*-*Themeda* Veld) (Acocks, 1988) and Biome Gh6 (Dry Highveld Grassland – 16)

Central Free State Grassland) (Mucina & Rutherford, 2006). This biome occurs on undulating flats, is dominated by *Themeda triandra* while *Eragrostis curvula* and *Eragrostis chloromelas* become dominant in degraded habitats, dwarf karoo bushes establish on severely degraded clayey bottomlands and overgrazed and trampled low-lying areas with heavy clayey soils are prone to *Acacia karoo* encroachment (Mucina & Rutherford, 2006). During verification of the natural resources present on the study site, it was established that the vegetation is dominated by *Themeda triandra* with *Eragrostis curvula* and *Eragrostis chloromelas* the second most important grasses. Small numbers of dwarf karoo bushes (i.e.; *Felicia muricata*) are present in some areas of the study area.

It is concluded that the best agricultural use for the agricultural resources of the study area can be described as livestock farming with cattle grazing from the veld and on planted pastures (established on marginal lands). The study area is currently used for cattle farming with one of the cultivated fields planted with soybeans for the production of cattle feed. The rest of the lands are either lying fallow or are established with Smutsfinger grass.

The grazing capacity of the area where the site is located varies between 8 ha/LSU and 10 ha/LSU (Dept. Agric., Forestry & Fisheries – www.agis.agric.za) (see Appendix 14). The current grazing capacity of the veld is estimated by the consultant to be 5 ha/LSU. The current grazing capacity of the one land established with Smutsfinger grass is estimated to be 2.5 ha/LSU. Based on these estimates the 30ha size of the proposed PV Energy site can therefore carry ~6 large stock units (LSU's) or 4 medium framed beef cows, which is negligible in terms of agricultural production and/or food security (**Dr du Pisani**).

Figure 13: Grazing Capacity Map

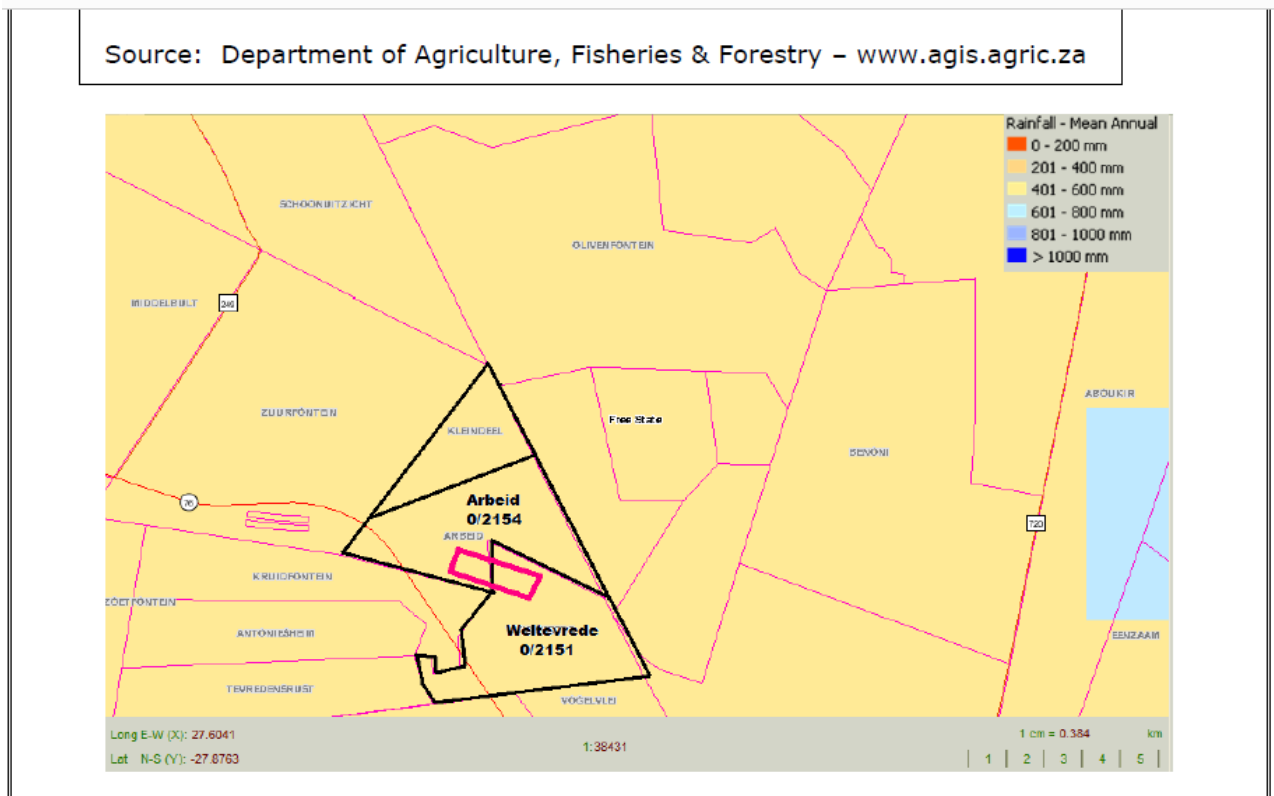


10.2 Climate

According to Dr du Pisani's report the climate of the area is typical of the Highveld Climatic Region as was defined by Schulze (1980). In this climatic region the average annual precipitation varies from about 900mm on its eastern border to about 650mm in the west. According to Mucina & Rutherford (2006) the mean annual precipitation over the study area is 590mm, while the owner of the property, Mr Boy Saaiman's 32-year rainfall record, calculates the long-term annual rainfall as 620mm, this puts the study area in a category of **"suitable for dryland cultivation"**.

Precipitation is almost exclusively due to showers and thunderstorms and falls mainly in the summer from October to March with the peak of the rainfall season occurring in January. Heavy rainfall showers of 125mm to 150mm occasionally fall in a single day, which put the soils at **risk of water erosion** if not sufficiently protected from high volumes of fast flowing runoff water. The average daily maximum temperature is 27°C in January and 17°C in July, while the average daily minimum temperatures are 13°C in January and 0°C in July.

Figure 14: Map Showing Mean Annual Rainfall of the study area



10.3 Geology, Land types and Soils

According to the Land Type Survey Staff (1976 - 2006) the study area's geology can be categorized as mainly Adelaide and Tarkastad Subgroups mudstone, shale and sandstone, with Burgersdorp Formation mudstone, shale and sandstone present in the south east, and Ecca shale, mudstone, sandstone and grit in the far north. Dolerite sills are common, with crests and scarps on dolerite or sandstone.

The study area is situated within the Dc land type (Land Type Survey Staff, 1976 - 2006) (see Appendix 4). The Dc land type consists of duplex soils with either prisma-cutanic and/or pedocutanic diagnostic horizons dominant, while one or more vertic, melanic or red structured diagnostic horizons may be prevalent (Land Type Survey Staff, 1976 - 2006). Soils with marked clay accumulation, strongly structured and with a non-reddish colour are to be expected (Department of Agriculture, Forestry & Fisheries - www.agis.agric.za).

These soils are generally shallow and the effective depth varies between 100mm and 1200mm, while the clay content varies between 15% and 50% in the A-horizon, and between 15% and 55% in the B21-horizon (Land Type Survey Staff, 1976 - 2006). Due to the high clay content and shallowness of the soils expected in the study area, the area is categorised as being “marginal potential arable land”.

During reconnaissance of the study area several drill core samples were taken. Mainly two soil forms occur on the higher lying areas, namely Swartland (Orthic A/Pedocutanic B/Saprolite – MacVicar *et al*, 1991) and Valsrivier (Orthic A/Pedocutanic B/Unconsolidated Material - MacVicar *et al*, 1991), both which are duplex soils (Fey, 2010). On the lower lying areas (= drainage lines) two soil forms dominate, i.e.; Bonheim (Melanic A/Pedocutanic B – MacVicar *et al*, 1991) and Arcadia (Vertic A/Unspecified – MacVicar *et al*, 1991). All of the identified soils are well structured and display high clay content values. The clay content of the A-horizons is on average 20% while the clay content of the B-horizons is on average 45%. The soils are generally shallow with an average effective depth of less than 200mm, even on the cultivated lands.

The design and position of the solar arrays structure should take into consideration the impact these structures could cause on soil and vegetation potential issues, the structure should be positioned in such a way that there is minimal impact on land capability issues. The Geotech- study should be considered at an appropriate time, to ensure structural stability.

10.4 Agriculture Soil Potential

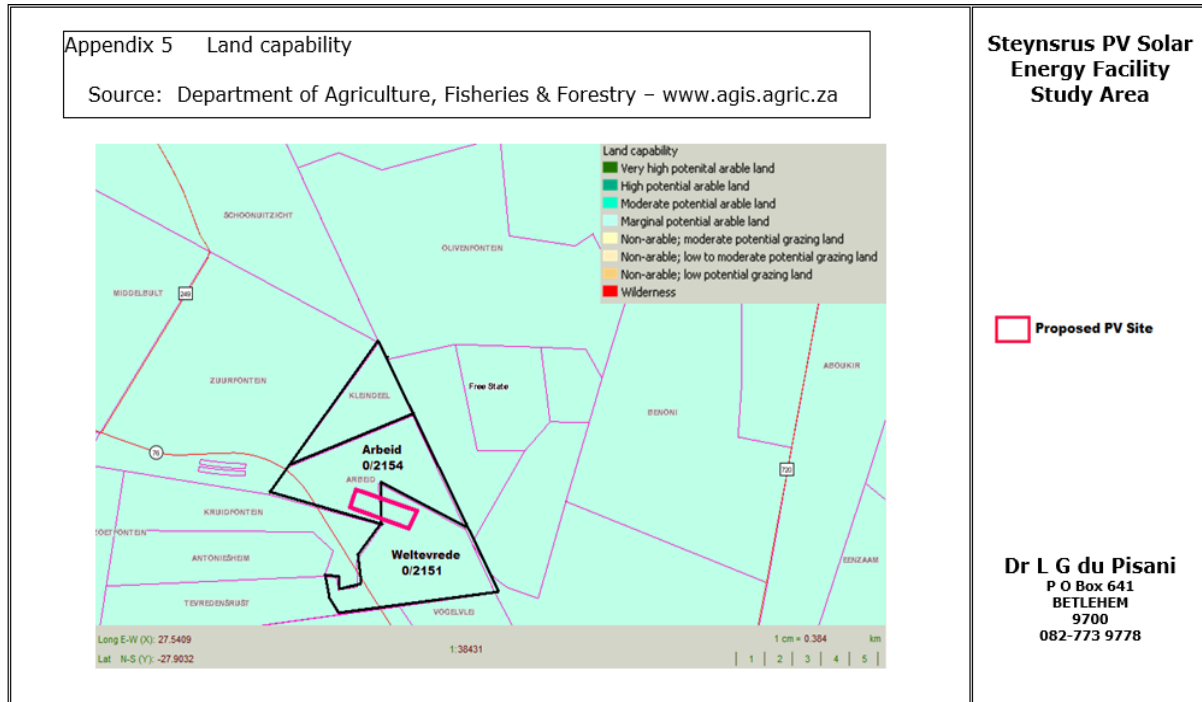
According to the study conducted by Dr Du Pisani, the prevailing climatic conditions over the study area makes it suitable for dryland cultivation, with maize and sunflower the primary crops which can be produced. The study area is dominated by duplex, vertic and melanic soils.

The clay contents are high and the soils are relatively shallow which put them in a category of “**marginal potential arable land - not suitable for cultivation**”. Therefore, although the climate is suited for dryland cultivation, the soils are not (refer to Figure 15 below)

There are a few lands on the study area. They are clayey and shallow and should never have been ploughed. They should preferably be taken out of

cultivation and be established with perennial grasses to be used for grazing purposes. The lands on the study area are **not** to be regarded as No-Go areas due to its low production potential and none are situated within the proposed development footprints.

Figure 15: Land Capability Map



10.5 Topography

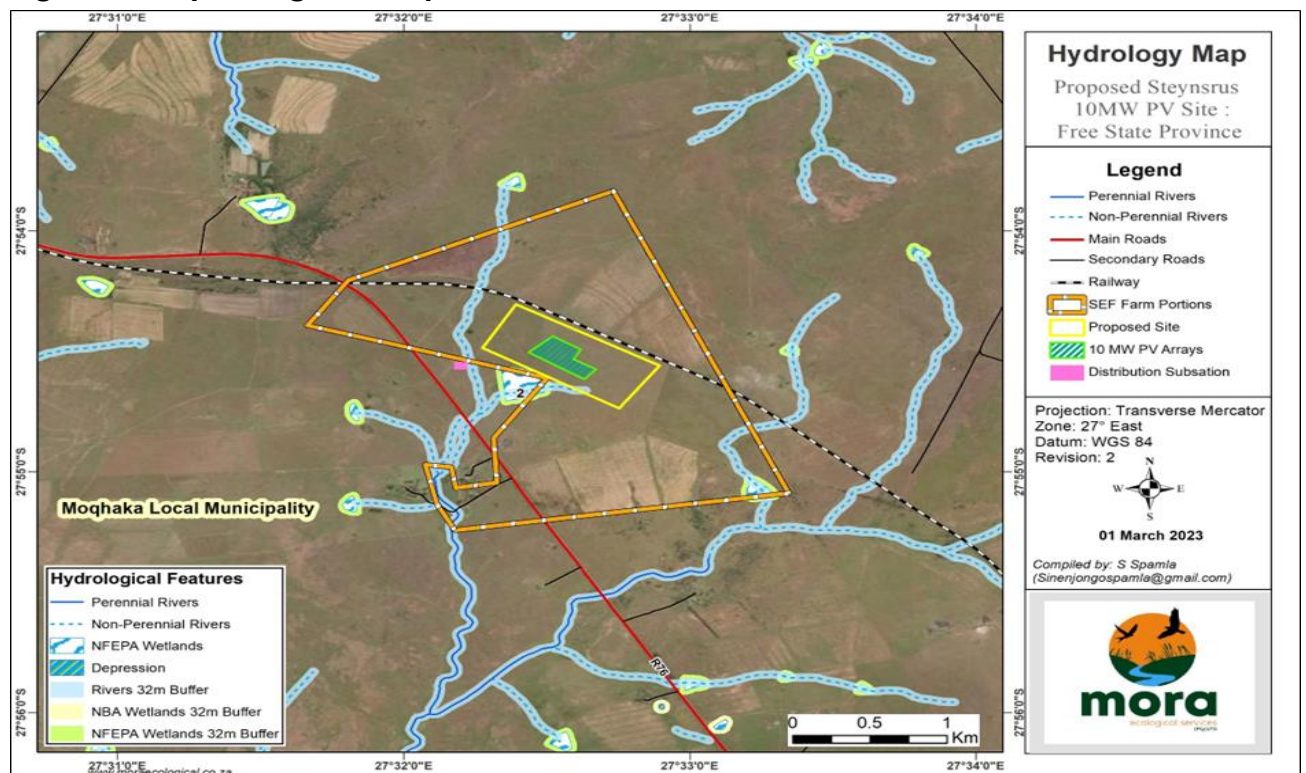
The topography and the major ridgelines of the area were determined and mapped by using a Digital Elevation Model 2. The project site is located at a mean elevation of approximately 1527m above sea level. The project site is essentially flat in nature and as the DEM shows, there are virtually no prominent topographical manifestations in close proximity to the project site from which the proposed activity would be visually exposed. Furthermore, the project site is located below any ridgeline. The proposed activity will therefore not impact on the skyline (VIA -Steynsrus, Zone Land Solutions, 2013)

10.6 Hydrology

Hydrology consists of all water related features, includes rivers, dams, canals, pans, wetlands, spings, surface water and ground water features. The main hydrological features within the study area have been mapped (See figure 16

below). The main hydrological features of the study area were dams, wetlands and non-perennial rivers. A 32 m rivers buffer area was applied at desktop level for all aquatic habitats to define the sensitivity of the proposed development area. The protection of the aquatic ecosystem structure and function is an important goal of environmental water resource management (MORA Ecological Services).

Figure 16: Hydrological Map

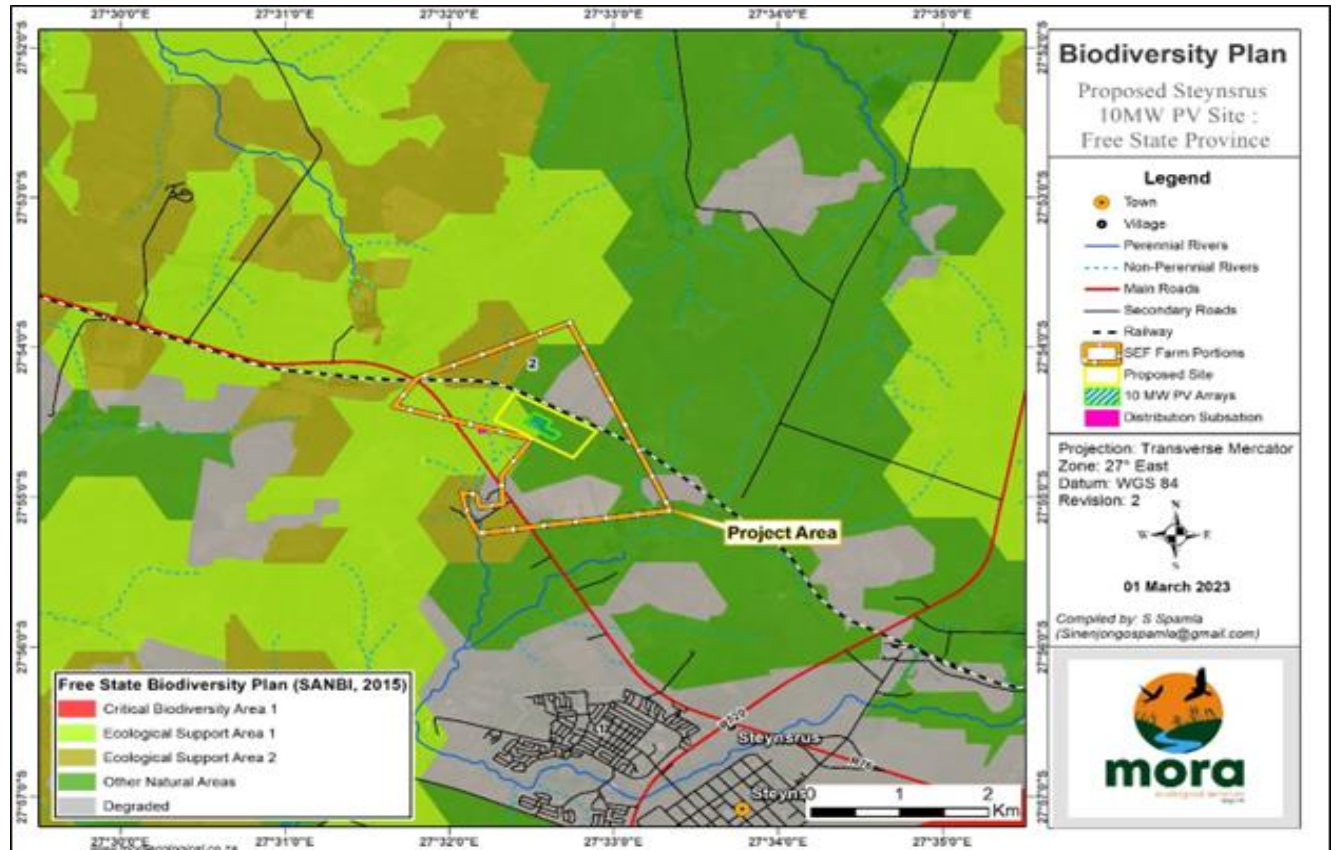


10.7 Terrestrial Biodiversity (Flora, Fauna & Avifaunal)

The Terrestrial Biodiversity of the study area was conducted by Mokgatla Molepo of MORA Ecological Services. Figure 17 below is a spatial representation of the biodiversity sector plan of the Free State Province, relative to the proposed development footprint. Critical Biodiversity Areas (CBAs) are terrestrial and aquatic features in the landscape that are critical for conserving biodiversity and maintaining ecosystem functioning. Whereas, Ecological Support Areas (ESAs) are supporting areas which are intended for safeguarding and/or preventing the degradation of CBAs. This shows a large proportion of the proposed development area being categorized as ESA1, and smaller parts in close proximity of the development footprints being Other

Natural Areas and ESA2. This, therefore, gives an indication that the receiving environment is of great biodiversity significance. Construction activities should be limited to the lesser sensitive regions of the receiving environment.

Figure 17: FSBP Terrestrial CBAs of the receiving environment



10.7.1 Flora Assessment

Mucina and Rutherford (2006) were consulted at desktop level to understand the habitat types and flora species composition, especially quantifying the presence of Red Data or species of conservation importance with the proposed prospecting area. Important taxa species in each bioregion are as follows: Evidently, flora species data from Mucina and Rutherford (2006) indicate a higher diversity. Important taxa occurring in the Central Free State Grassland are as follows:

Small Trees:

Acacia karroo, *Celtis africana*, *Cussonia paniculata*, *Pittosporum viridiflorum*, *Rhus lancea*, *Scolopia zeyheri*, *Ziziphus mucronata*.

Tall Shrubs:

Buddleja saligna (d), *Euclea crispa* subsp. *ovata* (d), *Gymnosporia polyacantha* (d), *Olea europaea* subsp. *africana* (d), *Rhus burchellii* (d), *R. erosa* (d), *Diospyros lycioides* subsp. *lycioides*, *Grewia occidentalis*, *Gymnosporia buxifolia*, *Tarchonanthus camphoratus*.

Low Shrubs:

Helichrysum dregeanum (d), *Pentzia globosa* (d), *Anthospermum rigidum* subsp. *pumilum*, *Asparagus cooperi*, *A. laricinus*, *Berkheya annectens*, *Chrysocoma ciliata*, *Clutia pulchella*, *Euryops empetrifolius*, *Felicia filifolia* subsp. *filifolia*, *F. muricata*, *Nenax microphylla*, *Osyris lanceolata*, *Rosenia humilis*, *Selago saxatilis*, *Solanum tomentosum* var. *coccineum*.

Graminoids:

Aristida adscensionis (d), *A. congesta* (d), *A. diffusa* (d), *Cymbopogon pospischilii* (d), *Cynodon dactylon* (d), *C. incompletus* (d), *Eragrostis chloromelas* (d), *E. lehmanniana* (d), *E. micrantha* (d), *E. obtusa* (d), *E. trichophora* (d), *Eustachys paspaloides* (d), *Heteropogon contortus* (d), *Panicum stapfianum* (d), *Setaria lindenbergiana* (d), *S. sphacelata* (d), *Sporobolus fimbriatus* (d), *Themeda triandra* (d), *Tragus koelerioides* (d), *Digitaria argyrograpta*, *Elionurus muticus*, *Enneapogon scoparius*, *Eragrostis plana*, *E. superba*, *Tragus berteronianus*, *T. racemosus*, *Triraphis andropogonoides*.

Herbs:

Berkheya onopordifolia var. *onopordifolia*, *Hermannia coccocarpa*, *Indigofera alternans*, *Mohria caffrorum*, *Pupalia lappacea*, *Salvia repens*.

Geophytic Herbs:

Oxalis corniculata, *O. depressa*.

Succulent Herb:

Crassula lanceolata.

10.7.2 Alien invasive plants

Invasive alien species have been identified as the second greatest driver of habitat destruction by outcompeting native biodiversity. Biological invasions have deleterious impact on water quality, microclimate, soil nutrients, agricultural economies, and fire regime, listing them amongst the most prominent influencers of ecological change. Within the jurisdiction of the

proposed project area, previously observed invasive alien plants at high infestations are flowering plants in the cactus family Cactaceae.

10.7.3 Faunal Assessment

Based on historical data of the Animal Demographic Units (ADU) Virtual Museum, the following fauna species occur on site:

When assessing the List of mammal, reptile and amphibian species from ADU Virtual Museum records using the 2727DC Quarter Degree Square, No historical records of the Mammalia, Reptile or Amphibian species have been previously recorded in the 2727DC.

According to the SABAP2 species list in pentads 2750_2730 and 2755_2730, the estimated total of 133 birds species occur in the broader area of the proposed project. Table 2 is the list of avifauna species occurring in the broader pentads areas and might possibly be affected by the proposed Solar PV development.

Table 7: List of avifaunal species recorded during February 2023 surveys

Scientific name	Common name
<i>Unidentified</i>	Unidentified
<i>Chrysococcyx caprius</i>	Diederik Cuckoo
<i>Mirafra africana</i>	Rufous-naped Lark
<i>Lamprotornis nitens</i>	Cape Glossy Starling
<i>Corvus albus</i>	Pied Crow
<i>Cursorius temminckii</i>	Temminck's Courser
<i>Pternistis swainsonii</i>	Swainson's Spurfowl
<i>Plectropterus gambensis</i>	Spur-winged Goose
<i>Anthus cinnamomeus</i>	African Pipit
<i>Mirafra fasciolata</i>	Eastern Clapper Lark
<i>Macronyx capensis</i>	Cape Longclaw
<i>Prinia flavicans</i>	Black-chested Prinia
<i>Coturnix coturnix</i>	Common Quail

<i>Cisticola aridulus</i>	Desert Cisticola
<i>Fulica cristata</i>	Red-knobbed Coot
<i>Bostrychia hagedash</i>	Hadedda
<i>Euplectes capensis</i>	Yellow Bishop
<i>Euplectes orix</i>	Southern Red Bishop
<i>Anas undulata</i>	Yellow-billed Duck
<i>Anas erythrorhyncha</i>	Red-billed Teal
<i>Cecropis cucullata</i>	Greater Striped Swallow
<i>Hirundo rustica</i>	Barn Swallow
<i>Riparia paludicola</i>	Brown-throated Martin
<i>Petrochelidon spilodera</i>	South African Cliff Swallow
<i>Plocepasser mahali</i>	White-browed Sparrow-Weaver
<i>Ardea melanocephala</i>	Black-headed Heron
<i>Bubulcus ibis</i>	Western Cattle Egret
<i>Lanius collaris</i>	Southern Fiscal
<i>Ploceus velatus</i>	Southern Masked Weaver
<i>Ploceus capensis</i>	Cape Weaver
<i>Vanellus armatus</i>	Blacksmith Lapwing
<i>Vanellus coronatus</i>	Crowned Lapwing
<i>Ortygospiza atricollis</i>	African Quail-Finch
<i>Quelea quelea</i>	Red-billed Quelea
<i>Curruca subcoerulea</i>	Chestnut-vented Tit-Babbler
<i>Pycnonotus nigricans</i>	African Red-eyed Bulbul
<i>Falco naumanni</i>	Lesser Kestrel
<i>Falco rupicoloides</i>	Greater Kestrel
<i>Calandrella cinerea</i>	Red-capped Lark
<i>Spilopelia senegalensis</i>	Laughing Dove

<i>Columba guinea</i>	Speckled Pigeon
<i>Streptopelia capicola</i>	Cape Turtle Dove
<i>Microcarbo africanus</i>	Reed Cormorant
<i>Alopochen aegyptiaca</i>	Egyptian Goose
<i>Euplectes progne</i>	Long-tailed Widowbird
<i>Lanius collaris</i>	Southern Fiscal

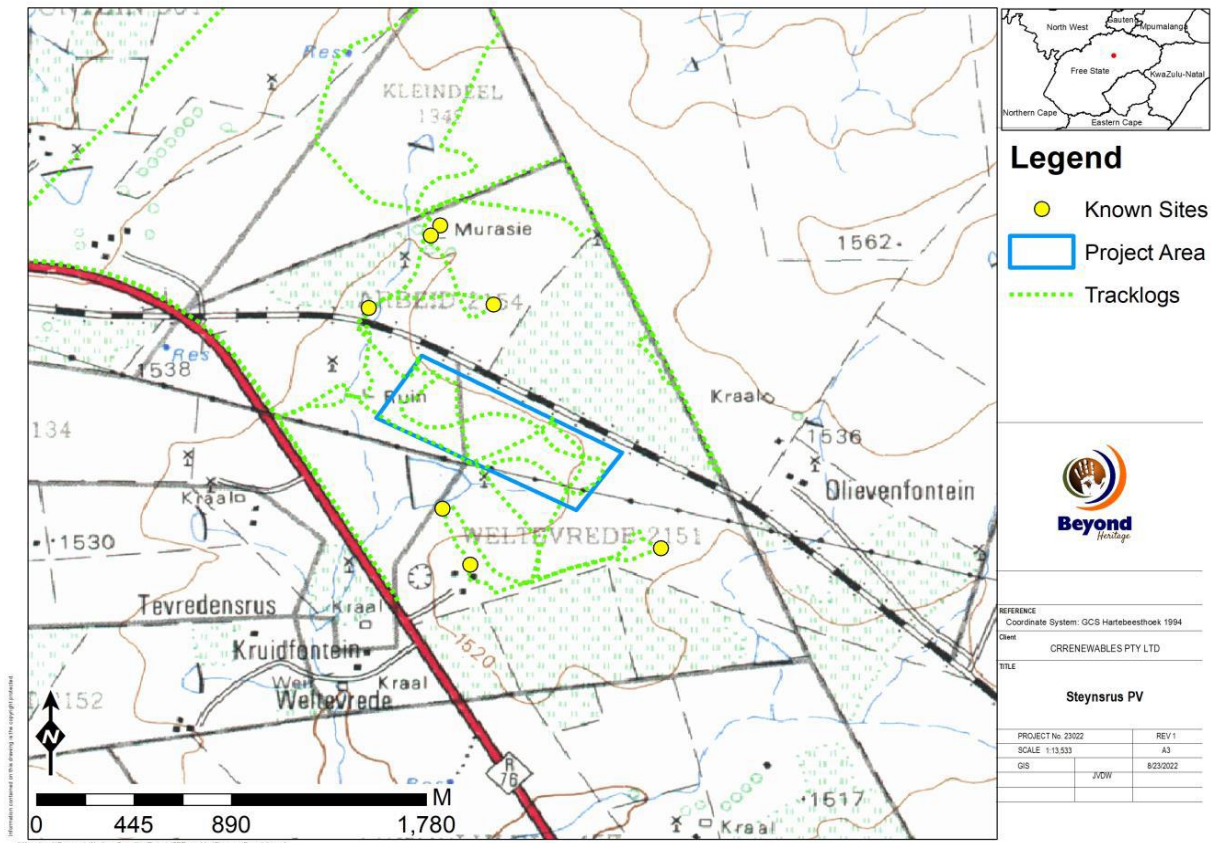
10.8 Cultural Heritage & Palaeontological Features

The proposed development falls within the jurisdiction of Moqhaka Local Municipality, in the Free State Province.

Six sites of heritage significance were identified during the 2013 survey consisting of:

- The demolished remains of two residential dwellings (Site 2 and 3) and the foundations of a rectangular cattle kraal (Site 1) associated with the residential complex.
- Site 4 is a large farm labourer compound setup.
- Site 5 consists of approximately 23 stone packed graves and
- Site 6 consists of three stone cairns roughly aligned east to west that might represent graves.

Figure 18: Map showing Six sites of heritage significance



According to Jaco Van Der Walt of Beyond Heritage, none of the documented sites are in close proximity to the proposed development and no direct impact is foreseen on the recorded sites.

10.9 Overview of the Socio-Economic Environment

According to the BMC one of the limitations was access to the latest data about the area, the data used was dating back to census done in 2001 acquired via the Municipal Demarcation Board. As a result, it was not possible to obtain ward level data for the MLM at the time of the study. The social baseline for this part of the study area is therefore described at a broader municipal level only. The most recent census data (2011) was used.

The area of jurisdiction of the Moqhaka Local Municipality is situated in the southern part of the Fezile Dabi District Municipality. The former Kroonstad, Steynsrus and Viljoenskroon Transitional Local Councils and sections of the

Riemland, Kroonkop and Koepel Transitional Rural Councils are included in the Moqhaka Local Municipality.

The MLM comprises the previous areas of jurisdiction of Kroonstad, Steynsrus and Viljoenskroon Transitional Local Councils and sections of the Riemland, Kroonkop and Koepel Transitional Rural Councils. The Municipal area borders the North West province LMs of Matlosana LM and Tlokwe LM to the North, the Ngwathe LM to the East, the Nketoana LM and Setsoto LM to the south and the Nala LM and Matjabeng LM to the west. The area is accessible principally via the N1 and R76 roads which transverse the Municipal area.

The main urban settlements are Kroonstad, Viljoenskroon and Steynsrus.

Kroonstad with its strong service character and prominent commercial and industrial components, will remain the main town and growth point of the region and will continue to render various services to the surrounding smaller towns and rural areas.

Viljoenskroon is located in an area of agricultural significance and mainly provides services in this regard to the surrounding rural areas. Viljoenskroon functions as a satellite town for residential purposes due to its strategic location in the proximity of the Vaal Reefs mines as well as the Orkney/ Stilfontein mining areas in the Northwest Province. These towns have the opportunity for future growth based on industrial development, mining and tourism. Steynsrus is located in an area of agricultural significance and mainly provides restricted services in this regard to the surrounding rural communities. Substantial future growth of this town is not foreseen.

Local Context and Surrounding Land Uses

The proposed Steynsrus SEF is located 4 km northwest of the town of Steynsrus, which is located within the Moqhaka Local Municipality (MLM) of the Free State Province. Steynsrus is a typical, small rural town that acts as service centre for the surrounding farming area. According to the Moqhaka IDP, Steynsrus has a total population of 13 000. The Moqhaka IDP identifies the area around Steynsrus as an area of agricultural significance with the mainland uses in the area are linked to commercial stock farming (cattle and sheep). The town serves the local agricultural community with basic services (education, healthcare, safety and security, basic provisions etc).

Population

The MLM Census 2011 and Community Survey 2016 were used for the statistics. The table below shows demographic indicator for MLM for 2001 and 2011.

Table 8: Overview of key demographic indicators for the MLM

ASPECT	2001	2011	Change
Population	167 892	160 532	-4.4%
Households	41 514	45 661	+10%
Household size (average)	3,7	3.5	-0.2
% Female headed households	36,5	40,9	+4,4
Sex Ratio (males per 100 females)	99,2	98,1	-1,1
Dependency ratio per 100 (15-64)	51	50,5	-0,5
% Population <15 years	28,1	27	-1,1
% Population 15-64	66,4	66,4	0
% Population 65+	5,7	6,5	+0,8
Unemployment rate (official) - % of economically active population	39,9	35,2	-4,7
Youth unemployment rate (official) - % of economically active population	54,6	47,2	-7,4
No schooling - % of population 20+	10,9	5,4	-5,5
Higher Education - % of population 20+	6,5	8,6	+2,1
Matric - % of population 20+	20	27,8	+7,8

- The table above indicates that the demographic indices for MLM. Population of the municipality has decreased by 4.4% from 167 892 in 2001 to 160 532 persons in 2011. The community survey conducted during 2016 indicated that the population once again decreased with 3.61% to 154 732.

- Contrary to the aforementioned, the number of households increased by 10.0% from 41 514 in 2001 to 45 661 and increased again with 17.39% to 53 601 according to the Community Survey results of 2016.
- Statistics for age, gender and household size and structure have remained more or less the same.
- Female-headed households have increased largely (from 36,5% to 40,9%).
- There is an improvement with regard to employment and education. While the current unemployment figure remains high (35.2%), both the official and youth unemployment rates have declined significantly, namely by 4,7% and 7,4%, respectively
- With regard to education levels, the portion of the population older than 20 years without formal education has declined by 5,5% to 5,4%. At the same time, the percentages of the adult population with tertiary (+2,1%) and secondary (+7,8%) qualifications have increased.

Table 9: Overview of access to basic services in the MLM

	2001	2011	Change
Formal dwellings % of total	82,5	88,7	+6,2
% Dwellings owned by occupant	61,4	56,1	-5,3
% Households with access to flush toilet	65,6	85,6	+20
% Households with weekly municipal refuse removal	67,4	84,9	+17,5
% Households with piped water inside dwelling	28,4	57,7	+29,3
% Households which uses electricity for lighting	83,8	93,3	+9,5

As indicated by Table 8 above:

- The percentage of households living in formal dwellings has increased from 82,5% to 88,7% in 2011. However, the community Survey of 2016 indicates that the percentage of households living in formal dwellings has decreased with 3.3% and the number of households living in informal dwellings has increased with 2.7%.

- Households with access to piped (tap) water inside the dwelling showed a positive movement and increased to 94.2% in 2011, and also the 2016 Community Survey showed a 2% increase from the 2011 Census.
- Significant progress has also been made in respect of access to sanitation whereby households with flush/chemical toilets increased to 88.5% in 2011. The percentage of households utilising pit latrines and bucket toilets declined in the past 15 years. The 2016 Community Survey results shows a further increase in access to sanitation.
- The statistics for 2011 (+9,5%) and Community survey 2016 show that more households utilise electricity for heating, lighting and cooking.
- In respect of access to refuse removal services 85.6% of households in 2011 had their refuse removed at least once a week showing a 16.6% increase compared to 1996. Households utilising their own or communal refuse dumps and with no access to refuse removal services show a comparative decline over the same period. No access to refuse removal information was provided for the 2016 Community Survey.

10.10 Planning

Existing Services and Infrastructure

Electricity, Water Infrastructures and Sewage

Fezile Dabi District Municipality (FDDM) 89.8 % of households have access to electricity for light s receive piped water inside. Mo haka Local Municipality has higher provision levels (93.3 %), followed by the Ngwathe Municipality Municipality where 92 % of households have access to electricity for lighting. In the Metsimaholo , 86.4 % and 84.4 % of households have access to electricity for lighting.

Moqhaka Regional Perspective: Level of Service Provision
(Source: Census 2011)

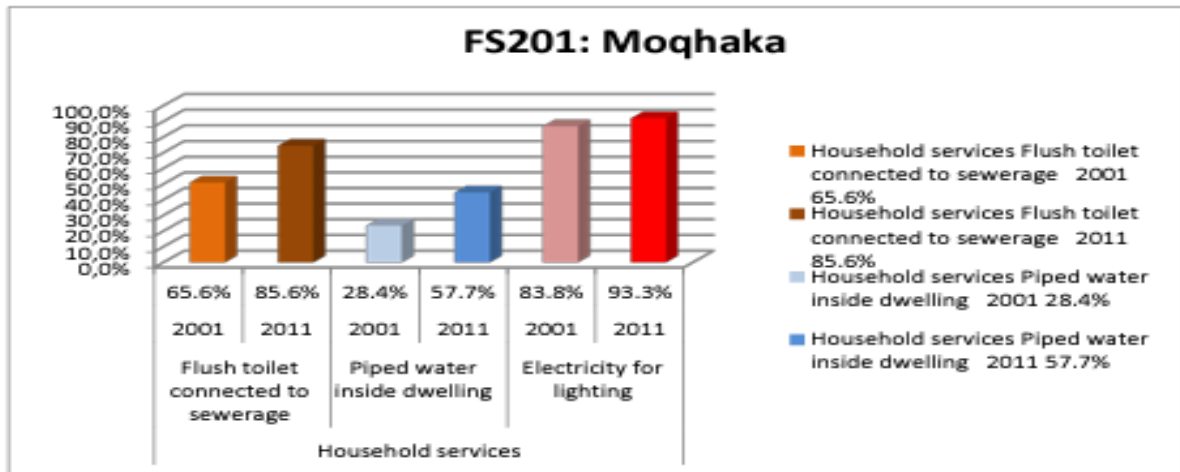


Figure 19: Graph Showing Services Provided

Transportation / Roads

The proposed Steynsrus SEF is located 4 km northwest of the town of Steynsrus, which is located within the Moqhaka Local Municipality (MLM) of the Free State Province, approximately 45 km southeast of the town of Koonstad, which is located on the N1. Steynsrus is linked to Koonstad via the R 76, which runs in a north-westerly direction between the two towns.

The earmarked site will be accessed through R76, which also provides a link with the town of Bethlehem to the southeast of Steynsrus (90 km). The town of Senekal is located 40 km south of Steynsrus and is linked via the R 720.

10.11 Noise

Noise of the study area would emanate mainly from vehicles traffic on the R76 and farming activities respectively.

10.12 Health

Health Care Facilities

There is one district hospital, Boitumelo Hospital, provided for the entire Fezile Dabi district that is situated in Koonstad and provides simultaneously in regional and district hospital services. In the Ngwathe Region, two hospitals exist that are situated in Heilbron and Parys. Rural health provision, similar to the national tendency, is still an issue of concern in the region. Health services are normally provided on a monthly basis in the region through Mobile Clinics. The service needs to be enhanced in the entire region as there are shortcomings in rural health services (Ngwathe IDP, 2021).

11 SPECIALIST STUDIES

11.1 Specialist Studies and Purpose

This section seeks to provide feedback on the studies conducted as part of the Basic Assessment Report. The studies were triggered by the Environmental Screening conducted as a guide prior to conducting an impact assessment and the nature of the project.

The purpose for the studies done, was to address key project issues and further ensure compliance with applicable legal requirements. It must be noted that the results shared in this chapter and supportive sub-sections are a summary of findings / results of specialists studies done, and must be read in-conjunction with the full Specialists Reports provided in Annexure K for a better understanding.

11.2 List of Specialist Studies conducted and Compliance Statements

- Aquatic and Flood line Assessment
- Terrestrial Biodiversity Assessment
- Phase 1 Cultural Heritage Impact Assessment (Compliance Statement)
- Desktop Paleontological Assessment
- Avifaunal Assessment (Included in the Terrestrial Ecology Assessment Report)
- Agricultural Impact Assessment
- Social Impact Study / Assessment

The findings and recommendations from the above studies were used to complete the specific description of the receiving environment and provide relevant mitigation measures for the proposed development.

11.3 Aquatic and Flood line Assessment

The details of the specialist that undertook Water Resources Impact Assessment and Wetland delineation.

Company Name	MORA Ecological Services
Name:	Mokgatla Molepo (MSc Zoology & BSc Botany)
Qualifications:	
Professional Registration (Where Applicable)	<ul style="list-style-type: none"> • SACNASP: Professional Natural Scientist (009509) • British Ecological Society (BES). Membership number: 1010709 • Zoological Society of Southern Africa (ZSSA). Membership number: 691

11.3.1 Main Objective for the study/ ToR

- Conduct a detailed impact assessment of the proposed development on the watercourses or wetlands of the site.
- Compile a study on the wetlands of the site as per the guidelines and criteria set by the Department of Water and Sanitation. The study includes a wetland / riparian delineation and functionality assessment (Present Ecological State Ecological Importance and Sensitivity and Wet-EcoServices), with descriptions of the anticipated impacts (risks) associated with the proposed development activities and mitigation to reduce impacts.
- The assessment must contribute to meeting the requirements of the National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998) in conjunction with Regulation 982 of December 2014, promulgated in terms of Section 24 (5) of NEMA and Chapter 4 of the National Water Act, Act 36 of 1998. Where the development will impede on wetlands, watercourses or other hydrological features, this study will form part of the Water Use License (WUL) application.

11.3.2 Methodology used to acquire information:

- The wetland delineation and classification for the project was done according to the criteria set by the Department of Water Affairs and Forestry (2005) guidelines and the Classification System for Wetlands and other Aquatic Ecosystems in South Africa (Ollis *et al.*, 2013).

- The soils and vegetation associated with wetlands and landscape were all used as parameters in identifying the wetlands. Baseline soil information, landscape profile and vegetation were used to confirm wetland and terrestrial properties within the study area. Present Ecological State (PES) and Ecological Importance and Sensitivity are given in the table below:

Classification	PES	EIS
Depression	C: Moderately modified	D: Low / marginal
UVB1	C: Moderately modified	C: Moderate
UVB2	C: Moderately modified	C: Moderate

A risk matrix assessment was conducted for the wetlands on site in addition to the mitigation measures recommended to ensure the protection of the wetlands. Impacts relating to the proposed development on the wetlands / riparian zones are as follows:

- Soil Erosion and Sedimentation. Alteration of the amount of sediment entering the water resource and associated change in turbidity
- Disturbance of watercourse habitat and fringe vegetation
- Soil and water pollution
- Import and spread of alien invasive vegetation.

11.3.3 Key Findings of the Study

According to the NEMA screening tool the site has a low sensitivity from an aquatic biodiversity perspective. A site sensitivity verification was therefore conducted to determine if the assessment was accurate. After the site visit, it was concluded that the site has a Low-Medium sensitivity from an Aquatic biodiversity perspective.

11.3.4 Impact Assessment

Please refer to page 33-46 of the report, for details on the Impact Assessment conducted.

11.3.5 Conclusion

Since the impacts were all low, the General Authorisation should be sufficient. The development of proposed Solar PV Project can be supported from a wetland perspective, provided that the mitigation measures are implemented.

11.4 Terrestrial Biodiversity (Flora, Fauna and Avifaunal)

11.4.1 The details of the specialist that undertook Terrestrial Ecology Assessment

Company Name	MORA Ecological Services
Name:	Mokgatla Molepo (MSc Zoology & BSc Botany)
Qualifications:	MSc Zoology & BSc Botany
Professional Registration (Where Applicable)	<ul style="list-style-type: none">• SACNASP: Professional Natural Scientist (009509)• British Ecological Society (BES). Membership number: 1010709• Zoological Society of Southern Africa (ZSSA). Membership number: 691

11.4.2 Objectives of the Study

Considering the requirements of national legislation and of the proposed project, the purpose of this report is to make provision of substantial information in advising the outcome of the application with respect to the ecological viability of the proposed project. The objectives of this report are, therefore, to:

- Describe the baseline receiving environment.
- Identify and describe terrestrial plants and animal species sensitivities within the area and the manner in which these sensitive receptors may be impacted upon;
- Identify priority ecological, hydrological, botanical and faunal features within the proposed areas;
- Record the presence and diversity of plant species of conservation significance (TOPS, Red data, Protected, etc.)
- Mapping sensitive areas within the proposed development area;

- Running the screening tool to identify any critical issues pertaining to biodiversity
- Evaluate the extent of site-related impacts;
- Conduct a risk assessment for the proposed project; and
- Provide the prescription of mitigation measures and recommendations for identified risks.

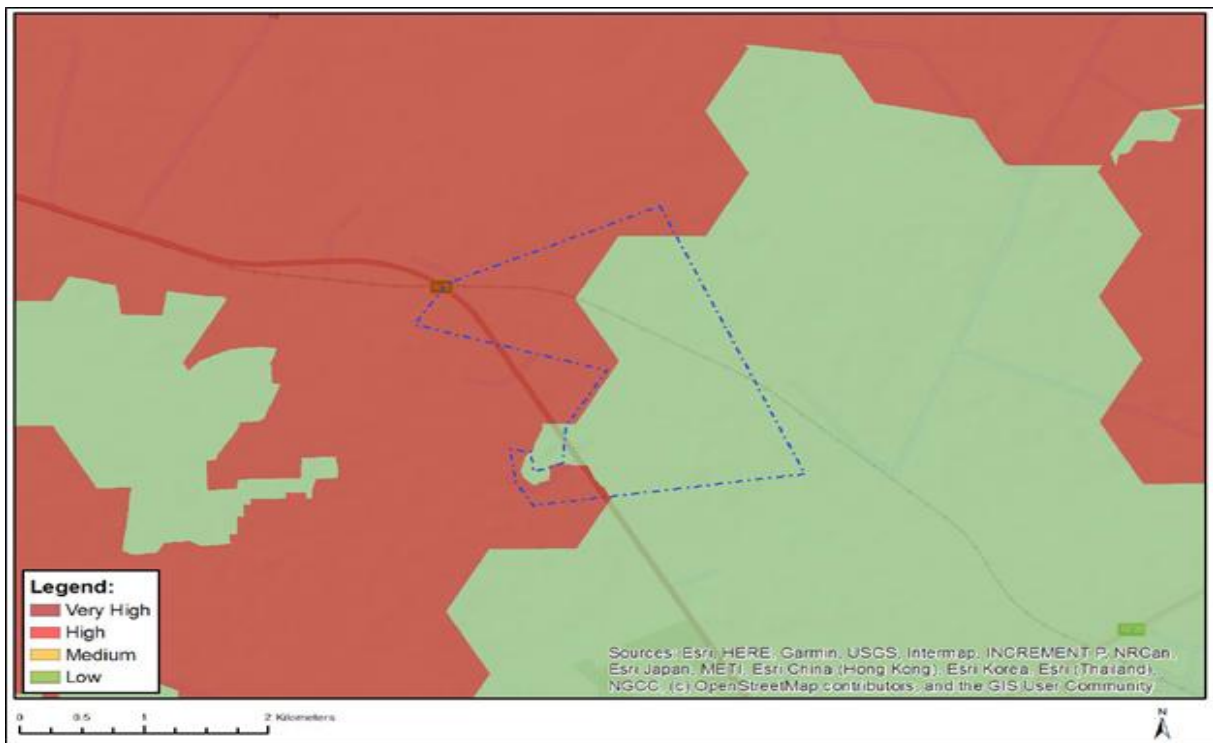
11.4.3 Methodology

- Prior to conducting field assessments, a comprehensive literature review of available published and unpublished literature pertaining to the current use of the land and the potential environmental sensitivity of the site was conducted.
- The site visit was conducted in February 2023 to undertake necessary in-field procedures in assessing the overall terrestrial biodiversity composition within the study area.
- The survey was conducted by two competent fieldworkers of MORA Ecological Services (Pty) Ltd, i.e., a senior ecologist (Pr. Sci. Nat.) and an assistant (Junior Specialist, Cand. Sci. Nat). Surveys were conducted on the development footprint area and the survey time daily was from 06h00 am until 18h00 pm.
- Photographic representation of the development footprint area were collected. Additional images of the receiving environment are shown in the report.

11.4.4 Key Findings of the Study

The DFFE screening tool was consulted using the feasibility of the region. The terrestrial biodiversity and animal themes were classified as having Very High Environmental Sensitivity. The Plant species category is of Medium Sensitivity. To explain the sensitivity rankings refer to the information provided below.

Figure 20: Terrestrial biodiversity sensitivity

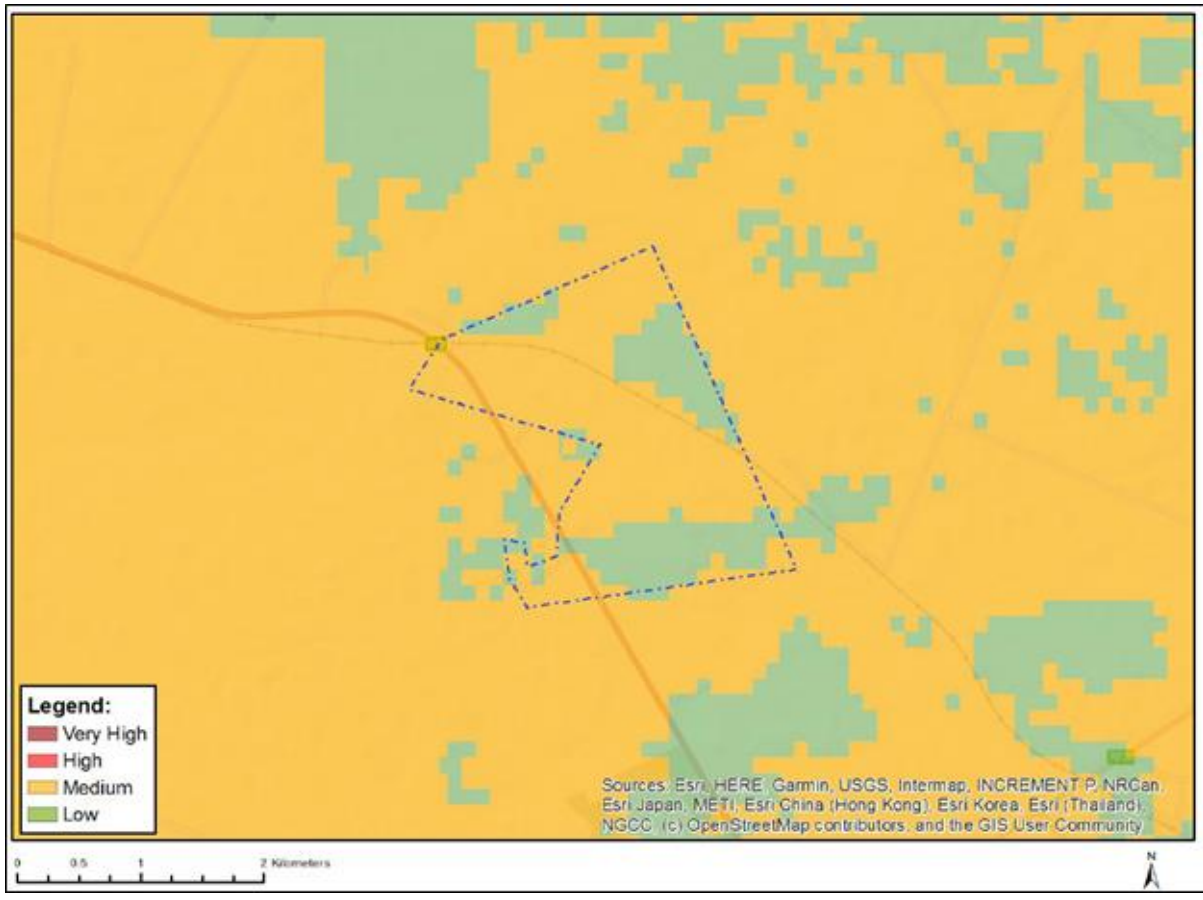


Sensitivity	Feature(s)
Very High	Ecological support area 1
Very High	Ecological support area 2

Figure 21: Plant theme sensitivity map



Figure 22: Animal theme (Avian sensitivity)



Group - Species	Sensitivity Feature(s)
Aves-Sagittarius serpentarius	Medium
Mammalia-Hydricctis maculicollis	Medium

11.4.5 Impact Assessment

Please refer to page 20 – 45 of the report for details of the Impact Assessment and mitigations.

11.4.6 Conclusions

Overall, the impacts associated with this proposed solar facility are considered Low-Medium. It is the opinion of the specialist that the proposed solar facility be considered, provided that the mitigations and recommendations are adhered to.

11.5 Phase 1 Cultural Heritage Impact Assessment

11.5.1 The details of the specialist that undertook Cultural Heritage Impact Assessment

Company Name	Beyond Heritage
Name:	Jaco Van Der Walt
Qualifications:	BA (Pret) BA (Hons) (Archaeology) [Wits], MA (Archaeology [Wits])
Professional Registration (Where Applicable)	N/a

11.5.2 Objectives of the Study

Conduct a Cultural Heritage Impact Assessment for the proposed Steynsrus 10MW PV Solar Facility & Storage.

11.5.3 Methodology

The study area was assessed by Jaco Van der Walt and Almond, the report has been submitted to the South African Heritage Resources Authority (SAHRA) (CaseID: 3420) and was approved in October 2013. The compliant statement letter was issued in this regard.

11.5.4 Key Findings of the Study

Six sites of heritage significance were identified during the 2013 survey consisting of:

- The demolished remains of two residential dwellings (Site 2 and 3) and the foundations of a rectangular cattle kraal (Site 1) associated with the residential complex.
- Site 4 is a large farm labourer compound setup.
- Site 5 consists of approximately 23 stone packed graves and
- Site 6 consists of three stone cairns roughly aligned east to west that might represent graves.

11.5.5 Impact Assessment

Refer to the page 25-43 the Social Impact Study.

11.5.6 Conclusions

None of the documented sites are in close proximity to the proposed development and no direct impact is foreseen on the recorded sites.

11.6 Desktop Paleontological Assessment

11.6.1 The details of the specialist that undertook Desktop Paleontological Assessment

Company Name	Palaeontologist Consultant
Name:	Prof Marion Bamford
Qualifications:	PhD (Wits Univ, 1990); FRSSAf, mASSAf
Professional Registration (Where Applicable)	Palaeontological Society of Southern Africa

11.6.2 Objectives of the Study

The Terms of Reference (ToR) for this study were to undertake a PIA and provide feasible management measures to comply with the requirements of SAHRA.

11.6.3 Methodology

The methods employed to address the ToR included:

1. Consultation of geological maps, literature, palaeontological databases, published and unpublished records to determine the likelihood of fossils occurring in the affected areas. Sources included records housed at the Evolutionary Studies Institute at the University of the Witwatersrand and SAHRA databases.
2. Where necessary, site visits by a qualified palaeontologist to locate any fossils and assess their importance (*not applicable to this assessment*);
3. Where appropriate, collection of unique or rare fossils with the necessary permits for storage and curation at an appropriate facility (*not applicable to this assessment*); and
4. Determination of fossils' representativity or scientific importance to decide if the fossils can be destroyed or a representative sample collected (*not applicable to this assessment*).

11.6.4 Key Findings of the Study

Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the overlying soils and sands of the Quaternary. There is a very small chance that fossils may occur below the soils in the deep-water shales of the Permian Volksrust Formation so a Fossil Chance Find Protocol should be added to the EMPr.

If fossils are found by the contractor, environmental officer, or other responsible person once excavations for foundations and infrastructure have commenced then they should be rescued, and a palaeontologist called to assess and collect a representative sample.

11.6.5 Impact Assessment

Please refer to page 12 of the report for details of the Impact Assessment

11.6.6 Conclusions

According to the specialist the impact on the palaeontological heritage would be low and that, so as far as the palaeontological heritage is concerned, the project should be authorised.

11.7 Avifauna Study

11.7.1 The details of the specialist that undertook Desktop Avifauna Assessment

Company Name	MORA Ecological Services
Name:	Mokgatla Molepo
Qualifications:	MSc Zoology & BSc Botany
Professional Registration (Where Applicable)	<ul style="list-style-type: none">• SACNASP: Professional Natural Scientist (009509)• British Ecological Society (BES). Membership number: 1010709• Zoological Society of Southern Africa (ZSSA). Membership number: 691

11.7.2 Objectives of the Study included, but not limited to the following:

- To conduct the on-site Bird Habitat Assessment
- Assessment of the expected impacts that the proposed development could have on Avifauna
- Provide recommendations to conserve possible threatened species or sensitive vegetation groupings if found to be present.

11.7.3 Methodology

Prior to the field visit, a desktop study of the available literature and relevant reports was made. The consultant conducted a site visit on 8th February 2022. The available roads near the site were driven using a 4x4 vehicle. Regular stops were made by the consultant to record diversity and veld conditions by walking random transects. Coordinates were taken at localities of note.

11.7.4 Key Findings of the Study

On-site Bird Habitat Assessment

The principal habitat type found at the earmarked site, and further considered most relevant to bird ecology and community structure, was the grassland habitat.

Observed Bird Species Diversity

An assessment was done, and it was found that bird species provided in the list below occur on site.

Table 10: List of avifaunal species recorded during February 2023 surveys

Scientific name	Common name
<i>Unidentified</i>	Unidentified
<i>Chrysococcyx caprius</i>	Diederik Cuckoo
<i>Mirafra africana</i>	Rufous-naped Lark
<i>Lamprotornis nitens</i>	Cape Glossy Starling
<i>Corvus albus</i>	Pied Crow
<i>Cursorius temminckii</i>	Temminck's Courser
<i>Pternistis swainsonii</i>	Swainson's Spurfowl
<i>Plectropterus gambensis</i>	Spur-winged Goose
<i>Anthus cinnamomeus</i>	African Pipit
<i>Mirafra fasciolata</i>	Eastern Clapper Lark
<i>Macronyx capensis</i>	Cape Longclaw
<i>Prinia flavicans</i>	Black-chested Prinia
<i>Coturnix coturnix</i>	Common Quail
<i>Cisticola aridulus</i>	Desert Cisticola
<i>Fulica cristata</i>	Red-knobbed Coot
<i>Bostrychia hagedash</i>	Hadedda
<i>Euplectes capensis</i>	Yellow Bishop

<i>Euplectes orix</i>	Southern Red Bishop
<i>Anas undulata</i>	Yellow-billed Duck
<i>Anas erythrorhyncha</i>	Red-billed Teal
<i>Cecropis cucullata</i>	Greater Striped Swallow
<i>Hirundo rustica</i>	Barn Swallow
<i>Riparia paludicola</i>	Brown-throated Martin
<i>Petrochelidon spilodera</i>	South African Cliff Swallow
<i>Plocepasser mahali</i>	White-browed Sparrow-Weaver
<i>Ardea melanocephala</i>	Black-headed Heron
<i>Bubulcus ibis</i>	Western Cattle Egret
<i>Lanius collaris</i>	Southern Fiscal
<i>Ploceus velatus</i>	Southern Masked Weaver
<i>Ploceus capensis</i>	Cape Weaver
<i>Vanellus armatus</i>	Blacksmith Lapwing
<i>Vanellus coronatus</i>	Crowned Lapwing
<i>Ortygospiza atricollis</i>	African Quail-Finch
<i>Quelea quelea</i>	Red-billed Quelea
<i>Curruca subcoerulea</i>	Chestnut-vented Tit-Babbler
<i>Pycnonotus nigricans</i>	African Red-eyed Bulbul
<i>Falco naumanni</i>	Lesser Kestrel
<i>Falco rupicoloides</i>	Greater Kestrel
<i>Calandrella cinerea</i>	Red-capped Lark
<i>Spilopelia senegalensis</i>	Laughing Dove
<i>Columba guinea</i>	Speckled Pigeon
<i>Streptopelia capicola</i>	Cape Turtle Dove
<i>Microcarbo africanus</i>	Reed Cormorant
<i>Alopochen aegyptiaca</i>	Egyptian Goose

<i>Euplectes progne</i>	Long-tailed Widowbird
<i>Lanius collaris</i>	Southern Fiscal

Threatened and Red-Listed Bird Species:

According to the specialists' study rating and that of DFFE, the area is rated as low, which means no species of international and/or national conservation concern (Red Data species, IUCN/Birdlife International 2011, Barnes 2000), ranging from Near Threatened to Vulnerable, were considered as possible to occur on site, therefore, the proposed development would not have negative impact.

11.7.5 Impact Assessment

Please refer to section 39-45 of the Terrestrial Biodiversity and Faunal report for details of the Impact Assessment

11.7.6 Conclusions

According to the specialist study findings, No red data bird species were identified on the site, while there is a remote possibility that sensitive species might occur on the proposed development area. The proposed development will not impact negatively on the habitat that it will occur on, because the footprint is small across the approximately 441 ha's property.

11.8 Social Impact Assessment

11.8.1 The details of the specialist that undertook Desktop Paleontological Assessment

Company Name	Beverley Monametsi Consulting (BMC)
Name:	Beverley Monametsi
Qualifications:	MSc. Water Resource Management; MSc Microbiology
Professional Registration (Where Applicable)	SACNASP Environnemental Scientist (Pr.Sci.Nat.)

11.8.2 Objectives of the Study

- Review of the current / or available demographic
- Review of relevant planning and policy framework and information collected during the site visit to the area and interviews with key stakeholders.
- Review of information from similar projects in South Africa; and
- Identification of social issues associated with the proposed project.

11.8.3 Methodology

The methods employed to address the ToR included the following:

- Describing and obtaining an understanding of the proposed intervention (type, scale, location), the communities likely to be affected and determining the need and scope of the SIA;
- Collecting baseline data on the current social environment and historical social trends
- Identifying and collecting data on the Social Impact Assessment variables and social change processes related to the proposed intervention. This requires consultation with affected individuals and communities;
- Assessing and documenting the significance of social impacts associated with the proposed intervention; and
- Identifying alternatives and mitigation measures.

11.8.4 Key Findings of the Study

The key findings of the study are summarised under the following sections:

- Fit with policy and planning;
- Construction phase impacts;
- Operational phase impacts;
- Cumulative Impacts;
- Decommissioning phase impacts;

Fit with Planning

The key documents reviewed included:

- The National Energy Act (2008);
- The White Paper on the Energy Policy of the Republic of South Africa (December 1998);
- The White Paper on Renewable Energy (November 2003);
- Integrated Resource Plan (IRP) for South Africa (2019);
- Free State Provincial Growth and Development Strategy (2013); and
- Mophaka Local Municipality Integrated Development Plan (2017-2022).

The findings of the review indicated that renewable energy is strongly supported at a national, provincial, and local level. Based on this it is reasonable to conclude that the establishment of the proposed 10MW Steynsrus SEF is supported.

Construction phase

The key social issues associated with the construction phase include:

Potential positive impacts

Creation of employment and business opportunities, and the opportunity for skills development and on-site training

11.8.5 Impact Assessment

Please refer to page 22-46 of the report for details of the Impact Assessment

11.8.6 Conclusions

Based on the findings it was concluded that renewable energy is strongly supported at a national, provincial, and local level. Based on this it is reasonable to conclude that the establishment of the proposed 10MW Steynsrus SEF is supported.

12 ENVIRONMENTAL IMPACT ASSESSMENT

12.1 General

This chapter addresses specific environmental impacts that could result during the different phases of the proposed project. The pre-construction phase, the construction phase and operational phases of the proposed Steynsrus 10MW PV Solar Facility and Storage.

Impacts were identified based on the following:

- Evaluation of the Project's activities and components
- Impacts associated with listed activities contained in GN No. R327 of 7 April 2017, as amended, for which Environmental Authorisation have been applied for;
- Assessment of the receiving environment: Ecological, social, economic, biophysical and built environments.
- Comments received during public participation from IAPs and from government.
- Results/ findings from specialist studies

12.2 Impacts associated with Listed Activities

The development of a 10 MW PV Solar Facility, outside an urban edge, require the Basic Assessment Process as contemplated in GNR. 327, Section 1(ii), of Environmental Impact Assessment Regulations Listing Notice 1 of 7 April 2017

The potential impacts associated with the key listed activities are provided in the table below.

Table 11: Listed Activities triggered by the project and their Impacts

Listed Activities Anticipated	Potential Environmental Impacts
<p>GN R327; Listing Activity 1:</p> <p>The development of facilities or infrastructure for the generation of electricity from a renewable resource where—</p> <p>(i) the electricity output is more than 10 megawatts but less than 20 megawatts;</p> <p>or</p> <p>(ii) the output is 10 megawatts or less but the total extent of the facility covers an area in excess of 1 hectare; excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs—</p> <p>(a) within an urban area; or</p> <p>(b) on existing infrastructure.</p>	<p>The generation capacity of the proposed development is 10MW.</p> <p>Possible Impacts:</p> <ul style="list-style-type: none"> • Clearance of vegetation (Grass) in land associated with the construction footprint of the power lines, on land used for agricultural purposes, outside of an urban area. • Impact on agricultural land (It must be noted that the proposed project's footprint may not stop grazing activities. The project can be well integrated. • Socio-economic impacts associated with construction activities (Such as noise, visual impact etc) <p>Potential loss of sensitive environmental features (e.g. sensitive fauna and flora species).</p>
<p>GN R325; Listing Activity 14</p> <p>The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.</p>	<p>The proposed development might have a battery Storage (BEES) of more than 80 square meters. The developer is awaiting final engineering drawing.</p>
<p>GN R327; Listing Activity 12 (x) and (xii):</p> <p>The development of:</p>	<p>The proposed development will surely have infrastructure / structure with a physical footprint of 100 square meters,</p>

<p>(ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs) within a watercourse;</p> <p>b) in front of a development setback; or</p> <p>c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding- (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</p> <p>(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;</p> <p>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;(dd) where such development occurs within an urban area; or</p> <p>(ee) where such development occurs within existing roads or road reserves.</p>	<p>and these may occur within a watercourse.</p>
<p>GN R327; Listing Activity 19 (i)</p> <p>The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving</p>	<p>Some of the proposed activities related to the proposed development may include depositing or the dredging, excavation, removal or moving of soil, sand, of more than 10 cubic metres from a watercourse. This activity may still need to be verified to ensure other legal activities triggered, from other laws such as NWA, are authorised too.</p>

<p>a) will occur behind a development setback;</p> <p>b) is for maintenance purposes undertaken in accordance with a maintenance management plan;</p> <p>c) falls within the ambit of activity 21 in this Notice, in which case that activity applies.</p> <p>d) Occurs within an existing ports or harbour's that will not increase the development footprint of the port or harbour; or</p> <p>e) Where such development is related to the development of a port or harbour in which case activity 26 in Listing Notice 2 of 2014 applies.</p>	
<p>GN R327; Listing Activity 24 (ii)</p> <p>The development of a road–</p> <p>(ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;</p> <p>but excluding a road–</p> <p>a) which is identified and included in activity 27 in Listing Notice 2 of 2014; or</p> <p>b) where the entire road falls within an urban area.</p>	<p>The proposed PV Solar facility may have a road without a reserve and is wider than 8 meters in length.</p>
<p>GN R327; Listing Activity 28 (ii)</p> <p>Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 01 April 1998 and where such development:</p>	<p>The proposed 10MW PV Solar facility is regarded as a commercial facility. The total development footprint exceeds 1ha and is located outside the urban edge.</p>

<p>(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.</p>	<p>Possible Impacts:</p> <ul style="list-style-type: none"> • Clearance of vegetation (Grass) in land associated with the construction footprint of the power lines, on land used for agricultural purposes, outside of an urban area. • Impact on agricultural land (It must be noted that the proposed project's footprint may not stop grazing activities. The project can be well integrated. • Socio-economic impacts associated with construction activities (Such as noise, visual impact etc) <p>Potential loss of sensitive environmental features (e.g. sensitive fauna and flora species).</p>
<p>R.327 – Activity no. 11(i):</p> <p>The development of facilities or infrastructure for the transmission and distribution of electricity—</p> <p>(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or</p> <p>(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more;</p> <p>excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is —</p> <p>(a) temporarily required to allow for maintenance of existing infrastructure;</p>	<p>The capacity of the proposed 155 m connecting (from DC switch station – to AC substation) power lines will be 132/22 kilovolts, outside an urban area.</p> <p>Possible Impacts:</p> <ul style="list-style-type: none"> • Clearance of vegetation (Grass) in land associated with the construction footprint of the power lines, on land used for agricultural purposes, outside of an urban area. • Impact on agricultural land (It must be noted that the proposed project's footprint may not stop grazing activities. The project can be well integrated. • Socio-economic impacts associated with construction

<p>(b) 2 kilometres or shorter in length;</p> <p>(c) within an existing transmission line servitude; and</p> <p>(d) will be removed within 18 months of the commencement of development.</p>	<p>activities (Such as noise, visual impact etc)</p> <ul style="list-style-type: none"> • Potential loss of sensitive environmental features (e.g. sensitive fauna and flora species).
<p>GN R325; Listing Activity 15</p> <p>The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for:</p> <p>(i) the undertaking of a linear activity; or</p> <p>(ii) Maintenance purposes undertaken in accordance with a maintenance management plan.</p>	<p>The proposed development may cause clearance of indigenous vegetation associated with the construction footprint for the substations. The proposed PV footprint is 30 ha approximately.</p> <p>Possible Impacts:</p> <ul style="list-style-type: none"> • Clearance of areas consisting of indigenous vegetation associated with the construction footprint of the and laydown areas. • Visual impacts. • Soil destabilisation and subsequent erosion. • Possible Spread of alien and invasive species.

12.3 Issues raised by Environmental Authorities and IAPs

Currently no issues raised by the authorities or interested and affected parties pertaining to the environmental Impacts of the proposed development.

12.4 Project Activities

The activities, aspects and Impacts listed below provide details of the project envisaged impacts. The Environmental Management Plan Report (EMPr) – found in Annexure G has provided mitigation measures.

12.4.1 Project Phase: Pre-construction

Activities related to	Activities	Aspects	Impacts
Pre-	Negotiations and agreements with the affected landowners	Inadequate negotiation process	Social Impact (Project Failure/

Construction Phase (PV Solar Facility, Powerline & Switch Station)	regarding PV Solar P Facility Site and Leasing agreements.		Possible contraventions)
	Identification / registration of affected and interested stakeholders and authorities	Inadequate consultation process	Social Impact (Project Failure/ Possible legal contraventions)
	Fencing off PV Solar Facility sites	Vegetation clearance and improper compaction	Impact on flora, land degradation
	Procurement Process to ensure appointment of appropriate suppliers	Inadequate procurement process	Possible legal Contraventions
	Surveying / Profiling / Pegging of the site	Inadequate survey process	Social Impact Impact on Flora & Fauna Water Pollution Air Pollution In adequate project layout
	Engineering Designs	Designs without environmental specifications	Social Impact Impact on Flora & Fauna Water Pollution Air Pollution Possible legal contraventions
	Geotech Investigations	Inadequate Geotech studies	Social Impact (geotechnical Impact on the building)
	Environmental Studies and acquisition of authorisation	Inadequate environmental and compliance monitoring process causing the project to start without required permits	Legal Contraventions
	Construction of site office and ablution facilities	Vegetation Clearance & Soil Erosion	Impact on flora Soil Degradation
	Investigation and confirmation of infrastructure routes	Inadequate Investigation process	Social Impact (Project Failure)
	Barricading of sensitive environmental features	Inadequate Investigation process	Impact on Flora/ Fauna /Impact on Water resources

12.4.2 Project Phase: Construction

Activities related to Construction Phase (PV Solar Facility, Powerline & Switching Station)	Activities	Aspects	Impacts
	Site establishment	Site Clearance	Impact on Flora Soil Erosion Air Pollution (Dust) Social Impact (Agricultural Land)
	Preparation of access roads	Site clearance	Impact on Flora Soil Erosion Air Pollution (Dust)
	Access to water	Possible extraction of water from rivers/water bodies	Impact on water resources
	Establish construction laydown areas	Site clearance & digging	Impact on Flora Soil Erosion Air Pollution
	Bulk fuel storage for construction machinery	Inadequate storage of chemicals	Possible land pollution / water pollution
	Delivery of construction material	Driving to the project sites (Usage of Heavy vehicles & machinery)	Social Impact (Health / Noise etc) Visual Impact
	Transportation of equipment, materials and personnel	Driving to the project sites (Usage of Heavy vehicles & machinery)	Social Impact (Health / Noise etc) Visual Impact
	Storage and handling of material	Inadequate storage of construction material	Visual Impacts
	Excavations for PV Structural foundation etc	Clearance of vegetation and causing the soil loose	Impact on Flora Soil Erosion Air Pollution (Dust)
	Concrete Works	In adequate usage of cement mixture	Land degradation
	Erection of steel structures	Digging and improper / lack compaction	Soil Erosion
	Construction of PV Solar Facility components	Site Clearance and digging	Impact on Flora Soil Erosion Air Pollution (Dust)
	Mechanical and Electrical Works	Inadequate operations and connections	Social Impact Safety Hazard
	Energy Usage	Misuse of energy	Impact on natural resources

	Material delivery and offloading	Usage of machinery to offload the material	Visual Impact Soil Pollution (Oil/chemical leakage)
	Stringing of distribution lines	Stringing work using different types of conductors	Visual Impact Noise Impact
	Stockpiling	Soil will be stockpiled for usage during the construction phase	Visual Impact Soil Degradation /Pollution (Possible Leakage)
	Waste and wastewater management	Inadequate Management of waste and wastewater	Land Pollution

12.4.3 Project Phase: Operation

Activities related to Operational Phase (PV Solar Facility)	Activities	Aspects	Impacts
	Powerline / Switching Station Maintenance	Driving to sites Vegetation clearance on the servitude	Air pollution (Dust & Emissions) Impact on Flora / Fauna Noise pollution
	PV Solar Facility Maintenance	Driving to sites (Using diesel driven vehicles / trucks/ machinery) Vegetation clearance around and inside the substation yard	Air pollution Impact on Flora/ Fauna Noise pollution
	Servitudes Maintenance (Road to the substation)	Driving to sites Vegetation clearance on the servitude	Air pollution (Dust) Impact on Flora Noise pollution
	Waste Generation (Domestic & Hazardous)	Improper storage and disposal of waste	Land Pollution and degradation Social Impacts (Health hazards)

12.5 Impact Assessment Methodology

12.5.1 Identification of Significant Rating

The quantitative Impact Assessment Methodology has been used. The environmental impacts associated with an aspect, are assessed by considering both the likelihood of an impact and its magnitude. Together they define the environmental impact. The likelihood and magnitude for each aspect are characterized as high, medium and low according to the following definitions and score ratings:

A LIKELIHOOD

HIGH	Routine or ongoing activity or impact. Is known to have occurred on routine basis in the past. Impacts associated with the aspects are likely to emerge soon. Impacts are unknown.	3
MEDIUM	Periodically; occurs once or twice a year. Impacts that are likely to occur within one year.	2
LOW	Very infrequent; every several years. Impacts associated with the aspects are several years away.	1

B MAGNITUDE

HIGH	Aspect has a recognized global and national environmental impact. Widespread or permanent ecological damage locally. Remediation would take longer than one year. Could result in a major public health hazard. Magnitude is unknown.	3
MEDIUM	Aspect could result in a major uncontained or sustained environmental release impacting on a regional or local environment only. Ecological damage can be remedied within one year. Health hazard to humans in the immediate vicinity, but not resulting in critical or fatal injury/illness.	2
LOW	Little or no ecological effect and no measurable impact on human health.	1

Three factors have been identified in the procedure as important areas to consider. Each factor is scored as 1, 2 or 3. For each category, the extreme scenarios (1 and 3) are described; the 2 rating is left to the judgement of the assessor.

C. REGULATORY SCRUTINY

HIGH	Very important. Regulated by legislation. High potential for regulatory action or limitations to operate (e.g. subject to regulatory inspections; past compliance problems). Voluntary commitments or quasi-regulated aspects.	3
MEDIUM	Important. Regulated, although legislation is not stiff.	2
LOW	Relatively unimportant. Little or no potential for regulatory action (e.g. not regulated; not a target of enforcement).	1

D. STAKEHOLDER INTEREST

HIGH	Very important to public and customers. Aspect has the potential to cause damage to corporate reputation. Ongoing dialogue has begun; negative perception; possibility for third party lawsuits. Customers expect superior performance by Eskom in managing this aspect.	3
MEDIUM	Important to public and customers. The aspect is likely to cause damage to corporate reputation.	2
LOW	Relatively unimportant; the public is unaware or is aware but it is not an issue. No threat to corporate image. Is not an issue with customers.	1

D. BUSINESS RISK/BENEFIT

HIGH	Aspect poses significant risk. Early response necessary. Industrial initiatives underway/developed. May have major impact on competitive position. May have a significant impact on value of Municipality assets. Score rating.	3
MEDIUM	Aspect is likely to pose risk.	2
LOW	Aspect does not pose significant risk. No need for early response. No industry initiatives associated with aspect. Does not threaten competitive position. Does not affect values of Municipality assets	1

12.5.2 Determining Significant Environmental Aspects, Risks and Opportunities Environmental Objectives, and Environmental Management Programmes / or Action Plans

- a) The equation for calculating the significant environmental aspects score is: (likelihood x magnitude) + regulatory scrutiny + stakeholder interest +

business risk/benefit) = overall score. The threshold for significance rating will be classified, as a guideline, as follows: **Low <5, Medium 5-10; High 11-18.**

The significance meaning for each potential impact are as follows:

- Low (i.e., Where the significant impact would be minor or no impact at all)
- Medium (i.e., Where the significant impact is moderate with effective mitigation measures and is reversible over time)
- High (i.e., Where the significant impact is major and Irreversible)

The aspects and their related impacts will be developed using the above methodology. In developing aspects and impacts mitigation measures before and after, shall be taken into consideration.

12.6 Impact Mitigation

12.6.1 Mitigation Hierarchy

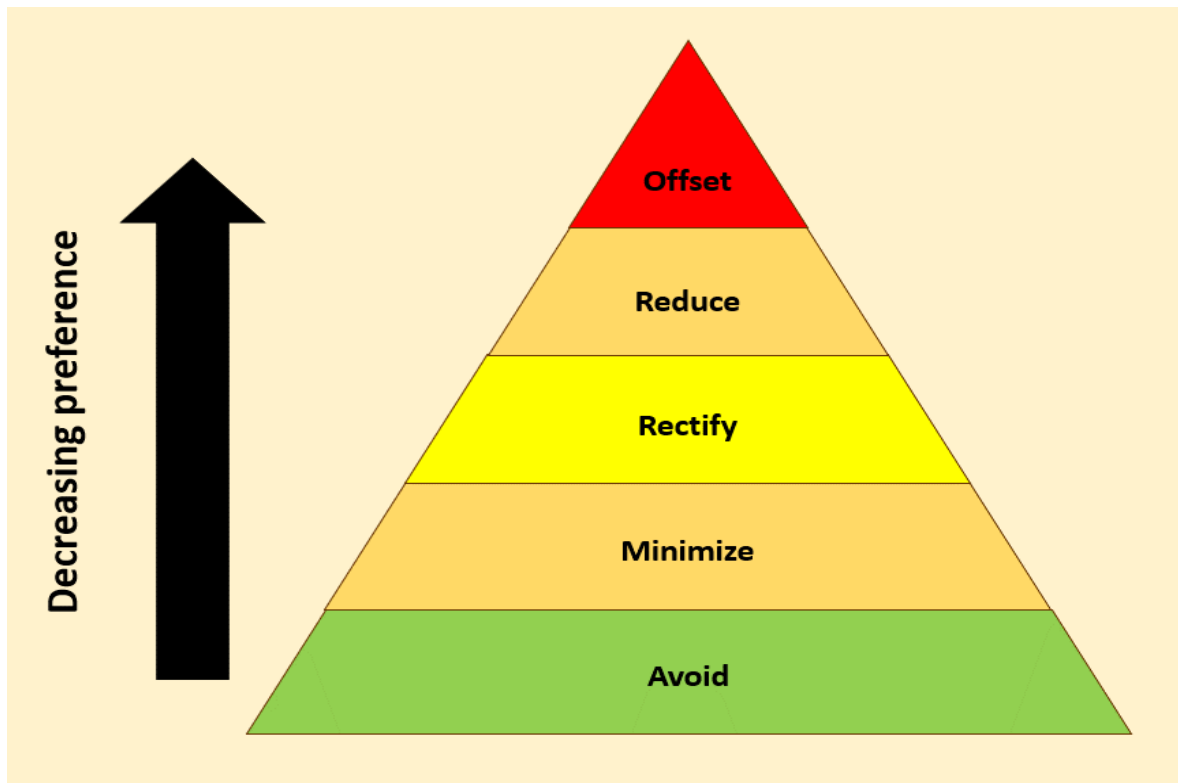
Impacts are to be managed by assigning suitable mitigation measures. According to DEAT (2006), the objectives of mitigation are to:

- Find more environmentally sound ways of executing an activity;
- Enhance the environmental benefits of a proposed activity;
- Avoid, minimise or remedy negative impacts; and
- Ensure that residual negative impacts are within acceptable levels.

Mitigation measures raised should always strive to meet following hierarchy –

- 1= Avoid;
- 2= reduce/ minimise;
- 3= rectify (rehabilitate or remediate);
- 4=Reduce and/ or
- 5= Offset (compensate for the environmental impacts).

Figure 23: Mitigation Measure Hierarchy



The proposed mitigation of the impacts associated with the Project includes specific measures identified environmental specialists, government legal requirements and environmental best practices.

12.6.2 EMPr Framework

The purpose of Environmental Management Programme (EMPr) is “to describe how negative environmental impacts will be managed, rehabilitated and monitored and how positive impacts will be maximised during the life-cycle of a project. The content of an EMPr contains information set out in Appendix 4 of GN No. R. 327 of 7 April 2017 (As amended). The EMPr of the proposed development is provided in **Appendix G** of the report.

12.7 Analysis of Significant Environmental Aspects and Impacts

Significant environmental impacts associated with the proposed project were identified through the evaluation of the following:

- Nature and profile of the receiving environment
- Operation of the power lines and substation
- Project-related factors / aspects and infrastructure.
- Potential sensitive environmental features and attributes
- Activities related with the project life cycle (pre-construction, construction, operation and decommissioning phases);
- Findings from specialist studies

Table 12: Showing the Significant Environmental Impact Assessment

SIGNIFICANT ENVIRONMENTAL IMPACT ASSESSMENT																			
Project Name	The proposed STEYNSRUS 10 MW PV Solar Facility																		
Compiled by	Cate Rapudi																		
Date	Feb-23																		
Significant Rating , Meaning / Risk	Low < 5, Medium 6 - 10, High > />=11																		
Rev	0																		
Receiving Environmental	Project Activities/Products	Aspects	Impacts	Significant Impact- No mitigations					Mitigation Measures	Significant Impact- With mitigations					Risk	Comments			
				Likelihood	Magnitude	Regulatory Scrutiny	Stakeholder Interest	Business R/O	Significant Rating	Significant Meaning	Likelihood	Magnitude	Regulatory Scrutiny	Stakeholder Interest			Business R/B	Significant Rating	Significant Meaning
Land Use/ Agricultural	Pre-Construction Phase	Vegetation Clearance for Site preparation of PV arrays Installations and Routes Creation	Impact on Flora/ Fauna	3	1	3	2	2	10	M	Only clear where project is taking place- avoid unnecessary clearance of vegetation	1	1	2	1	1	5	L	Refer to the Specialist Study done & EMPr recommendations

Land Use/ Agricultural	Construction Phase	Construction of PV arrays, Substation, Powerline and Routes Creation	Impact on Flora	3	1	3	3	2	11	H	Legally remove, relocate and protect the affected species , Alien control and monitoring programme. EP-Accidental fire .Only clear where project is taking place-avoid unnecessary clearance of vegetation, Aquire necessary permits for protected trees. Offset Programme where necessary,an alien control and monitoring programme must be established and implemented.	1	1	2	1	1	5	L	Refer to the Specialist Study done & EMPr recommendations	
			Impact on Fauna	2	1	2	2	2	8	M	Avoid habitat destructions , Contain all construction & Operational within the boundaties of the specified development area.	1	1	2	1	1	5	L	Refer to the Specialist Study done & EMPr recommendations	
			Land Degradation(Possible Loss of Grazing Land,Habitat loss, Restriction on servitude acquired)	3	1	3	3	2	11	H	Avoid habitat destructions , Contain all construction & Operational activities within the boundaties of the specified area. Adhere to the biodiversity study recommendations done by the Terrestrial Biodiversity Study & EMPr	1	1	2	2	1	6	M	Refer to the Specialist Study done & EMPr recommendations	
	Operational Phase	Cleaning of the PV arrays with chemicals which could cause Soil and water contamination.	Land Degradation (Possible Soil contamination)	3	1	3	3	2	11	H	Avoid habitat and / or land degradation , Contain all operational activities within the boundaties of the specified development area. Adhere to the Agricultural study recommendations done	1	1	2	2	1	6	M	Refer to the Specialist Study done & EMPr recommendations	
			Possible impact on the normal day-to-day management of the livestock and the veld management system	Impact on fauna (Livestock and maintenance)	3	1	3	3	2	11	H	Adhere to the Agricultural study recommendations done								Refer to the Specialist Study done & EMPr recommendations

Historical, Cultural Features & Paleontological	Construction and Operational Phases	Disturbance of Heritage sites / Paleontological Features	Social Impact	1	1	2	1	1	5 M	<p>A heritage & paleontological Impact studies were done. According to the report Grave Yards / Cementries should be avoided, If archaeological sites are exposed during construction work, the contractor should immediately report to relevant authorities (e.g SAHRA) and construction activities should be stopped until assessment is conducted by relevant specialists and is safe to proceed. EMPr to include all mitigations mentioned in the specialist report</p>	1	1	2	1	1	5 L	Refer to the Specialist Study done & EMPr recommendations
Noise	Construction Phase	Generation of Noise due to traffic, and influx of people during construction phase	Social Impact	2	1	2	3	2	9 M	<p>Local residents should be notified of any potentially noisy activities, * Stick to allowed working hours- should there be an overlap- affected neighbors must be informed, Construction site yards, concrete batching plants, asphalt batching plants, construction worker camps (accommodation) and other noisy fixed facilities should be located well away from noise sensitive zones. All construction vehicles and equipment are to be kept in good maintenance status. Operations should comply with the noise standard requirements of the Occupational Health and Safety Act (Act No 85 of 1993). * Construction staff working in areas where the 8-hour ambient noise levels exceed 75dBA should wear ear protection equipment. All activities, buildings and designs should align with the requirements</p>	1	1	2	1	1	5 L	Refer to the Specialist Study done & EMPr recommendations

Terrestrial Biodiversity (Flora & Fauna/ Avifauna)	Pre-Construction	Site disturbance during site preparation activities	Impact on flora & fauna	3	2	3	3	3	15	H		1	1	2	3	2	8	M	Refer to the Specialist Study done & EMPr recommendations
	Construction Phase	Loss of priority flora and fauna species from important habitats during site clearance for construction	Impact on flora & fauna	3	2	3	3	3	15	H	Offset Programme where necessary, an alien control and monitoring programme must be established and implemented.	1	1	2	3	2	8	M	Refer to the Specialist Study done & EMPr recommendations
	Operational Phase	Permanent loss of important habitats for species due the existing PV solar arrays structure	Impact on flora & fauna	3	2	3	3	3	15	H	Offset Programme where necessary, an alien control and monitoring programme must be established and implemented.	1	1	2	3	2	8	M	Refer to the Specialist Study done & EMPr recommendations
		Electrocution of critically endangered birds due to the operation of powerline constructed	Impact on Fauna (Avifauna)	3	2	3	3	3	15	H	Appropriate bird electrocution mitigation devices must be installed on the powerlines to minimise possible eletrocution and bird collision	1	1	2	3	2	8	M	Refer to the Specialist Study done & EMPr recommendations

Surface Water/ Aquatic	Construction Phase	Usage of Water and Possible contamination	Impact on natural resources	3	2	3	3	3	15	H	Quality of surface water and ground water on site should be managed & monitored. Minimise or avoid the encroachment of construction activities into riparian zones / wetlands. EMP should be used to address water management issues and pollution Control. Implement water use or water wastage minimisation Plans to ensure management supply & demand where necessary.	1	1	2	3	2	8	M	Refer to the Specialist Study done & EMPr recommendations	
	Operational Phase	Emmissions	Air Pollution		2	3	2	3	3	14	H	Compliance with ambient air quality standards. Compliance with AEL & EA conditions. Install Emmission Control Devices, Use Cleaner technology , Service vehicles often, Continual Maintenance of machineries.	1	1	2	3	2	8	M	Refer to the Specialist Study done & EMPr recommendations
		Operation of Sewage facilities	Soil Pollution		2	3	3	3	3	15	H	Control by: * Correctly sizing, designing and constructing the facility; and * Groundwater monitoring	1	1	2	3	2	8	M	Refer to the Specialist Study done & EMPr recommendations
			Social Impact		2	3	3	3	3	15	H		1	1	2	3	2	8	M	Refer to the Specialist Study done & EMPr recommendations
			Ground water Pollution		2	3	3	3	3	15	H		1	1	2	3	2	8	M	Refer to the Specialist Study done & EMPr recommendations
		Fuel Usage and Storage of hazardous Substances (possible Spillages)	Soil/ Land Pollution		2	3	2	3	3	14	H	Fuel (bunker) : Possible oil and hazardous substance spillages should be managed by - EP for accidental spillages, Containing oil/ Hazardous chemicals in bunded area, Ensuring storage permits are acquired for relevant authorities.	1	1	2	3	2	8	M	Refer to the Specialist Study done & EMPr recommendations
			Water Pollution		2	3	2	3	3	14	H	Monitoring groundwater levels and quality. Ensure proper clean-up in case of accidental spillages. Report incidents to relevant authorities	1	1	2	3	2	8	M	Refer to the Specialist Study done & EMPr recommendations
		Storage of soil on site (Stockpiles)	Soil / Land degradation		2	3	2	3	3	14	H	*The storage facility must be well designed with non-pearmeable surface. *Construct a proper drainage system.	1	1	2	3	2	8	M	Refer to the Specialist Study done & EMPr recommendations
			Water Pollution		2	3	2	3	3	14	H	*Constructing clay base; * Separating clean and dirty runoff; * Minimising coal stock piles and size of yard; * Installing and maintain surface water controls; * Sloping topography to prevent ponding; and * Monitoring groundwater levels and quality	1	1	2	3	2	8	M	Refer to the Specialist Study done & EMPr recommendations
			Social Impact		2	3	2	3	3	14	H	Provide proper PPE for those exposed or working in the storage facility to ensure their health	1	1	2	3	2	8	M	Refer to the Specialist Study done & EMPr recommendations
Usage of Water and Possible contamination	Impact on natural resources		3	2	3	3	3	15	H	Quality of surface water and ground water on site should be managed & monitored. Completely avoid the encroachment of construction activities into riparian zones / wetlands. EMP should be used to address water management issues and pollution Control. Implement water use or water wastage minimisation	1	1	2	3	2	8	M	Refer to the Specialist Study done & EMPr recommendations		

Social Issues	Construction Phase	Influx of jobseekers		3	2	3	3	3	15	H	Some community members will find Jobs during construction phase (possible Impact) The findings of the Social Impact Assessment must be adhererd to.	1	1	2	1	2	6	M	Refer to the Specialist Study done & EMPr recommendations		
	Construction Phase	Job losses at the end of the project life-cycle		3	2	3	3	3	15	H	Those who had temporary jobs could loose employment , whereas those with scarce skills in PV industry could get permanent employments. The findings of the Social	1	1	2	1	2	6	M	Refer to the Specialist Study done & EMPr recommendations		
		Communicable Diseases		1	2	2	2	2	8	M	All working on site must take pre-cautionary measures to minimise or avoid the spread of communicable diseases. The findings of the Social Impact Assessment must be adhererd to.	1	1	2	1	1	5	L	Refer to the Specialist Study done & EMPr recommendations		
		Tourism / More Visitors in the area due to the new PV Solar Facility									H	The findings of the Social Impact Assessment must be adhererd to.	1	1	2	1	1	5	L	Refer to the Specialist Study done & EMPr recommendations	
					2	3	2	3	3	14											
			Social Impact (Traffic Impact)		2	3	2	3	3	14		It recommended that the Abnormal Load Permit for Transporting the component parts of the proposed PV Solar Facility to be scheduled in advance to ensure the routes & destination is arranged.	1	1	2	1	1	5	L	Refer to the Specialist Study done & EMPr recommendations	
		Transportation	Noise Pollution	2	3	2	3	3	14		H	All activities should be conducted within normal working hours	1	1	2	1	1	5	L	Refer to the Specialist Study done & EMPr recommendations	

Decommissioning Phase	Dismantling activities & Removal of equipments	Inadequate removal of equipments	Air Pollution	3	2	3	3	3	15	H	Mitigations must conform with specialists reports requirements as well the EMPr Recommendation provided in Annexure G of the BAR.	1	1	2	1	2	6	M	Refer to the Specialist Study done & EMPr recommendations
			Soil and Land Degradation	3	2	3	3	3	15	H		1	1	2	1	2	6	M	Refer to the Specialist Study done & EMPr recommendations
			Impact on flora	2	2	2	3	3	12	H		1	1	2	3	2	8	M	Refer to the Specialist Study done & EMPr recommendations
			Impact on Faunal	2	2	2	3	3	12	H		1	1	2	3	2	8	M	Refer to the Specialist Study done & EMPr recommendations
			Water Pollution	2	3	2	3	3	14	H		1	1	2	3	2	8	M	Refer to the Specialist Study done & EMPr recommendations
			Social Impact (Health and Safety Impacts)	2	1	2	2	2	8	M		1	1	2	1	1	5	L	Refer to the Specialist Study done & EMPr recommendations
			Noise Pollution	2	3	2	3	3	14	H		1	1	2	3	2	8	M	Refer to the Specialist Study done & EMPr recommendations

12.8 Terrestrial Biodiversity (Flora, Fauna & Avifauna)

12.8.1 Impact Description:

The study conducted identified a number of activities that will be taking place throughout the life cycle of the project, and further provided mitigation measures required to minimise or avoid the environmental impact. Activities and potential environmental impact that are expected to take place are listed in table 9 below.

12.8.2 Impact Assessment

Given that only a small portion within the development footprint will occupy the proposed 10 MW PV arrays area, the impacts assessment ratings will be mostly Negative medium impact to Negative low impact from a specialist perspective. However, considering the conservation status of the footprint bioregion and the recommended mitigations are not implemented, the project will drastically have an overall Negative high impact which should be avoided by the applicant.

Table 13: List of activities and potential environmental impacts

Construction Phase	Preferred Alternative (Alternative 1)	
	Before Mitigation	After Mitigation
POTENTIAL IMPACTS ASPECTS		
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Loss of priority flora and fauna species from important habitats	Minimise the development footprint and reserve indigenous vegetation wherever possible. Avoid undertaking project activities during the breeding season (summer). The project should be in shortest timeframe and control pollution.
Magnitude:	3	2
Duration:	2	1
Geographical Extent:	1	1
Loss of Resources:	3	2
Reversibility:	3	2
Cumulative Effect:	2	1
Probability:	3	1
Total SP:	42	16
Significance rating:	Negative medium impact	Negative low impact

POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Loss of resident flora and fauna through increased disturbance	Minimise the development footprint and reserve indigenous vegetation wherever possible. Avoid undertaking project activities during the breeding season (summer). The project should be in shortest timeframe and control pollution.
Magnitude:	3	2
Duration:	2	1
Geographical Extent:	1	1
Loss of Resources:	2	2
Reversibility:	2	1
Cumulative Effect:	2	1
Probability:	3	2
Total SP:	36	16
Significance rating:	Negative medium impact	Negative low impact
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Long-term or permanent degradation and modification of the receiving environment resulting to the loss of important habitats	Use designated roads to access the site. Minimise the project footprint and reserve indigenous vegetation wherever possible. Avoid undertaking project activities during the breeding season (summer). The project should be in shortest timeframe and control noise pollution. Rehabilitate area with indigenous flora
Magnitude:	3	2
Duration:	3	2
Geographical Extent:	1	1
Loss of Resources:	3	2
Reversibility:	3	2
Cumulative Effect:	2	1
Probability:	3	2
Total SP:	45	20
Significance rating:	Negative medium impact	Negative low impact
Operation Phase	Preferred Alternative (Alternative 1)	
	Before Mitigation	After Mitigation
POTENTIAL IMPACTS ASPECTS		
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Long-term or permanent degradation and modification of the receiving environment resulting to the loss of important habitats for species	Minimise the development footprint and reserve indigenous vegetation wherever possible. Avoid undertaking project activities during the breeding season (summer). The project should

		be in shortest timeframe and control pollution
Magnitude:	3	2
Duration:	3	2
Geographical Extent:	1	1
Loss of Resources:	3	2
Reversibility:	3	2
Cumulative Effect:	2	1
Probability:	3	2
Total SP:	45	20
Significance rating:	Negative medium impact	Negative low impact
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Loss of resident flora and fauna through increased disturbance	Minimise the development footprint and reserve indigenous vegetation wherever possible. Avoid undertaking project activities during the breeding season (summer). The project should be in shortest timeframe and control pollution
Magnitude:	3	2
Duration:	2	1
Geographical Extent:	1	1
Loss of Resources:	2	2
Reversibility:	2	1
Cumulative Effect:	2	1
Probability:	3	2
Total SP:	36	16
Significance rating:	Negative medium impact	Negative low impact
Decommissioning Phase	Preferred Alternative (Alternative 1)	
	Before Mitigation	After Mitigation
POTENTIAL IMPACTS ASPECTS		
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Long-term or permanent degradation and modification of the receiving environment resulting to the loss of important habitats	Have a biodiversity protocol and rehabilitation plan that will be implemented following the decommissioning phase
Magnitude:	3	2
Duration:	3	2
Geographical Extent:	1	1
Loss of Resources:	3	2
Reversibility:	3	2
Cumulative Effect:	2	1
Probability:	3	2

Total SP:	45	20
Significance rating:	Negative medium impact	Negative low impact
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Displacement of resident fauna species through increased disturbance	Have a biodiversity protocol and rehabilitation plan that will be implemented following the decommissioning phase
Magnitude:	3	2
Duration:	2	1
Geographical Extent:	1	1
Loss of Resources:	2	2
Reversibility:	2	1
Cumulative Effect:	2	1
Probability:	3	2
Total SP:	36	16
Significance rating:	Negative medium impact	Negative low impact
Post Decommissioning Phase	Preferred Alternative (Alternative 1)	
	Before Mitigation	After Mitigation
POTENTIAL IMPACTS ASPECTS		
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Long-term or permanent degradation and modification of the receiving environment resulting to the loss of important habitats for all animal and vegetation groups	Minimise project footprint and habitat transformation, limit ongoing human activity to the minimum required for ongoing operation, control noise to minimum, rehabilitate with native vegetation and retain indigenous vegetation throughout as far as possible, limit roadways and vehicle speeds; rehabilitate thoroughly post-decommissioning with locally native species
Magnitude:	3	2
Duration:	3	2
Geographical Extent:	1	1
Loss of Resources:	3	2
Reversibility:	3	2
Cumulative Effect:	2	1
Probability:	3	2
Total SP:	45	20
Significance rating:	Negative medium impact	Negative low impact
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Cumulative displacement of resident fauna species	Minimise development footprint and habitat transformation, limit ongoing human activity to the minimum required for ongoing operation, control noise pollution, rehabilitate with indigenous flora and reserve indigenous vegetation

		throughout as far as possible, limit roadways and vehicle speeds
Magnitude:	3	2
Duration:	2	1
Geographical Extent:	1	1
Loss of Resources:	2	2
Reversibility:	2	1
Cumulative Effect:	2	1
Probability:	3	2
Total SP:	36	16
Significance rating:	Negative medium impact	Negative low impact
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Long-term or permanent degradation and modification of the receiving environment resulting to the loss of important habitats for flora and fauna species	Minimise project footprint and habitat transformation, rehabilitate with indigenous flora and reserve indigenous vegetation throughout as far as possible
Magnitude:	3	2
Duration:	3	2
Geographical Extent:	1	1
Loss of Resources:	3	2
Reversibility:	3	2
Cumulative Effect:	2	1
Probability:	3	2
Total SP:	45	20
Significance rating:	Negative medium impact	Negative low impact
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Spreading of invasive alien plants from margins. The altered environment will also favour species that are better adapted to disturbed/transformed areas.	Invasive plant material should be disposed by incineration, or alternatively, composting to break down seeds. If seedbank persists, invasive alien plant management and eradication measures should be implemented.
Magnitude:	4	3
Duration:	3	3
Geographical Extent:	1	1
Loss of Resources:	2	2
Reversibility:	3	2
Probability:	4	3
Total SP:	52	33
Significance rating:	Negative high impact	Negative medium impact

12.8.3 Specific Mitigation Measures

According to the specialist study results, the overall impacts associated with the proposed solar facility are considered Low-Medium. The recommendations are listed below:

Flora Mitigations:

Important recommendations for the conservation of the current vegetation structure

- The proponent must be committed to a conservation approach of practice and the actual footprint of disturbance must be kept to a minimum.
- As much of the natural environment must be conserved, there should be minimal vegetation clearing.
- Relocation of important species, identification and demarcation of specimens and sub habitats not to be disturbed will have to be done beforehand by a specialist.
- Important species (flora) that will be threatened by the development must be relocated to safer habitats by suitable specialists.
- Preventative erosion control measures to be put in place.
- Conduct alien invasive species monitoring on an annual basis.

Fauna Mitigations (Including Avifaunal)

Important recommendations for conservation of fauna species

- The proponent must be committed to a conservation approach of practice and the actual footprint of disturbance must be kept to a minimum.
- Relocation of important species (if any), identification and demarcation of specimens and sub habitats not to be disturbed will have to be done beforehand by a specialist.
- Important species (fauna / avifauna) that will be threatened by the development must be relocated to safer habitats by suitable specialists.
- Preventative erosion control measures to be put in place.

12.8.4 Cumulative Impacts

The cumulative impact of the proposed PV Solar Facility on the terrestrial biodiversity (Flora/ Fauna/ Avifauna) is regarded to have a *negative low impact*, with the proposed mitigation measures.

12.8.5 Conclusion

Overall, the impacts associated with this proposed solar facility are considered Medium-Low. It is the opinion of the specialist that the proposed solar facility be considered, provided that the mitigations and recommendations are adhered to.

12.9 Aquatic Biodiversity (Aquatic and Flood line Assessment)

The two Wetlands are located outside the PV panel footprints. The impacts of the PV panel are not expected to be severe, as vegetation will not be cleared, and wetlands will not be traversed.

12.9.1 Compaction, Soil Erosion and Sedimentation

Impact Description

This impact will be mostly on the depression wetlands and to a lesser extent on the unchanneled valley bottom wetlands. The use of heavy machinery during the construction process of the development will result in the compaction of soil, resulting in decreased infiltration of rainwater and increased surface run-off volumes and velocities leading to a greater erosion risk. The hardened surfaces of the road and compacted soils of the proposed development area will also lead to an increase in surface run-off during storms. This can lead to erosion in the cleared areas and sedimentation in the wetlands.

Soil erosion also promotes a variety of terrestrial ecological changes associated with disturbed areas, including the establishment of alien invasive plant species, altered plant community species composition and loss of habitat for indigenous fauna and flora.

Mitigation measures

- Compaction of soils must be limited and / or avoided as far as possible. Compaction will reduce water infiltration and will result in increased runoff and erosion. Where any disturbance of the soil takes place (have taken place in the past), these areas must be stabilised and any alien plants which establish must be cleared and follow-up undertaken for the duration of the construction and decommissioning phases. It is to be undertaken by the Internal Environmental Officer or the Environmental Control Officer. Where compaction becomes apparent, remedial measures must be taken (e.g., “ripping” the affected area).
- Reseed any areas where earthworks have taken place with indigenous grasses to prevent further erosion.
- Erosion control mechanisms must be established as soon as possible.
- A stormwater plan must be developed with the aid of an engineer to ensure that water runoff is diverted off the site without pooling and stagnation causing erosion. Financial provision for closure will include the estimated costs for erosion control post-construction and post-decommissioning.
- If compaction occurs, rectification can be done by application and mixing of manure, vegetation mulch or any other organic material into the area. Use of well cured manure is preferable as it will not be associated with the nitrogen negative period associated with organic material that is not composted.
- Vehicle traffic must not be allowed on the rehabilitated areas, except on allocated roads, due to adverse impacts of dispersive/compaction characteristics of soils and its implications on the long term.
- Appropriate design and mitigation measures must be developed and implemented to minimise impacts on the natural flow regime of the watercourse i.e., through placement of structures/supports and to minimise turbulent flow in the watercourse.
- The indiscriminate use of machinery within the wetland area will lead to compaction of soils and destruction of vegetation and must therefore be strictly controlled.
- Solar panels may not be placed within 32 m of the waterbodies.
- Perform scheduled maintenance to be prepared for storm events. Ensure that culverts have their maximum capacity, ditches are

cleaned, and that channels are free of debris and brush than can block structures.

12.9.2 Disturbance of watercourse habitat and fringe vegetation

Description of impact:

Disturbance to the wetlands during construction and maintenance of the solar panels and associated power line may be inevitable as heavy vehicles will operate in the area. As habitat is disturbed, fauna and flora will be negatively impacted. Vegetation structure may change, affecting wetland properties and fauna.

Mitigation measures

- As far as possible, disturbance must be kept outside of the wetlands and their buffer zones.
- Existing access roads must be used where possible.

12.9.3 Soil and water pollution

Description of impact:

Construction work will also carry a risk of soil and water pollution, with large construction vehicles contributing substantially due to oil and fuel spillages. If not promptly dealt with, spillages or accumulation of waste matter can contaminate the soil and surface- or groundwater, leading to potential medium/long-term impacts on fauna and flora.

Mitigation measures

- Ensure that all hazardous storage containers and storage areas comply with the relevant SABS standards to prevent leakage. Regularly inspect all vehicles for leaks. Re-fuelling must take place on a sealed surface area to prevent ingress of hydrocarbons into topsoil.
- No dumping of waste must take place within the wetlands or their buffer zones. If any spills occur, they must be cleaned up immediately.
- Contain all dirty water in the dirty water system and contain all dirty stormwater up to a 1:50 year flood line as a minimum. Ensure that all activities impacting on groundwater resources of the subject property

are managed according to the relevant DWS Licensing regulations and groundwater monitoring and management requirements.

- Appropriate sanitary facilities must be provided for the duration of the proposed development and all waste removed to an appropriate waste facility.
- Excess waste or chemicals must be removed from site and discarded in an environmentally friendly way. The Environmental Control Officer (ECO) must enforce this rule rigorously.
- Hazardous chemicals to be stored on an impervious surface protected from rainfall and stormwater run-off.
- Spill kits must be on-hand to deal with spills immediately.
- All vehicles must be inspected for oil and fuel leaks on a regular basis. Vehicle maintenance yards on site must make provision for drip trays to capture spills. Drip trays must be emptied into a holding tank and returned to the supplier.
- Implement standard dust control measures, including periodic spraying (frequency will depend on many factors including weather conditions, soil composition and traffic intensity and must thus be adapted on an on-going basis) and chemical dust suppressants of construction areas and access roads, and ensure that these are continuously monitored to ensure effective implementation.
- A speed limit (preferably 40 km/hour) must be enforced on dirt roads.
- Limit pesticide use to non-persistent, immobile pesticides and apply in accordance with the label and application permit directions and stipulations for terrestrial and aquatic applications.

12.9.4 Spread and establishment of alien invasive species.

Description of impact:

The construction almost certainly carries by far the greatest risk of alien invasive species being imported to the site, and the high levels of habitat disturbance also provide the greatest opportunities for such species to establish themselves, since most indigenous species are less tolerant of disturbance. The biggest risk is that seeds of noxious plants may be carried onto the site along with materials that have been stockpiled elsewhere at already invaded sites.

Continued movement of personnel and vehicles on and off the site, as well as occasional delivery of materials required for maintenance, will result in a risk of importation of alien species throughout the life of the project.

Furthermore, the spread of the alien invasive species through the area will be accelerated when seeds are carried by stormwater into the drainage features on the site that will cause environmental degradation and indigenous species to be displaced.

Mitigation measures

- Alien and invader vegetation must not be allowed to colonise the area. Control involves killing alien invasive plants present, seedlings and establishing an alternative plant cover to limit re-growth. The use of indigenous plants must be encouraged in the rehabilitated areas (stormwater canals). Control must begin prior to construction phase considering that small populations of invader plant species occur around the project area.
- Institute strict control over materials brought onto site, which must be inspected for seeds and steps taken to eradicate these before transport to the site. The contractor is responsible for the control of weeds and invader plants.
- Rehabilitate disturbed areas outside the development footprint as quickly as possible.
- Institute a monitoring programme during construction, undertaken by the IEO or the ECO, to detect alien invasive species early. Monitoring must be done periodically by the ECO.
- Institute an eradication/control programme for early intervention if invasive species are detected. The use of indigenous plants must be encouraged in the rehabilitated areas.

12.9.5 Cumulative Impacts

The EIA Regulations (as amended in 2017) determine that cumulative impacts, "in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities." Cumulative impacts can be incremental, interactive, sequential or synergistic.

The term "Cumulative Effect" has for the purpose of this project been defined as: the summation of effects over time which can be attributed to the operation of the Project itself, and the overall effects on the ecosystem of the

Project Area that can be attributed to the Project and other existing and planned future projects.

12.9.6 Cumulative impact on wetlands

The cumulative impact of PV Solar Facility developments in the area on wetlands is not foreseen to be significant, as most of the development is proposed outside of major wetlands.

12.9.7 Conclusion

The impacts were all low and therefore a General Authorisation will be sufficient. The development of proposed Solar PV Project can be supported from a wetland perspective, provided that the mitigation measures are implemented.

12.10 Paleontological

12.10.1 Impact Description

A Palaeontological Impact Assessment conducted in order to comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed development and impact assessments and mitigations are reported herein.

12.10.2 Impact Assessment

An assessment of the potential impacts to possible palaeontological resources considers the criteria encapsulated in various tables below:

Table 14: Criteria for assessing impacts

PART A: DEFINITION AND CRITERIA		
Criteria for ranking of the SEVERITY/NATURE	H	Substantial deterioration (death, illness or injury). Recommended level will often be violated. Vigorous community action.

of environmental impacts	M	Moderate/ measurable deterioration (discomfort). Recommended level will occasionally be violated. Widespread complaints.
	L	Minor deterioration (nuisance or minor deterioration). Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	L+	Minor improvement. Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	M+	Moderate improvement. Will be within or better than the recommended level. No observed reaction.
	H+	Substantial improvement. Will be within or better than the recommended level. Favourable publicity.
Criteria for ranking the DURATION of impacts	L	Quickly reversible. Less than the project life. Short term
	M	Reversible over time. Life of the project. Medium term
	H	Permanent. Beyond closure. Long term.
Criteria for ranking the SPATIAL SCALE of impacts	L	Localised - Within the site boundary.
	M	Fairly widespread – Beyond the site boundary. Local
	H	Widespread – Far beyond site boundary. Regional/ national
PROBABILITY (of exposure to impacts)	H	Definite/ Continuous
	M	Possible/ frequent
	L	Unlikely/ seldom

Table 14a: Impact Assessment

PART B: Assessment		
SEVERITY/NATURE	H	-

PART B: Assessment		
	M	-
	L	Soils and sands do not preserve fossils; so far there are no records from the Volksrust Fm of plant or animal fossils in this region so it is very unlikely that fossils occur on the site. The impact would be negligible
	L+	-
	M+	-
	H+	-
DURATION	L	-
	M	-
	H	Where manifest, the impact will be permanent.
SPATIAL SCALE	L	Since the only possible fossils within the area would be transported fragmentary fossils in the Quaternary sands or fragmentary fossil plants or trace fossils in the Volksrust Fm deep-water shales, the spatial scale will be localised within the site boundary.
	M	-
	H	-
PROBABILITY	H	-
	M	-
	L	It is extremely unlikely that any fossils would be found in the loose soils and sands that cover the area or in the deep-water shales of the Volksrust Fm that will be disturbed. Nonetheless, a Fossil Chance Find Protocol should be added to the eventual EMPr.

12.10.3 Mitigation Measures Recommended:

According to the specialist report, based on experience and the lack of any previously recorded fossils from the earmarked area, it is extremely unlikely that any fossils would be preserved in the overlying soils and sands of the Quaternary. There is a very small chance that fossils may occur below the soils in the deep-water shales of the Permian Volksrust Formation so a Fossil Chance Find Protocol should be added to the EMPr.

Should fossils found by the contractor, environmental officer, or other responsible person once excavations for foundations and infrastructure have commenced then they should be rescued, and a palaeontologist called to assess and collect a representative sample. The impact on the palaeontological heritage would be low, so as far as the palaeontological heritage is concerned, the project should be authorised.

12.10.4 Conclusion

The proposed site lies on the potentially fossiliferous Volksrust Formation (Ecca Group, Karoo Supergroup) that might preserve fragmentary plant fossils, trace fossils or very rarely any bivalves, being so far from the purported marine influence during the early Permian. Nonetheless, a Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no further palaeontological impact assessment is required unless fossils are found by the contractor, environmental officer or other designated responsible person once excavations or construction activities have commenced. Since the impact will be low, as far as the palaeontology is concerned, the project should be authorised.

12.11 Phase 1 Cultural Heritage

12.11.1 Impact Description

According to the heritage specialist the entire farm Arbeid and Weltevrede was not surveyed in detail. The field survey focused on the footprint of the proposed PV layout area, power line for connection to the grid and access routes as indicated in the locality layout plan. The area around the proposed development was scanned to determine whether any important heritage features formed part of the greater area. During this scan 6 heritage sites were identified but none of these are close to the proposed PV layout area and no direct impact is foreseen on these sites.

12.11.2 Impact Assessment

Table 15: Impact Evaluation for the Proposed PV Solar Facility

Site 1 – 4		
Without mitigation		With mitigation
<i>Extent</i>	Local (1)	Local (1)
<i>Duration</i>	Permanent (5)	Permanent (5)
<i>Magnitude</i>	Medium (6)	Low (2)
<i>Probability</i>	Probable (1)	Probable (1)
<i>Significance</i>	12 (Low)	8 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?		Yes
<p>Mitigation:</p> <p>Six sites of heritage significance were identified during the survey. The sites are located outside of the development footprint and no further action is necessary, but some management actions might be necessary (Please refer to section 7).</p>		
<p>Cumulative impacts:</p> <p>Archaeological and cultural sites are non-renewable and impact on any archaeological context or material will be permanent and destructive.</p>		
<p>Residual Impacts: N/A</p>		

Impact summary	Significance	Proposed mitigation
There is no Indirect or Direct impact on all sites 1 -4 as they are well located well outside of the development footprint.		
PLANNING AND DESIGN PHASE		
Direct impacts:		
There is no impact on the sites as they are located outside the development footprint.	NA	NA
Indirect impacts:		
There is no impact on the sites as they are located outside the development footprint.	NA	NA
Cumulative impacts:		
There is no impact on the sites as they are located outside the development footprint.	NA	NA

CONSTRUCTION PHASE		
		Direct impacts:
There is no impact on the sites as they are located outside the development footprint.	NA	NA
Indirect impacts:		
There is no impact on the sites as they are located outside the development footprint.	NA	NA
Cumulative impacts:		

There is no impact on the sites as they are located outside the development footprint.	NA	NA
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OPERATION PHASE		
Direct impacts:		
There is no impact on the sites as they are located outside the development footprint.	NA	NA
Indirect impacts:		
There is no impact on the sites as they are located outside the development footprint.	NA	NA
Cumulative impacts: N/A		





DECOMMISSIONING AND CLOSURE PHASE		
		Direct impacts:
There is no impact on the sites as they are located outside the development footprint.	NA	NA
Indirect impacts:		
There is no impact on the sites as they are located outside the development footprint.	NA	NA
Cumulative impacts:		

There is no impact on the sites as they are located outside the development footprint.	NA	NA
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Table 16: Informal cemetery (Site 5), possible graves (Site 6) Site Number

Site 5 and 6	1:50 000 map nr	2727 DC
Site Data	Description:	
Type of site	Open site	
Site categories	Informal cemetery	
Context	<p>Site 5 consists of approximately 23 stone packed graves. The graves are aligned east to west and are located on a farm fence. Three graves have cement headstones.</p> <p>Site 6 consists of three stone cairns roughly aligned east to west. Two cairns are elongated and the third almost round.</p> <p>None of these sites are located within the proposed development area.</p>	
Cultural affinities, approximate age and significant features of the site;	<p>Inscriptions on the headstones at site 5 indicate the site is at least 30 years old. The oldest visible date is 1982.</p> <p>No estimation of age is possible for site 6.</p>	

Figure 24: Photographs of the Sites with heritage value but not located on the earmarked site

<p>A. Site 5 viewed from the southwest.</p>	<p>B. The oldest visible date at Site 5.</p>
	
<p>C. Location of Site 5 on the farm fence.</p>	<p>D. Possible stone packed grave at Site 6.</p>
	
<p>Field Rating (Recommended grading or field significance) of the site:</p>	<p>Generally Protected A</p>
<p>Statement of Significance (Heritage Value)</p>	<p>High social significance</p>

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Table 15: Impact evaluation of the proposed project on heritage resources *Nature*

Site 5 & 6: During the operation of the project an indirect visual impact is expected for the site.		
Without mitigation		With mitigation
Extent	Local (2)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	Medium (5)
Probability	Probable (3)	Not Probable (1)
Significance	Medium (Low)	11 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?		Yes
Mitigation: There is no direct impact foreseen on the sites, but it is recommended that site 5 should be demarcated with danger tape to protect it during construction. (Please refer to section 7 for full details on recommendations).		

Cumulative impacts: Archaeological and cultural sites are non-renewable and impact on any archaeological context or material will be permanent and destructive.
Residual Impacts: N.A

Impact Summary PV Solar Facility (Site 5 and 6) Activity

Impact summary	Significance	Proposed mitigation
There is no Direct impact on Site 5 and 6 as it is located outside the development footprint. There might be an indirect impact on the sites and the proposed mitigation will include ensuring that the sites are avoided by construction workers. This can be done by informing workers of the sites and demarcating the area.		
PLANNING AND DESIGN PHASE		
Direct impacts:		
There is no impact on the sites as they are located outside the development footprint.	NA	NA
Indirect impacts:		
There is no impact on the sites as they are located outside the development footprint.	NA	NA
Cumulative impacts:		

There is no impact on the sites as they are located outside the development footprint.	NA	NA
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CONSTRUCTION			
Activity	Impact summary	Significance	Proposed mitigation
There is no impact on the 6 sites discovered, as they are located outside the development footprint.	NA	NA	
Indirect impacts:			
Sites can unknowingly be damaged by construction workers.	Graves are of high social significance.		The site should be demarcated with danger tape to ensure that the site is not indirectly impacted by construction activities.
Cumulative impacts:			
If the recommended mitigation measures are adhered to there should be no impact on the sites as they will be demarcated and remain as is.	NA		The site should be demarcated with danger tape to ensure that the site is not indirectly impacted by construction activities.
OPERATION PHASE			
Direct impacts:			

There is no impact on the sites as they are located outside the development footprint.	NA	NA
Indirect impacts:		
Sites can unknowingly be damaged by construction workers.	Graves are of high social significance.	The site should be demarcated with danger tape to ensure that the site is not indirectly impacted by operational activities.
Cumulative impacts:		
If the recommended mitigation measures are adhered to there should be no impact on the sites as they will be demarcated and remain as is.	NA	The site should be demarcated with danger tape to ensure that the site is not indirectly impacted by operational activities.

DECOMMISSIONING AND CLOSURE PHASE		
		Direct impacts:
There is no impact on the sites as they are located outside the development footprint.		
Indirect impacts:		
Sites can unknowingly be damaged by construction workers.	Graves are of high social significance.	The site should be demarcated with danger tape to ensure that the site is not indirectly impacted by activities.

Cumulative impacts:

If the recommended mitigation measures are adhered to there should be no impact on the sites as they will be demarcated and remain as is.

N/A

The site should be demarcated with danger tape to ensure that the site is not indirectly impacted by activities.

12.11.3 Conclusion:

There is no Direct impact on Site 5 and 6 as it is located outside the development footprint. There might be an indirect impact on the sites and the proposed mitigation will include ensuring that the sites are avoided by construction workers. This can be done by informing workers of the sites and demarcating the area.

12.12 Social Impact

12.12.1 Impact Description

This section provides Identification of social issues associated with the proposed project. The criteria used for the assessment of social impacts and mitigations recommended to eliminate or minimise the impacts.

12.12.2 Impact Assessment

Construction phase

The key Social Impacts associated with the construction phase are:

Potential positive impacts

- Creation of employment and business opportunities, and the opportunity for skills development and on-site training

Table 17: Overview of Social Impact Assessment during construction phase

Impact	Significance	Significance
	No Mitigation	With Mitigation
Creation of employment and business opportunities	Low (Positive impact)	Medium (Positive impact)
Presence of construction workers and potential impacts on family structures and social networks	Low (Negative impact for community as a whole) Medium-High (Negative impact of individuals)	Low (Negative impact for community as a whole) Medium-High (Negative impact of individuals)

Risk of stock theft, poaching and damage to farm infrastructure	Medium (Negative impact)	Low (Negative impact)
Risk of veld fires	Medium (Negative impact)	Low (Negative impact)
Impact of heavy vehicles	Low	Low
Construction activities	(Negative impact)	(Negative impact)
Loss of farmland	Medium (Negative impact)	Low (Negative impact)

Operational phase

The key social Impacts associated with operational phase are:

Potential positive impacts

- Creation of employment and business opportunities. The operational phase will also create opportunities for skills development and training;
- Benefits associated with the establishment of a community trust.
- The establishment of infrastructure to generate renewable energy.

Table 18: Overview of Social Impact Assessment during Operation phase

Impact	Significance No Mitigation	Significance With Mitigation
Creation of employment and business opportunities	Low (Positive impact)	Medium (Positive impact)
Benefits associated with the establishment of a community trust	Medium (Positive impact)	Medium (Positive impact)
Establishment of infrastructure for the generation of renewable energy	Medium (Positive impact)	Medium (Positive impact)
Visual impact and impact on sense of place	Medium (Negative impact)	Low (Negative impact)
Impact on tourism	Low (Positive and Negative)	Low (Positive and Negative)

Decommissioning phase

Due to the relatively small number of people affected (25) the social impacts associated with the decommissioning of the facility are likely to be low. In addition, the potential impacts can be effectively managed with the implementation of a retrenchment and downscaling programme. With mitigation, the impacts are assessed to be Low (negative). The specialist further recommended an option of establishing an Environmental Rehabilitation Trust Fund in order cover the costs of decommissioning and rehabilitation of disturbed areas, over the period of 20-25 years.

12.12.3 Mitigation Measures Recommended.

OBJECTIVE 1: Maximise local employment and business opportunities associated with the construction phase.

- Attempt to ensure that a minimum of 80% of the low skilled workers are sourced from the local area. This should be included in the tender documents. Construction workers should be recruited from the local area in and around the Bloemfontein.
- Local construction workers should be able to provide proof of having lived in the area for five years or longer.
- Identify local contractors who are qualified to undertake the required work.

OBJECTIVE 2: Avoid the potential impacts on family structures and social networks associated with presence of construction workers from outside the area:

- Attempt to ensure that a minimum of 80% of the low skilled workers are sourced from the local area. This should be included in the tender documents.
- Construction workers should be recruited from the local area in and around the Kroonstad, Steynsrus, Heuiningspruit, & Matlwangtlwang
- Local construction workers should be able to provide proof of having lived in the area for five years or longer.

- Identify local contractors who are qualified to undertake the required work.
- Develop a Code of Conduct to cover the activities of the construction workers housed on the site.
- Ensure that construction workers housed attend a brief session before they commence activities. The aim of the briefing session is to inform them of the rules and regulations governing activities on the site as set out in the Code of Conduct.
- Ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct.
- Ensure that construction workers who are found guilty of breaching the Code of Conduct are dismissed. All dismissals must be in accordance with South African labour legislation.
- Provide opportunities for workers to go home over weekends. The cost of transporting workers home over weekends and back to the site should be borne by the contractors.
- On completion of the construction phase all construction workers must be transported back to their place of origin within two days of their contract ending. The costs of transportation must be borne by the contractor.

OBJECTIVE 3: To avoid and or minimise the potential impact of the activities during the construction on the safety of local communities and the potential loss of stock and damage to farm infrastructure.

- Consider establishing a Memorandum of Understanding with the adjacent farmers and develop a Code of Conduct for construction workers.

- Inform all workers of the conditions contained in the Code of Conduct.
- Dismiss all workers that do not adhere to the code of conduct for workers. All dismissals must be in accordance with South African labour legislation.
- Compensate farmers / community members at full market related replacement cost for any losses, such as livestock, damage to infrastructure etc.

OBJECTIVE 4: To avoid and or minimise the potential risk of increased veld fires during the construction phase.

- Ensure that open fires on the site for cooking or heating are not allowed except in designated areas.
- Provide adequate firefighting equipment onsite.
- Provide fire-fighting training to selected construction staff.
- Compensate farmers / community members at full market related replacement cost for any losses, such as livestock, damage to infrastructure etc.
- Join Fire Protection Agency

OBJECTIVE 5: To avoid and or minimise the potential impacts of safety, noise and dust and damage to roads caused by construction vehicles during the construction phase.

- Implement dust suppression measures for heavy vehicles such as wetting roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.
- Ensure that all vehicles are road-worthy; drivers are qualified and are made aware of the potential noise, dust and safety issues.
- Ensure that drivers adhere to speed limits. Vehicles should be fitted with recorders to record when vehicles exceed the speed limit.

- Ensure that damage to roads is repaired before completion of construction phase;

OBJECTIVE 6: To avoid and or minimise the potential impact on current and future farming activities during the construction phase.

- Minimise the footprint of the PV facility and the associated infrastructure.
- Rehabilitate disturbed areas on completion of the construction phase. Details of the rehabilitation programme should be contained in the EMP.

OBJECTIVE 7: To avoid and or minimise the potential impacts associated with the decommissioning phase.

- Retrenchments should comply with South African Labour legislation of the day.

12.13 Agricultural

12.13.1 Impact Description

Direct, indirect, and cumulative impacts of the agricultural related issues were identified through the Basic Assessment Reporting study and were assessed in detail. Please refer to chapter 7 of the Agricultural Impact Study report for more details.

Agricultural resources that may be impacted upon

- **Impact 1:** Soil (degradation due to wind and water erosion, as well as by contamination with oil, petrol, diesel and other contaminants used by the construction vehicles and equipment)
- **Impact 2:** Vegetation and grazing capacity (degradation due to a decrease in species composition and vegetation cover and a loss of grazing capacity)
- **Impact 3:** Underground water (degradation due to contamination by oil, petrol, diesel and other contaminants used by the construction vehicles and equipment and for the cleaning of the PV arrays)

- **Impact 4:** Livestock production systems (interference with farm and livestock management activities and a decline in the long-term food production).

12.13.2 Impact Assessment

The above-mentioned impact assessment was conducted, and all found to carry a low-medium significant impact, at all phases of the project development (refer to page 20-38). According to DR du Pisani's study results, all impacts are mitigatable with effective monitoring in place.

Cumulative impacts were also found to be low with mitigation measures in place.

12.13.3 Mitigation Measures

A number of mitigation measures were raised (refer to page 20-38 of the report), the following have been suggested to be incorporated in the EMP as conditions.

Objective 1: Limit soil erosion

- Prevention and control of water erosion on the site. Care must be taken with the ground cover during and after construction on the site.

Objective 2: Limit construction and vehicle impact on dust production and wind erosion

- Proper road construction and maintenance Apply dust control measures.

Objective 3: Prevent contamination of the soil, vegetation and underground water by oil, diesel, petrol and other contaminants use by vehicles and construction equipment's.

- Vehicles and equipment must be serviced regularly and maintained in a good running condition. Vehicles must be fitted with spill kits. Storage of contaminants must be limited to low quantities and done under strict industry standards. There must be strict control over the safe usage of vehicles and equipment to minimise vehicle accidents and damage to vehicles by rocks and boulders which may cause spillages. Contingency plans must be in place to deal with spillages. The solar arrays should only be cleaned with water and soaps and detergents should not be allowed.

12.13.4 Conclusion

The study area does not consist of unique agricultural land and its conservation status is regarded as vulnerable. The development of the ~30ha sites is supported provided the proposed Environmental Management Program is followed.

12.14 “No-Go” Impacts

No-go Alternative

This is the option of not constructing Steynsrus PV Solar Energy Facilities and Storage. This option is assessed as the “no go alternative” in this BAR. Although consideration of this alternative would result in no environmental impacts on the site or surrounding local area, as a result of the proposed facilities, the option would be failing to align with the requirements of the Department of Energy goals of encouraging renewable energy as part of the energy mix to ensure compliance with Sustainable Development Goals.

The consideration for the No-go alternative was further analysed based on current status quo, the risk it poses both negative and positive impacts. The current load-shedding challenge is a reality at Moqhaka Local Municipality, and entire nation. Global warming and climate change challenges are a reality, hence the renewable energy solution is of utter most importance.

No-Development Option

The No-Development option would represent a lost opportunity for South Africa to supplement its current energy needs with clean, renewable energy. Given South Africa’s position as one of the highest per capita producers of carbon emissions in the world, this option would represent a high negative social cost.

The no-development option also represents a lost opportunity in terms of the employment and business opportunities (construction and operational phase) associated with the proposed PV SEF and the benefits associated with the establishment of a community Trust. This could represent a negative social cost. The No-Go option is therefore not a suitable option for this project, given the negative impacts related to it.

12.15 Cumulative Impacts

European Environmental Agency define cumulative impacts (be it positive or negative, direct and indirect, long-term and short-term impacts) as impacts arising from a range of activities throughout an area or region, where each individual effect may not be significant if taken in isolation. Such impacts can arise from the growing volume of traffic, the combined effect of a number of agriculture measures leading to more intensive production and use of chemicals, etc. Cumulative impacts include a time dimension, since they should calculate the impact on environmental resources resulting from changes brought about by past, present and reasonably foreseeable future actions.

12.15.1 Cumulative Impacts caused by the proposed development.

Currently, there could be a number of similar projects happening in the vicinity, or near the proposed development, this information will be provided during the final submission of the BAR. The following is expected during different phases of the project.

Table 19: Cumulative Impacts-Visual

Construction/ Operational Phases – Lines & substation sites		
Visual	Mitigations	
Possible Impacts	Construction Phase	Operational Phase
Visual change will occur as a result of the new PV Solar Energy Facility and Powerline and switching station.	Use / share of existing servitudes & roads where possible	Treat the steel members of the distribution steel monopoles towers with a low gloss, galvanized paint to mitigate the initial shiny appearance of a new tower
The new powerline (155M) will be highly visible throughout most of the study area	The consolidation of powerlines in parallel servitudes is highly recommended and will have the greatest reduction in the severity of the impacts	
Viewer incidence is generally expected to be high as the proposed PV Solar Energy Facility is located in an empty farm currently use for grazing purposes.	Barricade / Screen areas used for storage of construction materials	
Without Mitigations	High	High
With Mitigations	Medium to low	Medium to low

Cumulative Impacts: It is expected to cause an increased visual intrusion along its linear length and comes closer to a visual intolerance threshold, but it is only during the construction phase, when the operational phase starts, with appropriate mitigations, the impact will be Medium to low.

Table 20: Cumulative Impacts-Traffic

Construction/ Operational Phases – Line & substation sites		
Traffic	Mitigations	
Possible Impacts	Construction Phase	Operational Phase
- Traffic influx due to similar projects or other developments with similar traffic effect taking place during the sometime of project construction	Joint management of traffic management plans could be implemented, where possible	The operational phase will have minimal traffic impact due to reduction of influx
- Introduction of Heavy vehicle and machinery on site		
Without Mitigations	High	Medium
With Mitigations	Medium	Low

Cumulative Impacts:

It is expected that traffic impact will still continue even after the development since new opportunities for employment and operational activities would have been created, but the impact should be low impact.

Table 21: Cumulative Impacts-Avifauna

Construction/ Operational Phases – Line & substation sites		
Avifauna	Mitigations	
Possible Impacts	Construction Phase	Operational Phase
- Increased Birds Electrocution	Installation of bird friendly devices like	Joint management

	bird flappers / guards could minimise and also avoid the impacts	of Avifauna management plans could be implemented, where possible
- Increased Birds Collisions	Installation of bird friendly devices on the proposed 155m powerline structure, to increase visibility and to avoid collision	
- Habitat destruction or disturbance	-Avoid clearing vegetation unnecessarily	Adhere to available biodiversity legislation and policies
Without Mitigations	High	Low
With Mitigations	Medium	Low

Cumulative Impacts: The development of the new PV SEF, powerline and Switching station is expected to add to the risk of possible electrocution of avifaunal species and disturbance of habitat. The new line and the existing powerlines have potential to affect these species should mitigations proposed by the Terrestrial Biodiversity Specialist not taken into consideration. With mitigation measures in place the impacts can be avoided or minimised.

Table 22: Cumulative Impacts- Socio Economic Environment

Construction/ Operational Phases – PV SEF, Powerline Line & Switching station sites		
Socio Economic Environment	Mitigations / Benefits	
Possible Impacts (Positive)	Construction Phase	Operational Phase
<ul style="list-style-type: none"> - Job Creation - Enhancement of Economy - Improved renewable energy supply. - Possible reduction of loadshedding 	Construction: Increased creation of jobs and economic input into local businesses	Operational: Increased creation of jobs and economic input into local businesses

		Improved supply of renewable energy
Without Mitigations	High (Social Impact)	High (Social Impact)
With Mitigations	Medium	Medium

Cumulative Impacts: It is expected that opportunities for jobs will be created by the proposed development. The electricity supply might be expected to improve to a certain degree due to the proposed development. The positive impact will be felt during both construction and operational phases, will contribute toward renewables energy goals by the DoE.

13 PUBLIC PARTICIPATION PROCESS (PPP)

The PPP has been conducted based on the requirements of Chapter 6 of GN No. 326 of the 2017 EIA Regulations, of the NEMA (as amended).

13.1 The purpose for PPP is as follows:

- To provide for the opportunity for all role players including potential and RI&APs, EAPs, state departments, organs of state, and the competent authority (CA) to obtain clear, accurate and understandable information about the environmental impacts of the proposed activity or implications of a decision;
- To provide for role- players to voice their support, concerns and questions regarding the project, application or decision.
- To provide the opportunity for role-players to suggest ways for reducing or mitigating any negative impacts of the project and for enhancing its positive impacts;
- To enable the person conducting PP to incorporate the needs, preferences and values of potential or I&AP's into its proposed development that becomes the subject of an application for an environmental authorization (EA);
- To provide opportunities for clearing up misunderstandings about technical issues, resolving disputes and reconciling conflicting interests;
- To encourage transparency and accountability in decision-making; to contribute toward maintaining a healthy, vibrant democracy; and

- To give effect to the requirement for procedural fairness of administrative action as contained in the Promotion of Administrative Justice Act, 2000 (Act No. 3 of 2000).

13.2 The Public Participation Process:

- Placing site notices at noticeable and strategic points.
- Placing notices at the earmarked site and around the study area.
- Notices were e-mailed to all identified Interested and affected parties, including ward councillors of the area, authorities and relevant state departments
- Notice was placed in the local newspapers (VrystaatKroon)
- The African speaking community and those disadvantaged were informed of the EIA notice through site notices.
- Other younger generation / class of the community was also informed through social media Platforms such as Facebook.

13.3 Public Review Process:

Registered I&AP's have been given an opportunity to review the draft BAR from the 9th March -12th April 2023. Additional days were added due to public holidays in between. Please refer to Appendix C for details and proof.

14 CONSIDERING THE BEST PRACTICABLE ENVIRONMENTAL OPTION (BPEO) FOR THE PROPOSED DEVELOPMENT

Kindly refer to section 4.3 for the BPEO for the proposed development and motivation.

15 CONCLUSION

15.1 Compliance Statement

Based on the specialist studies conducted, assessment of the project life-cycle's possible or potential impacts and the implementation of mitigation measures aimed at either preventing, reducing and minimising possible

significant impacts, It is the opinion of the EAP that the project be considered for authorisation

Further, looking at the cumulative impacts, it is unlikely that any of the assessed impacts would result in spatial and temporal cumulative change. With mitigation measures, all the envisaged and assessed cumulative impacts can be regarded as marginal or minimal. The significance of cumulative impacts can be further reduced should existing powerline Infrastructure servitudes and access roads /tracks used.

Based on alternatives assessed, alternative 1 site and option 1 Powerline are recommended to be granted Environmental Authorisation to satisfy the purpose and need of the proposed Steynsrus 10MW PV Solar Facility, on condition that an EMPr and applicable mitigation measures recommended by the Environmental Specialists in their reports are implemented. The services of an Independent ECO to audit compliance at all project phases should be mandatory. All necessary Environmental Authorisations in terms of NEMA legislation and other applicable legislations such as SAHRA, NWA regulations , NEMBA regulations and NFA regulations for vegetation are complied with, prior to development establishment.

16 REFERENCES

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