



Final EIAR for the Proposed Heuningspruit 50MW PV Solar Facility and Storage , Free State



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EIAR for the Proposed new Heuningspruit 50MW PV
Solar Facility and Storage, Near Koppies, Free State
Province

EIAR REPORT

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REPORT INFORMATION

Project Title	EIAR for the Proposed new Heuningspruit 50MW PV Solar Facility and Storage, Near Koppies, Free State Province.
Purpose of the EIAR Phase	<p>The EIAR is based on the outcomes of the Scoping Phase and provides the results of specialist studies that have been conducted, the alternatives that are considered, as well as the PPP that has been undertaken at various phases. The main objectives of the EIAR Process in terms of the 2017 NEMA EIA Regulations (GN R326) are as follows:</p> <p>The Objectives of the EIA Phase is to:</p> <ul style="list-style-type: none"> • Determine the policy and legislative context within which the activity is located and note how the proposed activity complies with and responds to the policy and legislative context; • Describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location; • Identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment; • Determine the nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and 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; • Identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment; • Identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity; • Identify suitable measures to avoid, manage or mitigate identified impacts; • Identify residual risks that need to be managed and monitored
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June 2023	0	1 st Issue	
August 2023	1	2 nd Issue	

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EXECUTIVE SUMMARY

I. Project Overview

Contrarians Capital (Pty) Ltd is proposing to development of a 50-Megawatt (MW) Solar Photovoltaic (PV) power generation facilities and associated electrical infrastructure.

Based on the requirements of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) and the 2017 amended NEMA Environmental Impact Assessment (EIA) Regulations promulgated in Government Gazette 40772 and Government Notice (GN) R327, R326, R325 and R324 on 7 April 2017, a full Scoping and EIA Process is required for the construction of Solar PV facilities of this magnitude. The purpose for the EIA Processes is to determine the biophysical, social and economic impacts associated with undertaking the proposed development. The report will be made available for Interested and Affected Parties (I&AP) review.

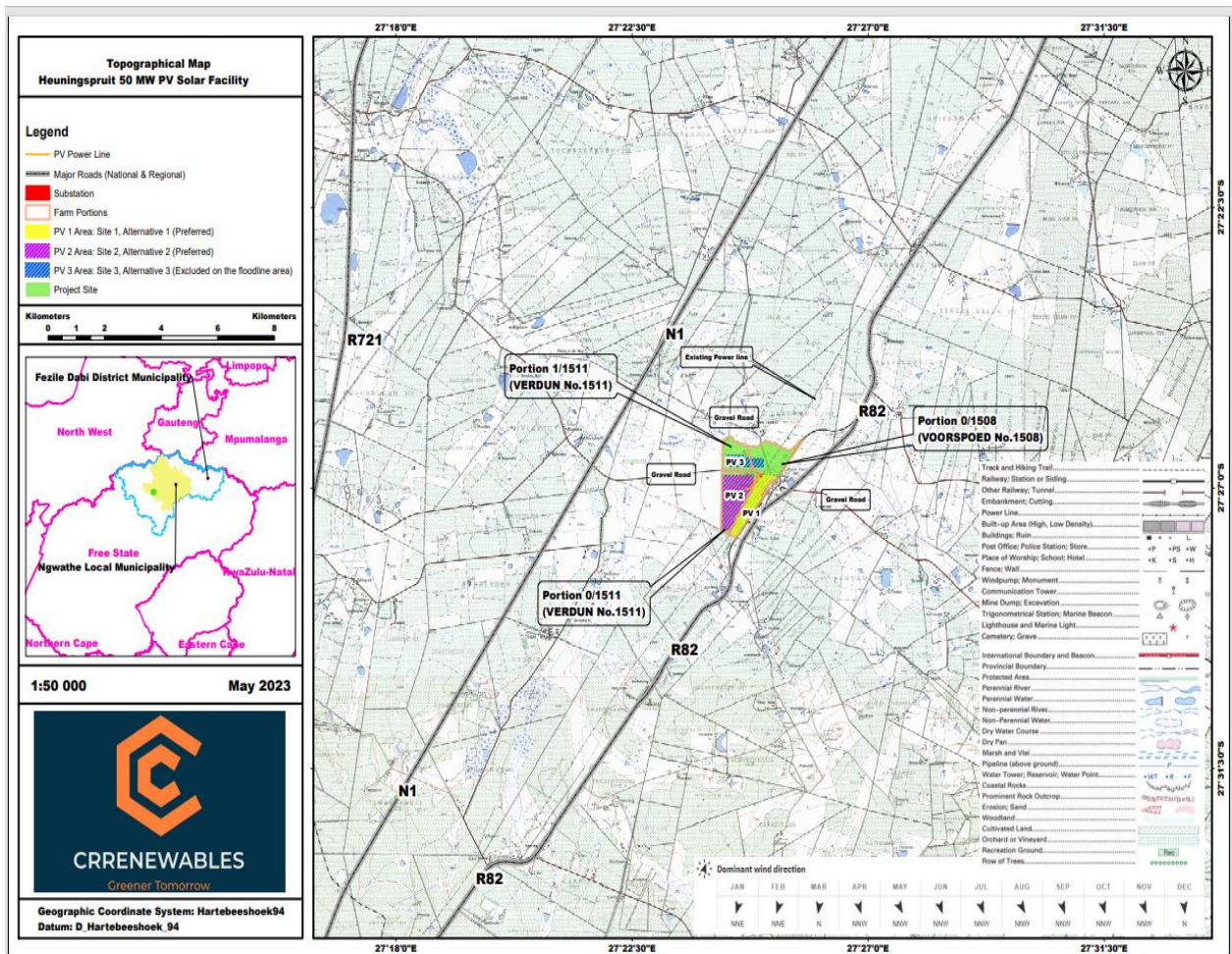
The proposed 50 MW Solar PV facility project is referred to as: Heuningspruit 50 MW PV Solar Facility.

II. Project Location

The proposed Heuningspruit 50 Megawatt PV Solar Energy Facility and storage will be located on the farm Voorspoed 1508. The earmarked site is located approximately 35 km Southwest of Koppies, within Ngwathe Local Municipality, in the Free State Province.

EIAR for the Proposed new Heuningspruit 50MW PV Solar Facility and Storage, Near Koppies, Free State Province

Figure 1: Locality Map



III. Project Technical Description

Contrarians Capital (Pty) Ltd is proposing the establishment of a commercial photovoltaic (PV) solar energy facility with a capacity of up to 50 MW to be established on the farm Voorspoed 1508 and Verdun 1511 which are located 35km south-west of Koppies in the Free State Province. The Heuningspruit PV solar energy facility will have a development footprint of 150 hectares within which the following typical infrastructure will be established:

- Arrays of photovoltaic (PV) panels with a capacity of up to 50MW.
- Mounting structures to be either rammed steel piles or piles with pre-manufactured.
- Concrete footing to support the PV panels.
- Cabling between the project components, to lie underground.
- Inverters/Transformer enclosures.
- An on-site 88kV or lower voltage kV switching station.
- An overhead power line of approximately 250m in length to tie into the existing power line (Heuningspruit Rural-Syferfontien Traction 88kV Eskom power line) on site.
- An application to Eskom has been made to connect to Eskom's existing Heuningspruit Rural Substation which is located adjacent (north-western boundary) of the development site.
- Eskom will confirm the voltage of connection power line and connection point.
- Eskom may request an adjustment or possible expansion or inclusion of additional transformers or bays or switching gear associated with the existing substation and 88kva overhead transmission line.
- Internal access roads (4 to 5 m wide).
- Fencing.
- The office area (20m x 30m).
- Workshop area (50 m x 50 m) for maintenance, storage, offices and small modular.
- Water filtration or di-ionisation unit (approx. 25 X 25m), should the need be more an additional 5m x 5m can be added.
- Parking.
- Water storage tanks (100 000 L), Approximately 20 X 5000L tanks.
- Laydown area.
- BESS.

IV. Need for an Environmental Impact Assessment

As indicated previously, in terms of the EIA Regulations promulgated under Chapter 5 of the NEMA published in GN R327, R326, R325 and R324 in Government Gazette number 40772, dated 7 April 2017, a full Scoping and EIA Process is required for the proposed project. The need to conduct a full Scoping and EIA is triggered by, amongst others, the inclusion of Activity 1 listed in GN R325 (Listing Notice 2):

"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs within an urban area, or, on existing infrastructure".

An environmental impact assessment is an effective planning and decision-making tool for the project developer as it provides the opportunity for the developer to be forewarned of potential environmental issues and to assess if potential environmental Impacts can be avoided, minimised or mitigated to acceptable levels. The EIA Scoping Process forms part of the feasibility studies for a proposed project and will inform the final design process in order to ensure that environmentally sensitive areas are avoided as far as possible. Comprehensive, independent environmental studies are required in accordance with the EIA Regulations to provide the competent authority with sufficient information in order to make an informed decision. Given that energy-related projects have been elevated to national strategic importance in terms of the EA Process, the proposed project requires authorisation from the provincial government DESTEA, acting in consultation with other spheres of government.

V. Purpose for Environmental Impact Assessment Report (EIAR)

The EIAR is based on the outcomes of the Scoping Phase and provides the Terms of Reference (TOR) for the specialist studies that have been conducted, the alternatives that are considered, as well as the PPP that has been undertaken at various phases. The main objectives of the EIAR Process in terms of the 2017 NEMA EIA Regulations (GN R326) are as follows:

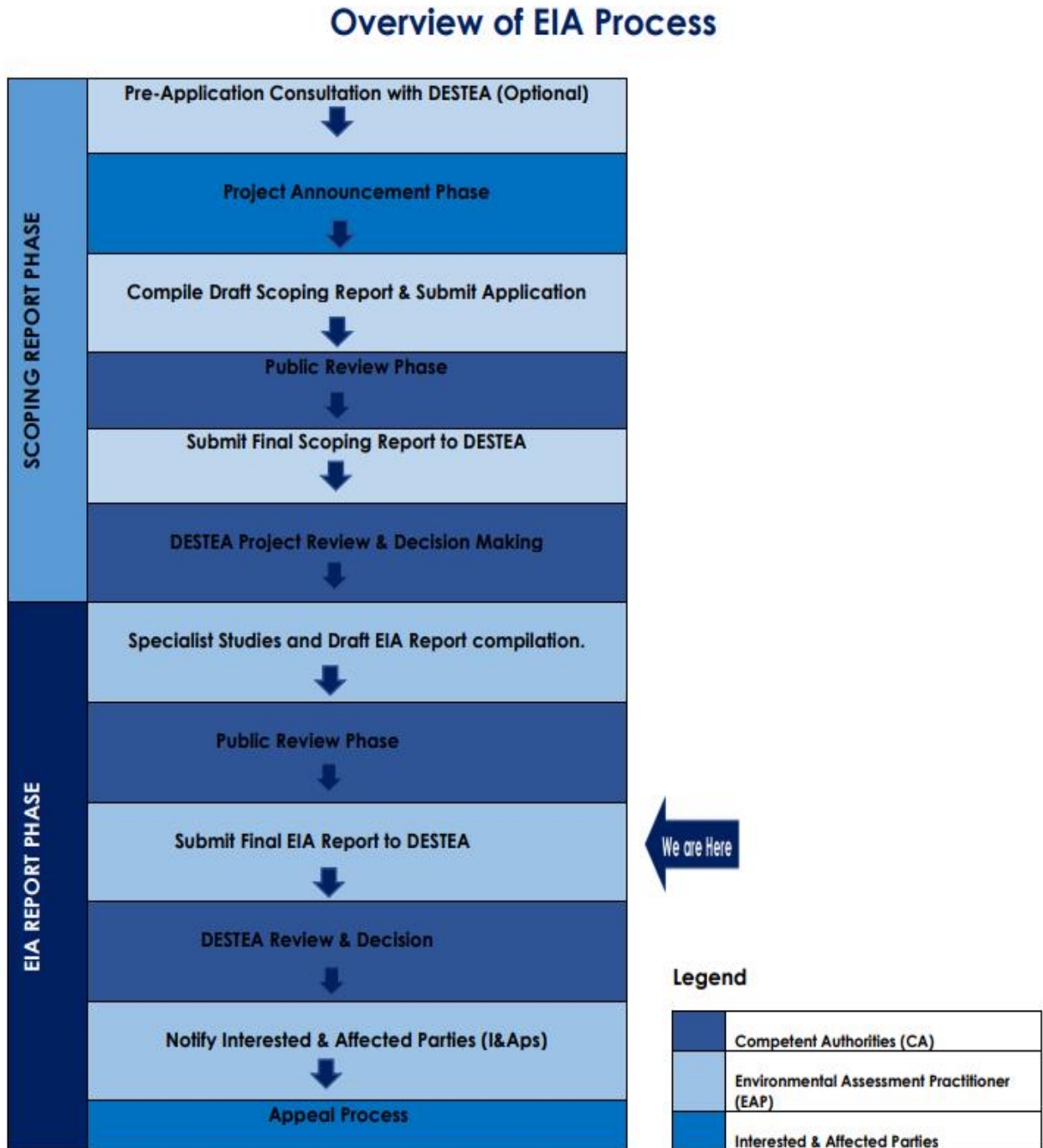
The Objectives of the EIA Phase is to:

- Determine the policy and legislative context within which the activity is located and note how the proposed activity complies with and responds to the policy and legislative context;
- Describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- Identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint

alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;

- Determine the nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and 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;
- Identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
- Identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
- Identify suitable measures to avoid, manage or mitigate identified impacts;
- Identify residual risks that need to be managed and monitored

Figure 2: An outline of the process is provided in the diagram below.



VI. An Overview of the receiving environment

The Environmental Impact Assessment Report generally describes the current state of the receiving environment in the Project Area. This offers the context in which the assessment was conducted and helps to enable an understanding of sensitive environmental features and potential receptors of the impacts of the proposed Project:

- Socio-Economic Environment
- Existing Structures and Infrastructure
- Land Use
- Flora & Fauna
- Climate
- Health
- Geology and Soil
- Topography
- Palaeontological and Cultural Features
- Surface Water
- Agriculture
- Air quality
- Noise
- Traffic/ Transportation

VII. Specialist Studies

The specialist studies 'triggered' by the nature of the proposed development and its receiving environment, which aimed at addressing the key issues and compliance with legal obligations, include the following:

1. Wetland Delineation and Risk Assessment
2. Terrestrial Biodiversity and Avifaunal Study
3. Paleontological Desktop Assessment
4. Phase 1 Cultural Heritage Impact Assessment
5. Social Impact Assessment
6. Agricultural Impact Assessment
7. Visual Impact Assessment

The following methods, among others, were used to incorporate the data from the relevant expert studies into the EIA Report:

- Using the data, a more thorough and site-specific description of the receiving environment was determined.
- The specialists' assessments of the alternatives for the Project components were considered when identifying the most suitable option.
- Each specialized study is summarized, with emphasis on methodology, major findings, and recommendations.
- In the overall project impact assessment, the specialists' impacts assessments and identified mitigation measures were considered.
- The specialists' key recommendations were carried over to the final conclusions.

IX. Environmental Impact Assessment

The EIAR evaluated the relevant environmental effects resulting from Project's pre-construction, construction, and operating phases. The impacts include the following:

- A review of the Project's activities and components
- Issues raised by environmental commenting authorities and CA.
- An evaluation of the receiving biophysical, social, economic, and built environments
- Findings from specialists' studies
- comments received during public participation.
- Impacts related to activities listed in terms of the Government Notice No: R327, R326, R325 and R324 in Government Gazette Number 40772, dated 7 April 2017, for which an Environmental Authorization has been applied for.

The assessment took into account both impacts before and after mitigation, with the latter case evaluating the residual impact after the implementation of the mitigating measures. The following teams contributed toward proposed mitigation measures for the proposed development, the technical team, environmental specialists, and the requirements of environmental authorities, plus environmental best practices. These measures included recommendations raised during specialists' studies.

Since no other renewable energy applications have been submitted for properties it within a 30km radius of the proposed Solar PV Site.

The cumulative effects of other renewable energy projects were not assessed.

Other factors considered in terms of cumulative impacts were the following:

- Cumulative area of indigenous vegetation to be cleared, mostly grass
- Erosion that will be exacerbated by clearing vegetation for the Project's development footprint;
- Traffic related effects on the local road network;
- There will be a rise in dust and noise levels,
- Influx of job seekers,
- Overall good economic effects from the construction Phase of the development

The Environmental Management Programme Report (EMPr) provides a comprehensive list of mitigation measures that go above and beyond the effects evaluated in the main body of the Environmental Impact Assessment Report. The definition of the "no-go option" is also established. The "no go option" was considered considering the motivation, as well as the necessity and appeal of the Project as a whole. Should the project fail, any potentially significant environmental issues associated with it would be irrelevant, and the Project-related activities would have no bearing on the current situation of the local receiving environment.

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.

X. Analysis Project Alternatives

The applicant suggested a preliminary layout. However, the design was adjusted to consider the specific environmental aspects found through the environmental screening process, specialists and experts' recommendations. Currently, only the redesigned plan has been offered as a layout option for the study.

A single axis tracker system are the Preferred solar PV technology options. The Project's yield output will be optimized using this technology. Alternatives to BESS technology include solid state and flow battery systems. An option that uses solid state lithium-ion technology is the recommended choice.

XI. PUBLIC PARTICIPATION PROCESS

In order to notify and inform the registered and affected stakeholders about the public review process, the draft EIAR and all its supportive documents will be placed at the Kroonstad Public Library for 30 days. All registered and affected stakeholders will be notified of the public review period by registered mails (where required) and by emails. The link with all project documents will be sent accordingly. The link of EIAR and all supportive documents will also be published on the company face-book page. The public will be given 30-day period to air their concerns and inputs and to be part of the EAIR. Virtual meeting with registered and affected stakeholders will be conducted as and when required. Kindly refer to Appendix L of the draft EAIR for more details.

XII. CONCLUSION

The environmental assessment is defined by a variety of issues. Such as, the nature of the receiving or affected environment, development alternatives considered, and the approach towards the assessment conducted. Key results of the EIAR Phase for the proposed Solar PV Solar Facility and Storage, plus the supporting power line, are provided below:

- Potential Significant environmental aspects and impact pertaining to the pre-construction phase, construction phase and operational phase of the Project were identified.
- Project alternatives for achieving the objectives of the proposed activity were considered.
- Interested and Affected Parties (I&AP'S) were identified and notification of the review of the draft Scoping Report;
- Sensitive features of the environment that may be affected by the Project were identified and assessed
- A Plan of Study was developed to explain the approach to be adopted during the EIAR Phase; and

No fatal flaws were identified in terms of the proposed activities and the receiving environment that would prevent the environmental assessment from proceeding beyond the Scoping Phase. It is the opinion of the EAP that EIAR was conducted in an objective manner and that the process and report conform to the requirements of Regulation 21 and Appendix 3 of the EIA Regulations, respectively. It is also believed that the EIAR is comprehensive and will allow DESTEA to make an informed decision.

ACRONYMS

NBA	South African National Parks
DESTEA	Department of Economic, Small Business Development, Tourism and Environmental Affairs
NEMA	National Environmental Management Act (Act 107 of 1998)
NEMBA	NEMBA National Environmental Management: Biodiversity Act
NERSA	National Energy Regulator of South Africa
NFEPA	National Freshwater Ecosystems Protected Areas
NHRA	National Heritage Resources Act (Act 25 of 1999)
NPAES	National Protected Expansion Strategy
NWA	National Water Act (Act No. 36 of 1998)
NEMAQA	National Environmental Management: Air Quality Act (Act No. 39 of 2004)
NEMPAA	National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
NEMWA	National Environmental Management: Waste Act (Act No. 59 of 2008)
NP	Not Protected
NPAES	National Protected Area Expansion Strategy
NT	Near Threatened
NWA	National Water Act (Act No. 36 of 1998)
NWCS	National Wetland Classification System
NLM	Ngwathe Local Municipality
OG	Ordinary Game
OHS	Occupational Health and Safety
ONA	Other Natural Area
PES	Present Ecological State
PPA	Power Purchasing Agreement
PV	Photovoltaic
REDZs	Renewable Energy Development Zones
REIPPPP	Renewable Energy Independent Power Producer Procurement
S&EIR	Scoping and Environmental Impact Reporting
SABAP2	S South African Bird Atlas Project
SAHRA	South African Heritage Resources Agency
SEF	Solar Energy Facility
IPP	Independent Power Producer
IRP	Integrated Resource Plan
kWh	Kilowatt Hours
LSA	Later Stone Age
MSA	Middle Stone Age
MW	Megawatts
IPP	Independent Power Producer
IRP	Integrated Resource Plan
kWh	Kilowatt Hours
LSA	Later Stone Age
AC	Alternating Current

ADT	Average Daily Traffic
AGIS	Agricultural Geo-Referenced Information System
BA	Basic Assessment
BGIS	Biodiversity Geographic Information System
BID	Background Information Document
CA	Competent Authority
CBA	Critical Biodiversity Area
CPV	Concentrated Photovoltaic
CSP	Concentrated Solar Power
CSIR	Council for Scientific and Industrial Research
DFFE	National Department Forestry, Fisheries and the Environment
DC	Direct Current
DMR	National Department of Minerals Resources
DOE	Department Of Energy
DOT	National Department of Transport
DSR	Draft Scoping Report
DWS	National Department of Water and Sanitation
EA	Environmental Authorization
EAP	Environmental Assessment Practitioner
EC	Electrical Conductivity
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
ESA	Ecological Support Area
FEPA	Freshwater Ecosystem Protection Areas
FSR	Final Scoping Report
GA	General Authorization
GG	Government Gazette
GIS	Geographical Information Systems
GNR	Government Notice Regulation
HPM	Hydraulic Plant Module
I&AP	Interested and Affected Party
IEM	Integrated Environmental Management
ICB	Iron Chromium Battery
IDP	Integrated Development Plan
IBA	Important Bird & Biodiversity Area
IFC	International Finance Corporation
IPP	Independent Power Producer
IRP	Integrated Resource Plan
IUCN	International Union for Conservation of Nature

UNIT OF MEASURE

%	Percentage
°C	Degrees Celsius
ha	Hectare
hz	Hertz
km	Kilometre
kV	Kilovolt
l/s	Litres per second
m	Metre
m²	Square metre
mm	Millimetre
MVA	Megavolt Amperes
MW	Megawatt
MWh	Megawatt hour
V	Volt



Chapter 1



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**THE ROAD MAP SHOWING HOW THE STUDY HAS COMPLIED WITH NEMA EIA
REGULATIONS**

The Environmental Impact Assessment (EIA) process undertaken to date has resulted in the establishment of this Environmental Impact Assessment Report (EIAR) which provides information relevant to the project and establishes the potential impacts of the project and the methodologies and impacts that will be assessed in detail during the impact assessment phase.

The Road Map in the below table shows how EIAR has addressed the applicable requirements for the EIA Regulations in terms on the National Environmental Management Act (Act No. 107 of 1998) (NEMA).

EIA Regulations section	Environmental Impact assessment report requirements in terms of Appendix 3 of NEMA Regulations (GN R326)	Pages
Appendix3-(1)(a)	Details of— (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae;	P41
Appendix3-(1)(b)	The location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report, including: (i) the 21-digit Surveyor General code of each cadastral land parcel. (ii) where available, the physical address and farm name; and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	P46, P112, Appendix A & D
Appendix3-(1)(c)	A plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is— (i) a linear activity, a description, and coordinates of the corridor in which the proposed activity or activities is to be undertaken. (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken	P112, Appendix A & D
Appendix3-(1)(d)	A description of the scope of the proposed activity, including— (i) all listed and specified activities triggered and being applied for; and (ii) a description of the associated structures and infrastructure related to the development;	Chapter 2 / 3
Appendix3-(1)(e)	A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;	Chapter 2/ P53-59
Appendix3-(1)(f)	A motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred [location] <u>development footprint within the approved site as contemplated in the accepted scoping report;</u>	Chapter 1/ P21-39

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Appendix3- (1)(g)	A motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report;	Chapter 1 P26
Appendix3- (1)(h)	<p>A full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including:</p> <ul style="list-style-type: none"> (i) details of the development footprint alternatives considered; (ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; (iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; (iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts— <ul style="list-style-type: none"> (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; (vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks; (vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects (viii) the possible mitigation measures that could be applied and level of residual risk; (ix) if no alternative development [locations] <u>footprints</u> for the activity were investigated, the motivation for not considering such; and (x) a concluding statement indicating the <u>location of the preferred alternative development [location] footprint within the approved site as contemplated in the accepted scoping report;</u> 	Chapter 4 Chapter 5 Chapter 6
Appendix3- (1)(i)	<p>A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred [location] <u>development footprint on the approved site as contemplated in the accepted scoping report</u> through the life of the activity, including—</p> <ul style="list-style-type: none"> (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and 	Chapter 6

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	(ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	
Appendix3- (1)(j)	An assessment of each identified potentially significant impact and risk, including— (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be mitigated;	Chapter 6
Appendix3- (1)(k)	Where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;	Chapter 6 p140-165
Appendix3- (1)(l)	An environmental impact statement which contains— (i) a summary of the key findings of the environmental impact assessment; (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred <u>[site] development footprint on the approved site as contemplated in the accepted scoping report</u> indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives	Chapter 6 & Chapter 7
Appendix3- (1)(m)	Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed [impact management objectives, and the] impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;	Chapter 6 & Chapter 7
Appendix3- (1)(n)	The final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;	Chapter 5 Appendix C&D
Appendix3- (1)(o)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	Chapter 6 p140-165/ Chapter 7
Appendix3- (1)(p)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Specialists Reports: Appendix K1=P5 Appendix K2=P12 Appendix K3=P12 Appendix K4= Section 3.7 Appendix K5=P12

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		Appendix K7=P3
Appendix3-(1)(q)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Chapter 7 / P168-171
Appendix3-(1)(r)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	Not Applicable at this Stage
Appendix3-(1)(s)	An undertaking under oath or affirmation by the EAP in relation to <ul style="list-style-type: none"> (i) the correctness of the information provided in the reports. (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties; 	Appendix I & IA
Appendix3-(1)(t)	Where applicable, details of any financial provision[s] for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	Not Applicable at this stage
Appendix3-(1)(u)	An indication of any deviation from the approved scoping report, including the plan of study, including— <ul style="list-style-type: none"> (i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and (ii) a motivation for the deviation; 	Not Applicable
Appendix3-(1)(v)	Any specific information that may be required by the competent authority; and	Appendix L / N
Appendix3-(1)(w)	Any other matters required in terms of section 24(4)(a) and (b) of the Act.	Not Applicable at this stage

1. INTRODUCTION

1.1 PROJECT DESCRIPTION AND BACKGROUND

Contrarians Capital (Pty) Ltd, an Independent Power Producer (IPP), is proposing the establishment of a commercial solar energy facility (using photovoltaic technology) of approximately 50 MW in capacity. The facility is proposed on the farm Voorspoed 1508 located approximately 35 km southwest of Koppies in the Free State Province. The proposed project will be referred to as the Heuningspruit 50MW PV Solar Energy Facility. It must be noted that this project was initially proposed at a lower capacity of 5MW, and a BAR approval was granted by DESTEA, as the competent authority. Unfortunately, due to unforeseen circumstances and lockdown effects, the project was delayed, and permit lapsed. The purpose of the project is to generate electricity which will be fed-into the national electricity grid. REIPPP Programme has been designed to contribute towards the South African government's renewable energy target of 17GW by 2030, and to stimulate the renewable industry in South Africa.

The facility development footprint will be less than 125 ha within which the following infrastructure will be established:

- Photovoltaic (PV) panels up to 5m in height (fixed or tracking technology) with a capacity of up to 50 MW.
- Mounting structures to be either rammed steel piles or piles with pre-manufactured concrete footing to support the PV panels.
- Cabling between the project components, to be lain underground.
- Inverters/Transformer enclosures.
- An on-site switching station / substation up to 88kV in capacity.
- An overhead power line of approximately 250m in length to tie into the existing Heuningspruit Rural-Syferfontien Traction 88kV Eskom power line on site.
- An application to Eskom has been made to connect via this power line into the existing Heuningspruit Rural Substation which is located adjacent (on the north western boundary) to the development site.
- Eskom will confirm the voltage of the connection power line and connection point.
- Eskom may request adjustment or possible expansion or inclusion of additional transformers or bays or switching gear associate with the existing substation and 88kv overhead power line Internal access roads (4 to 5 m wide).
- Property Fencing.
- Workshop area (20m x 30m.) for maintenance, storage, offices and small modular.
- Water filtration or di-ionisation unit (approx. 10 X 10m).
- Parking and water storage tanks.
- Laydown area 200m².
- Battery storage area.

1.2 PROJECT MOTIVATION

The South African energy sector is dominated by Eskom company. Eskom currently produces 95% of South Africa's electricity. Due to their large presence in the non-renewable energy sector, there is a great need for independent power producers (IPP) who are capable of providing renewable energy sources. 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 local level, the proposed project is in line with the Ngwathe Local Municipality IDP. Critical services needed in the Ngwathe Municipality include bulk supply of electricity which includes transmission, distribution and where applicable, generation.

Ngwathe Local Municipality has listed the following objectives in their IDP:

- To ensure sustainable provision of bulk services through an effective internal network that will be able to supply quality electricity according to consumer demand.
- Ensure the success and sustainability of current government job creation programmes and projects.
- To create an enabling environment and sustainability of current government job creation programmes and projects.

The municipality's IDP makes reference to renewable energy, and advocates the following in order to slow climate change:

- Reduce emissions of heat trapping gases.
- Increase energy efficiency.
- Use of renewable energy sources like wind, solar and biomass.

The proposed solar energy facility is therefore in line with the municipality's IDP and it will assist in meeting the set objectives. The need for renewable energy is becoming increasingly apparent, in both local and international context, with South Africa becoming an integral part of the global transition towards renewable sources of electricity generation.

1.3 PROJECT NEED AND DESIRABILITY

Table 1.1: Need for and desirability of the proposed Project

Project Need	
Questions	Response
1. 1. How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?	
<p>1.1. How were the following ecological integrity considerations taken into account?:</p> <p>1.1.1. Threatened Ecosystems.</p> <p>1.1.2. Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.</p>	<p>The following specialist studies were undertaken to assess the impacts of the Project on the ecological integrity of the area:</p> <ul style="list-style-type: none"> ▪ Aquatic Study-Wetland Delineation and Risk Assessment (contained in Appendix K1) ▪ Terrestrial Biodiversity, Flora, Fauna and Avifaunal (contained in Appendix K2) <p>The following findings of the Terrestrial Biodiversity Compliance Statement (MORA Ecological Services – Feb 2023) are noted:</p> <p>Overall, the impacts associated with this proposed solar facility are considered Low-Medium. Mitigation measures are provided in details on page 50-51.</p> <p>The following findings of the Aquatic Compliance Statement MORA Ecological Services – Feb 2023) are noted:</p>

	<p>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:</p> <table border="1" data-bbox="826 488 1513 757"> <thead> <tr> <th data-bbox="826 488 954 600">Classification</th> <th data-bbox="954 488 1168 600">PES</th> <th data-bbox="1168 488 1513 600">EIS</th> </tr> </thead> <tbody> <tr> <td data-bbox="826 600 954 757">Flood plain</td> <td data-bbox="954 600 1168 757">C: Moderately modified</td> <td data-bbox="1168 600 1513 757">C: Moderate</td> </tr> </tbody> </table> <p>Impacts relating to the proposed development on the wetlands / riparian zones are as follows:</p> <ul style="list-style-type: none"> • 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. <p>The impacts were all low and therefore a General Authorisation will be sufficient.</p> <p>The development of proposed Solar PV Project can be supported from a wetland perspective, provided that the northern PV arrays are relocated to the southern part</p> <p>The following findings of the Agricultural Compliance Statement (Dr du Pisani; 2023) are noted:</p> <p>The study area consists of shallow duplex, vertical and melanic soils with a relatively high clay content. These attributes put the proposed development sites in a category of "marginal potential arable land - not suitable for</p>	Classification	PES	EIS	Flood plain	C: Moderately modified	C: Moderate
Classification	PES	EIS					
Flood plain	C: Moderately modified	C: Moderate					

	<p>cultivation". Therefore, although the climate is suited for dryland cultivation, the soils are not.</p> <p>The duplex, vertic and melanic soils present on the study area are prone to crusting and are highly erodible. The specific rainfall regime over the study area with the incidence of high intensity thunderstorms of 125mm to 150mm rainfall on a single day increases the erosion hazard over the study area. Nevertheless, little soil erosion is actually prevalent in the study area. This is ascribed to the flat topography of the land. It is therefore concluded that the study sites can be categorised as having a low erosion potential. Nevertheless, due diligence should be observed to minimize any erosion hazard by maintaining a healthy soil cover between the solar arrays.</p> <p>The slope of the study area is flat and less than 5% and is therefore not an impediment to the development of the site as a PV Solar Energy Facility.</p> <p>There are no agricultural sensitive areas present on the study area.</p> <p>There are no agricultural infrastructure or lands present within the proposed array development footprint.</p> <p>The best agricultural use for the study area is livestock farming with beef cattle. The current grazing capacity of the veld is estimated to be 7 ha/LSU, mainly due to the shallow and clayey soils present. Based on these estimates the ~245ha site can therefore carry ~35 large stock units (LSU's), which is 7 equivalent to 23 medium framed beef cows, which is negligible in terms of the regions agricultural production and/or food security.</p> <p>The land type in which the study area is located is 61 880ha in size. The relative size of the proposed PV Energy site is therefore negligible</p>
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	<p>in terms of the total agricultural production potential of the land type.</p> <p>The study area does not consist of unique agricultural land.</p> <p>The conservation status of the biome within which the site is located, is regarded as “vulnerable”.</p> <p>Based on the above, the development of the site is supported, provided the proposed Environmental Management Program is followed.</p>
<p>1.1.3. Critical Biodiversity Areas (“CBAs”) and Ecological Support Areas (“ESAs”).</p>	<p>According to the Terrestrial Biodiversity Study Conducted, No fine-scale conservation planning has been conducted for the region and as a result, no Critical Biodiversity Areas have been defined for the study area. In terms of other broadscale planning processes, the site does not fall within a National Protected Areas Expansion.</p> <p>Strategy Focus Area (NPAES), indicating that the area has not been identified as an area of exceptional biodiversity or of significance for the long-term maintenance of broad-scale ecological processes and climate change buffering within the region. In terms of the NFEPA wetland assessments, only the dam near PV2 has been identified as a wetland feature and as it is artificial it is not ranked of high significance. This agrees within the observations at the site, as no natural wetlands or pans were observed at the site. The vegetation types within the site are not considered threatened and the only listed ecosystem in the area, according to the National List of Threatened Ecosystems (2011) are the intact remnants of Vaal-Vet Sandy Grassland. These areas are however some distance from the site and would not be affected by the development.</p>

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1.1.4. Conservation targets.	The conservation status of the biome within which the site is located, is regarded as “vulnerable” (Dr du Pisani; 2023)
1.1.5. Ecological drivers of the ecosystem	Refer to the Terrestrial Biodiversity Study in Appendix K2
1.1.6. Environmental Management Framework.	Ngwathe Local Municipality's Environmental Management Framework exist and was assessed.
1.1.7. Spatial Development Framework.	<p>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).</p> <p>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. The FS PSDF is based on six growth and development pillars, each of which has its own set of drivers with long-term programmes. Pillar 1 highlights the job creation, economic and sustainable growth by expanding and maintaining basic road infrastructures through the implementation of alternative electricity infrastructures.</p> <p>The proposed project will contribute towards job creation and the maintenance of services such as roads which will be used during the construction of the proposed facility. The proposed project is a renewable energy facility that would add the national grid. Therefore, the proposed project contributes to the Free State PSDF.</p>
1.1.8 Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.)	

1.9. How will the ecological impacts resulting from this development impact on people's environmental right in terms following:

The social and ecological impacts were assessed as part of the Social Impact Assessment and the findings are provided in Section 3.1.10 below.

Mitigation measures to manage envisaged impacts, are included in the EMPr.

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<p>1.9.1. Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?</p> <p>1.9.2. Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?</p>	
<p>1.10. Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?</p>	<p>The earmarked site for the proposed PV Site is currently vacant and was historically used for agricultural purposes, in particular grazing. The Project's power line route options primarily follow property boundaries and traverse land used for animal grazing. According to the Agricultural Impact Assessment (Dr du Pisani), the land at the PV site has no high or very high potential land and the sensitivity is regarded as low.</p>
<p>1.11. Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?</p>	<p>Kindly refer to the response provided in question no. 1.1 above.</p>
<p>1.12. Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?</p>	<p>A site alternative refers to the identification of more than one potential site which maybe 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. Therefore no site alternatives have been</p>

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	<p>considered.</p> <p>The Best Practicable Environmental Option (BPEO) is presented in Chapter 5 below, which was identified based on the recommendations of the specialist, technical considerations, the comparison of the potential impacts (positive and negative with mitigations).</p>
<p>1.13. Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?</p>	<p>Cumulative impacts in relation to the Project were assessed individually in Chapter 6 below and mitigation measures were established for each one of the impact categories identified.</p> <p>Further, cumulative impacts of other renewable energy projects that are located within a 30km radius of the proposed PV Site were also considered / analysed.</p>
<p>2.1. What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?:</p> <p>2.1.1. The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area,</p> <p>2.1.2. Spatial priorities and desired spatial patterns (e.g. need for integrated or segregated communities,</p>	<p>The Free State PSDP 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).</p> <p>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. The FS PSDP is based on six growth and development pillars, each of which has its own set of drivers with long-term programmes. Pillar 1 highlights the job creation, economic and sustainable growth by expanding and maintaining basic road infrastructures through the implementation of alternative electricity infrastructures.</p> <p>The proposed project will contribute towards job creation and the maintenance of services such as roads which will be used during the construction of the proposed facility. The proposed project is a renewable energy facility that would add to the national grid. Therefore, the proposed project contributes to the Free State PSDP.</p>

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<p>2.3. How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?</p>	<p>The project will result into positive social impacts such as :</p> <ul style="list-style-type: none"> i) an alternative income source for the landowner. ii) generation of electricity from a renewable resource also reduces reliance (albeit limited) on conventional power sources; iii) local economic upliftment and job creation. <p>These positive impacts would extend beyond the boundary of the site and are expected to outweigh the negative impacts.</p>
<p>2.4. Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? Will the impact be socially and economically sustainable in the short- and long-term?</p>	<p>The proposed project will take place on a privately owned land. The proposed facility would impact directly on the landowner and indirectly on adjacent landowners. It must be noted that the affected landowner would enter into a 20-year lease agreement with the developer and would be compensated for the use of his property. Based on this set-up, it is believed that the project will have positive social and economical impact, which are sustainable.</p>
<p>2.5. In terms of location, describe how the placement of the proposed development will:</p>	

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<p>2.5.1. result in the creation of residential and employment opportunities in close proximity to or integrated with each other,</p> <p>2.5.2. reduce the need for transport of people and goods,</p> <p>2.5.3. result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport),</p> <p>2.5.4. compliment other uses in the area,</p> <p>2.5.5. be in line with the planning for the area,</p> <p>2.5.6. for urban related development, make use of underutilised land available with the urban edge,</p> <p>2.5.7. optimise the use of existing resources and infrastructure,</p> <p>2.5.8. opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with</p>	<p>2.5.1. The Project will result in increased economic activity, as well as increased opportunities for employment and for SMMEs.</p> <p>2.5.2. Not deemed to be relevant, due to the nature of the development.</p> <p>2.5.3. Not deemed to be relevant, due to the nature of the development.</p> <p>2.5.4. Impacts on surrounding land uses were assessed as part of the Agricultural Impact Assessment, Social Impact Assessment and Visual Impact Assessment (amongst others). Kindly refer to these studies.</p> <p>2.5.5. Yes, the development is inline with the area's IDP.</p> <p>2.5.6. The proposed Solar PV Site and associated infrastructures are located outside of the urban edge and should not impact on future urban expansion, based on the SDF.</p> <p>2.5.7. The resources and services required for construction and operation are discussed in chapter 3 below.</p> <p>2.5.8. The Project does not include the expansion of any bulk infrastructure.</p>
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<p>infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),</p> <p>2.5.9. discourage "urban sprawl" and contribute to compaction/densification,</p> <p>2.5.10. contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs,</p> <p>2.5.11. encourage environmentally sustainable land development practices and processes,</p> <p>2.5.12. take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.),</p> <p>2.5.13. the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential),</p> <p>2.5.14. impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and</p> <p>2.5.15. in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?</p>	<p>2.5.9. Not deemed to be relevant, due to the nature of the proposed development.</p> <p>2.5.10. Not deemed to be relevant, due to the nature of the proposed development.</p> <p>2.5.11. The study assessed potential environmental impact, and the provision is made within EMPr's to manage the impacts associated with the Project to ensure sustainable development.</p> <p>2.5.12. Locational factors which favour the proposed site for development include the favourable solar irradiation levels, close proximity to the grid connection point, flat topography, suitable site access and availability of land.</p> <p>2.5.13. According to Social Impact Assessment (contained in Appendix K5 the proposed development will result in highest socio-economic returns.</p> <p>2.5.14. Refer to the heritage and cultural study conducted in Appendix K4.</p> <p>2.5.15. The question does not seem to be relevant to the proposed development.</p>
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<p>2.6. How were a risk-averse and cautious approach applied in terms of socio-economic impacts?</p>	
<p>2.6.1. What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?</p> <p>2.6.2. What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?</p> <p>2.6.3. Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?</p>	<p>The assumptions, gaps and limitations that accompany the Social Impact Assessment are captured in Appendix K5 of the specialist report.</p> <p>None of the adverse social impacts assessed / investigated had a high residual risk after mitigation.</p>
<p>2.7. How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following:</p> <p>2.7.1. Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?</p> <p>2.7.2. Positive impacts. What measures were taken to enhance positive impacts?</p>	<p>The proposed project will take place on privately owned land. The proposed facility would impact directly on the landowner and indirectly on adjacent landowners. It must be noted that the affected landowner would enter into a lease agreement with the developer and would be compensated for the use of his property. Therefore, his rights are not considered to be affected.</p> <p>Adjacent landowners and surrounding residents might be affected from a visual perspective, but, It is not expected that this would impact their rights, as parties who might be interested in or affected by the proposed construction of the facility are consulted during EIA process. This approach allows I&AP's to air their concerns.</p>
<p>2.8. Considering the linkages and dependencies between human</p>	<p>The connection is clearly provided in the findings of the following related specialist studies:</p>

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<p>wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socio-economic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?</p>	<ul style="list-style-type: none"> • Agricultural Impact Assessment • Visual Impact Assessment • Social Impact Assessment (refer to <p>Also refer to the response to question no. 1.9 above.</p>
<p>2.9. What measures were taken to pursue the selection of the “best practicable environmental option” in terms of socio-economic considerations?</p>	<p>The BPEO is presented in Chapter 5 below, which was established based on the recommendations of the specialists, technical considerations, feedback from I&APs and the comparison of the impacts.</p>
<p>2.10. What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person,?</p>	
<p>Although the project affect private property, the Public Participation Process of the EIA process conducted, included advertisement in the local newspaper and the placement of site notices at the earmarked site and at the public library to ensure all affected directly and indirectly are provided an opportunity to air their concerns about the development : Refer to Appendix C1.</p>	

1.4 Public Participation Process Conducted

CRRENEWABLES Pty Ltd has been appointed by Contrarians Capital Pty Ltd to undertake the EIA required for the proposed project. Public participation forms an integral part of the EIA Process and assists in identifying issues and possible alternatives to be considered during the EIA Process. The CRRENEWABLES is undertaking the PPP for this EIA. Details on the PPP are included in Chapter 4 of the EIAR.

1.5 The EIA Team

The EIA team which participates in this Scoping and EIA Process is listed in Table 2 below. The team includes a number of environmental specialists who were appointed as per the requirements of DFFE Screening Assessment Conducted, which prescribed the protocol for studies done and or to be done during the EIA process.

TABLE 1.2: PROJECT TEAM

NAMES	COMPANY	ROLES	EXPERTIES
Cate Rapudi	CRRENEWABLES Pty Ltd	EAP	Registered EAP and Registered Environmental Scientist (23 Years): EAPASA/SACNASP
SPECIALISTS INVOLVED			
Mokgatla Molepo	Mora Ecological Pty Ltd	Terrestrial Biodiversity Study	Ecological Scientist with more than 14 years' experience
Mokgatla Molepo	Mora Ecological Pty Ltd	Aquatic Study	Ecological Scientist with more than 14 years' experience
Jaco Van der Walt	Beyond Heritage	Cultural & Heritage Study	Archaeologist ASAPA Accredited
Dr Du Pisani	Specialist Agri Consultant	Agricultural Study	Agricultural Scientist and Consultant
Beverley Monametsi	Beverly Monametsi Consulting	Social Impact Study	Environmental Scientist with more than 22 years' experience
Prof Marion Bamford	Archaeological and Heritage Services Africa Pty Ltd	Paleontological Impact Assessment	The Palaeontologist Consultant with more than 34 years' experience

1.5.1 Details and Expertise of the Environmental Assessment Practitioner

Mmatsie Cate Rapudi is a registered Environmental Assessment Practitioner (EAPASA-2021/3313) and Director of CRRENEWABLES Pty Ltd. Cate holds a Bachelor of Environmental Science and BSc Honours degree in Environmental Management and Analysis. She has been the Project Manager of several EIA projects within Eskom Distribution Group for 18 years, and several Basic Assessments for the energy sector and municipality projects. Prior to joining Eskom, Cate worked for 4 years, as a Principal Environmental Officer for the then Department of Agriculture Conservation and Environment in JHB, Cate Rapudi will be supported by the EIA Project Team as outlined within Table 2 above. Cv's for all experts involved are provided in Appendix E of the EIA Report.

1.6. Objectives for this Scoping Report

1.6.1 Objectives of the EIA Report

This EIA Report was preceded by a comprehensive Scoping Process. On May 22, 2023, DESTEA approved the EIA scoping report and study plan, bringing an end to the scoping phase. The EIA process then entered the impact assessment and reporting phase. The stakeholder review time for this EIA Report, will take 30 days period. All comments received will be included in the finalised EIA Report, which will be submitted to DESTEA for decision-making. The primary objective of this EIA Report is to be presented to all registered stakeholders, I&APs and the Competent Authority (DESTEA), with an overview of the predicted impacts and associated management actions required to avoid or mitigate the negative impacts; or to enhance the benefits of the proposed project.

In broad terms, the 2014 NEMA EIA Regulations (GN R326) stipulates that the EIA Process must be undertaken in line with the approved Plan of Study for the EIA, and that it must include a description of the potential environmental impacts, mitigation, and closure outcomes, as well as the residual risks of the proposed activity.

Based on the 2014 NEMA EIA Regulations, the objectives of the EIA Process is to establish the following:

- Determine the policy and legislative context within which the activity is located and note how the proposed activity complies with and responds to the policy and legislative context;
- Describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;

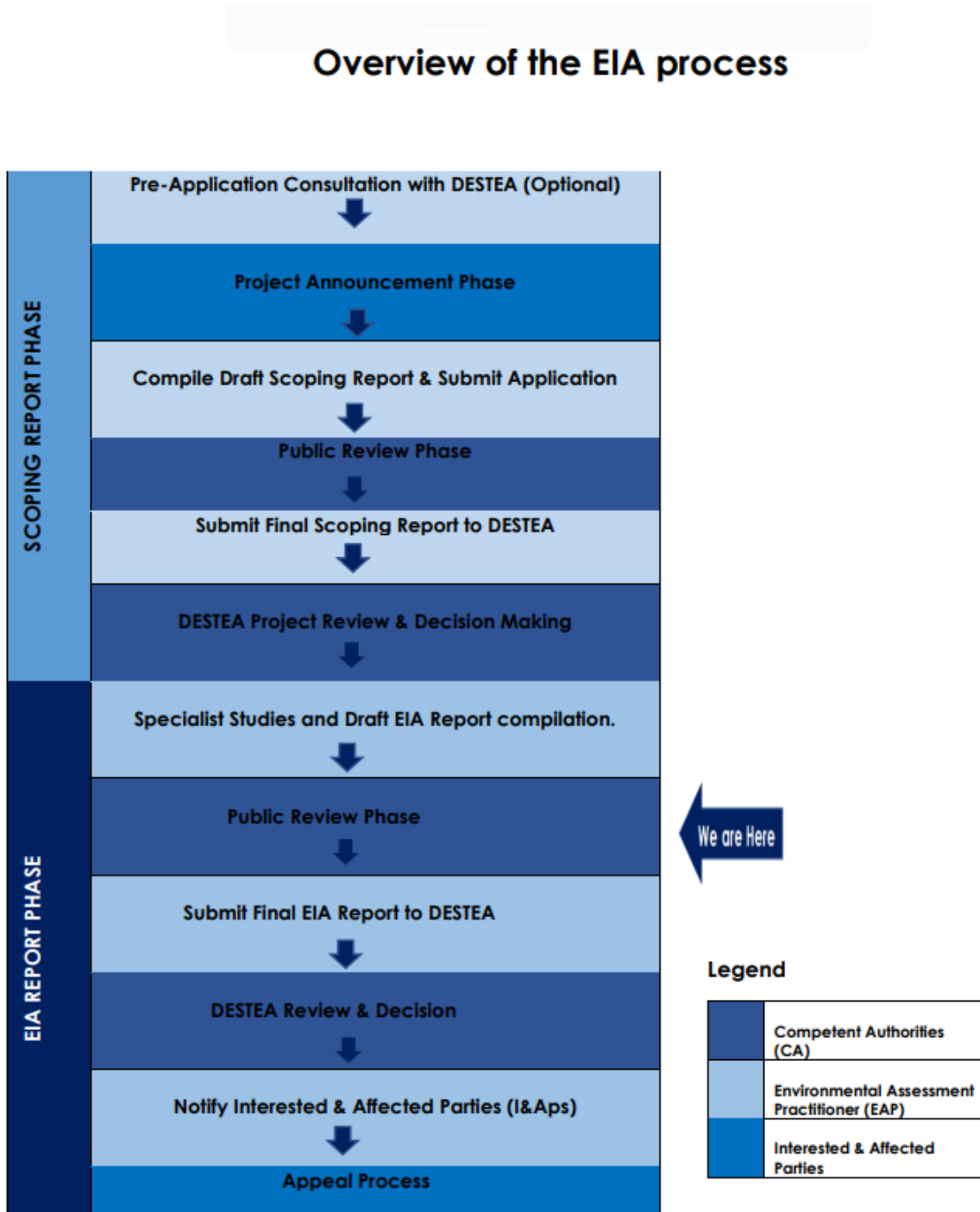
- Identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- Determine the nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and 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;
- Identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
- Identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
- Identify suitable measures to avoid, manage or mitigate identified impacts;
- Identify residual risks that need to be managed and monitored. In terms of legal requirements, a crucial objective of the EIA Report is to satisfy the requirements of Appendix 3 of the 2014 NEMA EIA Regulations (GN R326). This section regulates and prescribes the content of the EIA Report and specifies the type of supporting information that must accompany the submission of the EIA Report to the Competent Authority. An overview of where the requirements of Appendix 3 of the 2014 NEMA EIA Regulations are addressed in this EIA Report's Road Map Table. The EMPr that is required as part of the EIA Process is provided in Appendix G of this EIA Report and has been structured to comply with the requirements outlined in Appendix 4 of the 2014 NEMA EIA Regulations,

The above-mentioned process is achieved through parallel initiatives of consulting with:

- The lead authorities involved in the decision-making for this EIA application;
- The public to ensure that community concerns and interests are understood; and
- The involvement of EIA specialist team to ensure that technical issues are identified and addressed effectively.

The Final EIAR will be submitted to DESTEA, which is the competent authority to decide on the application in terms of NEMA. Below is overview of the EIA Process.

Figure 1.1: S&EIR Process





Chapter 2



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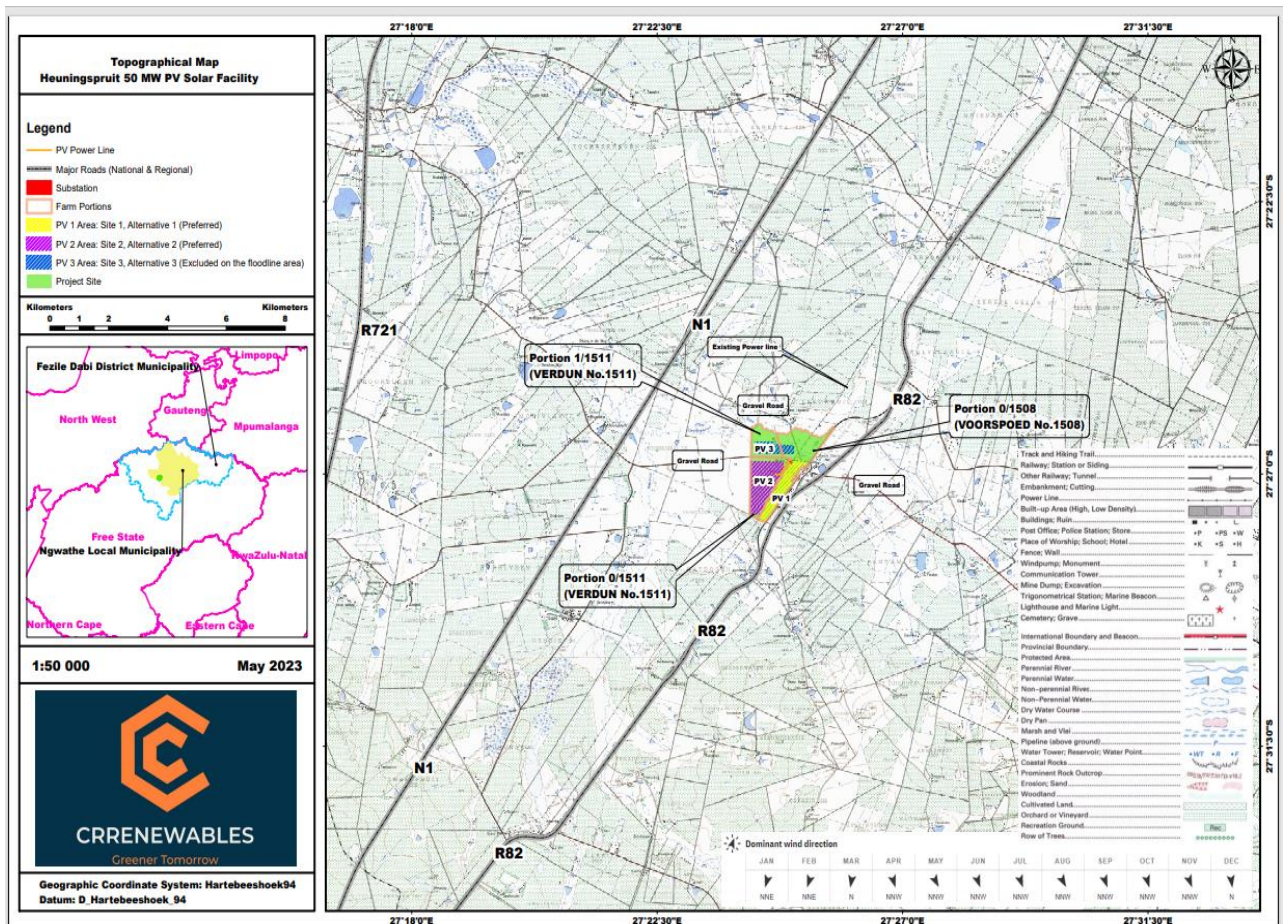
2. PROJECT DESCRIPTION

2.1 Project Overview

2.1.1 Site and location of the project

Contrarians Capital (Pty) Ltd is proposing the establishment of a commercial photovoltaic (PV) solar energy facility with a capacity of up to 50MW to be established on the farm Voorspoed 1508 which is located 35km southwest of Koppies, within Ngwathe Local Municipality, in the Free State Province.

Figure 2.1: Locality Map of the Proposed Heuningspruit 50 MW PV Solar Energy Facility and Storage



EIAR for the Proposed new Heuningspruit 50MW PV Solar Facility and Storage, Near Koppies, Free State Province

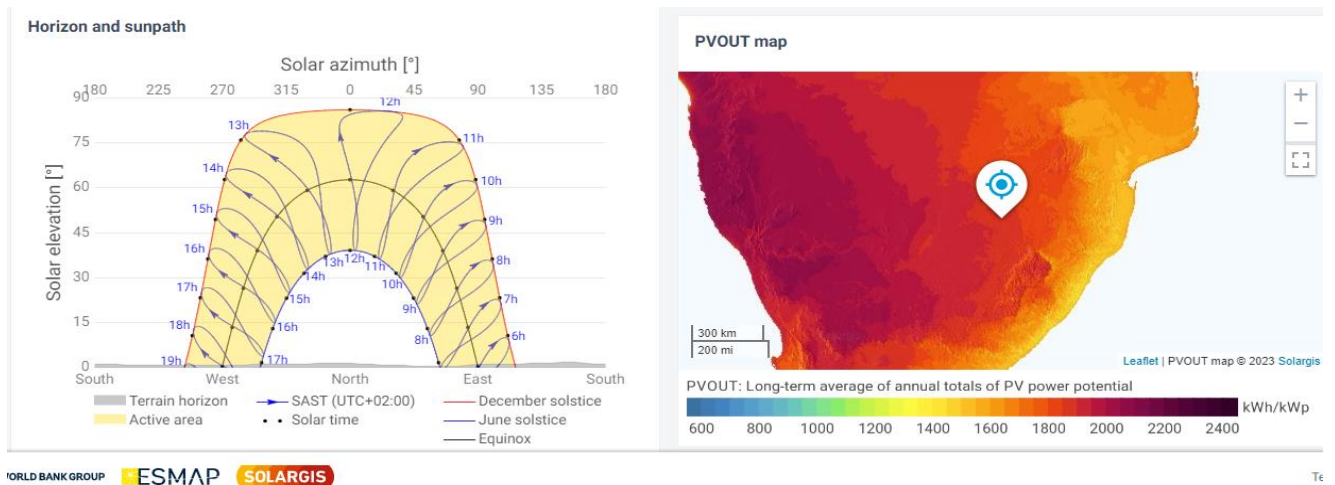
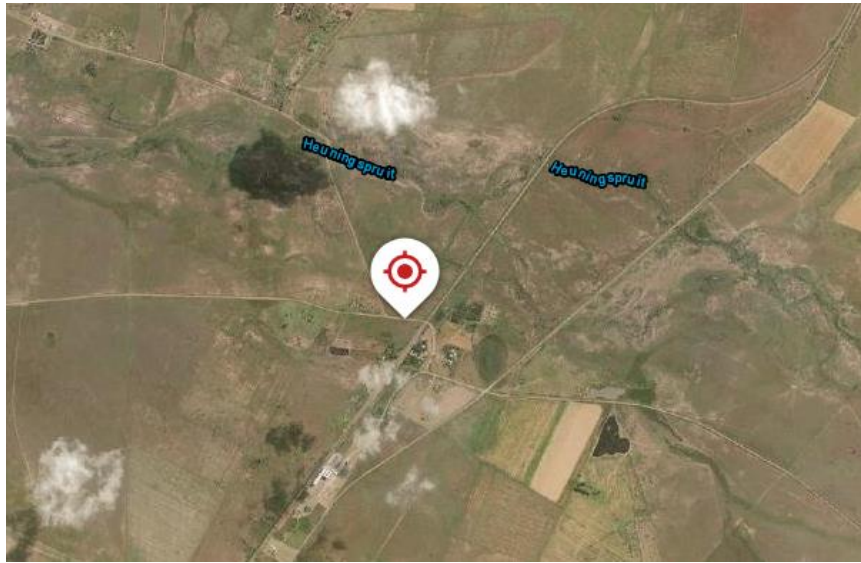
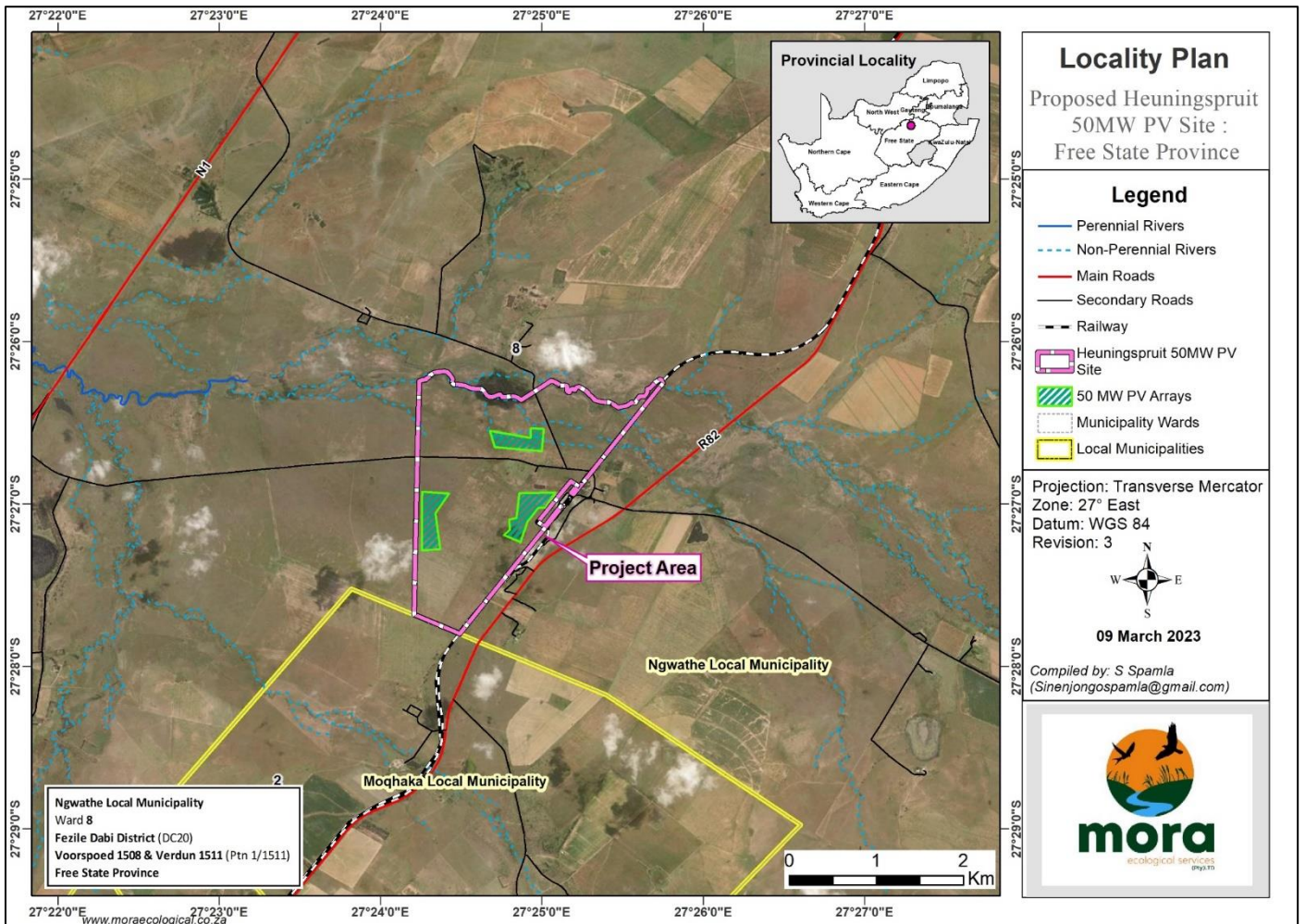


Figure 2.2: Location of the Project relative to PV Energy Potential

© 2023 The World Bank Group, Source: Global Solar Atlas 2.0, Solar resource data: Solargis

Figure 2.3: Proposed development Site Layout



The Heuningspruit PV solar energy facility will have a development footprint of 150 hectares approximately, within which the following typical infrastructure will be established:

- Arrays of photovoltaic (PV) panels with a capacity of up to 50MW.
- Mounting structures to be either rammed steel piles or piles with pre-manufactured.
- Concrete footing to support the PV panels.
- Cabling between the project components, to be lain underground.
- Inverters/Transformer enclosures.
- An on-site 88kV or lower voltage kV switching station.
- Internal access roads (4 to 8m wide).
- Fencing.
- Workshop area (20 m x 30 m.) for maintenance, storage, offices and small modular.

- Water filtration or di-ionisation unit (approx. 10 X 10m).
- Parking and water storage tanks.
- Laydown area 200 m².
- BESS.
- An overhead power line of approximately 250m in length to tie into the existing power line (Heuningspruit Rural-Syferfontien Traction 88/11 KV Eskom power line) on site. An application to Eskom will be made to connect into Eskom's existing.

Heuningspruit Rural Substation is located adjacent (north-western boundary) to the proposed development site. Eskom will confirm voltage of connection power line and connection point. Eskom may request adjustment or possible expansion or inclusion of additional transformers or bays or switching gear associated with the existing substation and 88kva overhead transmission line.

Water will be trucked from the nearest licenced water user, municipality or suitable borehole. In addition to standard water use for an office and toilets during the operational phase, the PV panels may need to be cleaned. Two cleaning events per year are estimated which should accommodate dust storm events and regular cleaning. For operations approximately 5000,000 litres (5000 m³) of water per annum is proposed to be trucked in from the nearest water source as per a water purchase agreement from a local authorised user or service provider. 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 is not regarded as wastewater. If the water quality of purchased water is poor and/or needs deionising for panel cleaning then a small salt-rich residue will remain and be disposed of at the appropriate municipal waste disposal facility. It is envisaged that the volume of salt residue would not exceed 0.5m³ per cleaning event and would be transported off-site and disposed of at the nearest authorised facility. The anticipated volumes of salt residue would not trigger the need for a waste license.

The overall aim of the design and layout of the facility is to maximise electricity production through exposure to the solar radiation, while minimising infrastructure, operation and maintenance costs, and social and environmental impacts. 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 will contribute to South Africa's electricity generating market which has historically been dominated by coal based power generation.

2.1.2 Solar Technology

Solar technologies convert sunlight into electrical energy either through photovoltaic (PV) panels or through mirrors that concentrate solar radiation. This energy can be used to generate electricity or be stored in batteries or thermal storage.

Figure 2.4: Overview of Solar PV Power Plant



Source: www.electricaltechnology.org

2.1.3 Components of the PV Facility

The PV solar facility will be comprised of the following:

Photovoltaic Cells

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. An individual photovoltaic cell is made of silicone 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 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) to alternating current (AC). The electricity is then transmitted through a power line for distribution to the grid and use.

A single cell is sufficient to power a small device such as an emergency telephone. However, to produce 50 MW of power, the proposed facility will require numerous cells arranged in multiples/arrays which will be fixed to a support structure.

PV Panels and Mounting for Fixed Panel Technology, the PV panels will be fixed to a support structure (as illustrated in Figure 5) 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.

The angle of the fixed 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.

2.1.4 Panels and mounting structure for Tracking

Single-axis tracking technology is being considered for this project. For this technology, the adopted mounting structure 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 an advantage of an increase of about 25% in terms of energy production compared to the horizontal fixed technology.



Figure 2.5: An Example of tracking PV technology



Figure 2.6: An Example of a double-sided solar panels that track the sun (New Scientists-2020)

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. These 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.

2.2. A description of Policy, and Legislation Context

2.2.1 National Environmental Management Act

NEMA is the framework legislation regulating the environment in SA. According to Section 2(3) of NEMA, "development must be socially, environmentally and economically sustainable", which means the integration of these three factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.

The proposed Project requires authorisation in terms of NEMA and the EIA is being undertaken in accordance the EIA Regulations, which consist of the following:

- EIA procedure - GN No. R 326 (7 April 2017)
- Listing Notice 1 - GN No. R 327 (7 April 2017)
- Listing Notice 2 - GN No. R 325 (7 April 2017)
- Listing Notice 3 - GN No. R 324 (7 April 2017)

The Project triggers activities under Listing **Notices 1, 2 and 3**, and thus needs to be subjected to a Scoping and Environmental Impact Reporting (S&EIR) process. The listed activities are explained within the context of the Project in Table 1

2.2.2 National Environmental Management: Waste Act

The purpose of the National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM:WA) includes amongst others, 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.

"Waste" is defined in NEM:WA as "any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to this Act".

Schedule 3 of the NEM:WA groups waste into two categories, namely hazardous waste and general waste. The classification of waste determines the associated management and licencing requirements. "Hazardous waste" is defined as "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 and includes hazardous substances, materials or objects within business waste, residue deposits and residue stockpiles".

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. No authorisation will be required in terms of NEM:WA, as the Project will not include any listed waste management activities. 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 Environmental Management Programme (EMPr) will make 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 from the on-site office and workshop will be sent to licenced municipal waste disposal sites; and Waste generated during maintenance or replacement of panels and inverters will be sent to suitable disposal sites.

2.2.3 National Water Act

The purpose of the National Water Act (Act No. 36 of 1998) (NWA) 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:

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

- g. Promoting dam safety; and
- h. Managing floods and droughts.

The Department of Water and Sanitation (DWS) is the custodian of South Africa's water resources. Some key 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 Project may entail the following activities that constitute water uses in terms of Section 21 of the NWA, which will be confirmed in consultation with DWS and following the completion of the delineation of the watercourses:

- 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.

Based on the development activities, should the the above water uses get triggered a Water Use Licence Application will be submitted to DWS to seek authorisation in terms of the NWA.

2.2.4 National Environmental Management: Air Quality Act

The purpose of the National Environmental Management: Air Quality Act (Act No. 39 of 2004) (NEM:AQA) 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 of the key definitions from the Act include the following:

- “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. No AEL is required for the Project. Provision is made in the EMPr to manage impacts to air quality as a result of the Project during the construction phase.

5.2.5 National Environmental Management: Biodiversity Act

The purpose of the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEM:BA) 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 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.

The implications of NEM:BA for the Project inter alia include the requirements for managing invasive and alien species, protecting threatened ecosystems and species, as well as for rehabilitating the areas affected by the Project (outside of the development footprint).

Terrestrial and Aquatic Ecological Impact Assessments will be undertaken for the Project, which will be included in the EIA Report.

2.2.6 National Heritage Resources Act

The purpose of the National Heritage Resources Act (Act No. 25 of 1999) (NHRA) 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 the NHRA, certain listed activities require authorisation from provincial agencies, which include the following:

- 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 e exceeding 5 000 m² in extent; or
- Involving three or more existing erven or subdivisions thereof; and the re-zoning of a site exceeding 1 ha in extent.

A Heritage Impact Assessment will be undertaken for the Project, which will be included in the EIA Report. The Project will need to apply for a permit if any heritage sites or graves are to be affected.

2.2.7 Energy Governance in SA

SA has expressed and entrenched its commitment to promoting the use of renewable energy and implementing Energy Efficiency through the following (amongst others): RSA is a signatory to various international treaties and conventions relating to climate change and greenhouse gas (GHG), such as – United Nations Framework Convention on Climate Change;

- Kyoto Protocol; and
- Paris Agreement

SA has developed the following related policy frameworks:

- White Paper on Renewable Energy (2003);
- White Paper on Energy Policy (1998);
- Integrated Energy Plan (2003);
- IRP 2010;
- RP 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).

SA 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 12L.

The DFFE, developed EIA Guideline for Renewable Energy Projects (2015). RSA's related voluntary instruments include – South African National Standard (SANS) 941 energy-efficiency of electrical and electronic equipment; and SANS 50001 energy management standard.

2.2.8 Guidelines

The following guidelines were considered during the preparation of the Scoping Report:

- Integrated Environmental Management Information Series, in particular Series 2 – Scoping (DEAT, 2002);
- Guideline on Alternatives, EIA Guideline and Information Document Series (DEA&DP, 2010a);
- Guideline on Need and Desirability (DEA, 2017);

Integrated Environmental Management Guideline Series 7: Public Participation in the EIA Process (DEA, 2010);

- EIA Guideline for Renewable Energy Projects (Department of Environmental Affairs (DEA, 2015); and
- Guidelines for Involving Specialists in the EIA Processes Series (Brownlie, 2005).

2.3 Description of the listed activities associated with the project as applied for

Table 2.1: Listed activities are 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 1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs — (a) within an urban area; or (b) on existing infrastructure.	The proposed 50 MW solar PV facility (i.e. Heuningspruit PV Solar Facility and storage will have an estimated footprint of approximately 150 ha. It is taking place outside an urban edge / area It is renewable

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GN R325; Listing Activity 14	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.	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.
GN R325; Listing Activity 15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for: (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	The proposed 50 MW solar PV facility (i.e. Heuningspruit PV Solar Facility) will have an estimated footprint of approximately 150 ha. As a result, more than 20 ha of indigenous vegetation would be removed for the construction of the proposed Solar PV facility. More information regarding the presence of indigenous vegetation on site will be provided in the Ecological Impact Assessment/ Terrestrial Bio-diversity study.
NEMA: GN R327		
GN R327; Listing Activity 11	The development of facilities or infrastructure for the transmission and distribution of electricity- (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;	Onsite infrastructure including underground cabling for collection of electricity, with a capacity of up to 88kV would be required to connect the proposed PV facility to the proposed onsite central 88 kV substation. The proposed facility is situated outside of the urban edge. This activity would therefore be triggered.
GN R327; Listing Activity 12 (x) and (xii)	The development of: (ii) infrastructure or structures with a physical	The proposed 50 MW Solar PV facility will entail the construction of building infrastructure and structures (such as the solar field,

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	<p>footprint of 100 square metres or more; where such development occurs) within a watercourse;</p> <p>b) in front of a development setback; or c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding-</p> <p>(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;</p> <p>(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>offices, workshop, ablution facilities, on-site substation, laydown area and security enclosures etc.).</p> <p>Based on the preliminary sensitivity screening undertaken for the site, drainage features occur onsite and the buildings and infrastructure are expected to exceed a footprint of 100 m² and some are likely to occur within 32 m of the watercourses.</p> <p>The proposed project will take place outside of an urban area.</p> <p>Additional information regarding the presence of watercourses on site will be provided in the Ecological Impact Assessment, which will be undertaken during the EIA Phase.</p>
GN R327; Listing Activity 19 (i)	The infilling or depositing of any material of more	The proposed project will entail the excavation, removal and moving of more than 10 m ³ of

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	<p>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 activity 26 in Listing Notice 2 of 2014 applies.</p>	<p>soil, sand, pebbles or rock from the nearby watercourses.</p> <p>The proposed project would also entail the infilling 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>
<p>GN R327; Listing Activity 24 (ii)</p>	<p>The development of a road– (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; but excluding a road–</p>	<p>Existing roads will be used to gain access to the preferred site. The existing roads can be accessed from the R82.</p> <p>An internal gravel road may be constructed from the existing roads to the proposed project site.</p>

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	<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 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 residential, mixed, retail, commercial, industrial or institutional purposes.</p>	<p>The earmarked site is currently used for agricultural purposes (mainly grazing).</p> <p>The proposed 50 MW solar PV facility, which is considered to be a commercial/industrial development, will have an estimated footprint of approximately 150 ha.</p>
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>An internal gravel road may be constructed from the existing roads to the proposed project site. The internal gravel road of 8 m in width, and the about 4-8km 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>(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>(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>	
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	(cc) Areas within urban protected areas.	
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2.4 Overview of Project Development Cycle

2.4.1 Overview of the Construction Phase

A facility consisting of several PV arrays with a generating capacity of 50 MW could take approximately 24-36 months to construct and commission, and would require the expertise of skilled, semi-skilled and low skilled staff. In order to construct the proposed PV solar energy facility and associated infrastructure, a series of activities will need to be undertaken. Site preparation activities will include clearance of vegetation at the footprint of certain components (i.e. inverters and transformer position) and the establishment of the internal access roads.

The PV panels will be sited a certain distance away from each other (to avoid shading) within the broader development site. Clearing activities, where required, will involve the stripping of topsoil which will need to be stockpiled and/or spread on site.

2.4.1.1 Anticipated activities during construction are described below.

Conduct Surveys

Prior to initiating construction, a number of surveys will be required including, but not limited to, a geotechnical survey, a site survey and, survey of substation site and access road servitudes.

Establishment of Access Roads

Direct access to the site exists via the R82 from Kroonstad and the S155 bordering the site on the northern side. There are several internal farm access roads on the study area and the proposed site is easily accessible via these roads. Internal access roads may however need to be upgraded for use during construction and operation.

Undertake Site Preparation

Site preparation activities will include clearance of vegetation at the footprint of each support structure. These activities will require the stripping of topsoil which will need to be stockpiled, backfilled and/or spread on site.

Transportation of components and equipment to site

The components and equipment required for the construction of the proposed facility will be brought to site in sections by means of national and provincial roads and then proposed internal access road. Some of the components (i.e. transformer) may be defined as abnormal loads in terms of the Road Traffic Act (Act No. 29 of 1989) by virtue of the dimensional limitations (i.e. weight). Typical civil engineering construction equipment will need to be brought to the site (e.g. excavators, trucks, graders, compaction equipment, cement trucks, etc.) as well as components required for the upgrade of the substation and site preparation.

Establishment of Laydown Areas on Site

Laydown and storage areas will be required for the typical construction equipment which will be required on site.

Erect PV Cells, Construct Substation and Inverters

The PV cells will be arranged in arrays. The support structures will be fixed into the ground with the use of concrete, depending on the soil conditions at the site. The height of the PV panel structure will be up to 5 m. An overhead power line of approximately 250m in length to tie into the existing power line (Heuningspruit Rural-Syferfontien Traction 88kV Eskom power line) on site. Inverters and PV plant transformer /substation will be installed to facilitate the connection between the solar energy facility and the Eskom electricity grid. Connection will be dependent on final engagement with Eskom, but it is expected to be via the Heuningspruit Rural Substation and or associated connecting infrastructure / switchyard investigated in this study. The position of the inverters within the footprint of the broader site will be informed by the final positioning of the PV components.

Establishment of Ancillary Infrastructure

Ancillary infrastructure may include a workshop, storage areas as well as a temporary contractor's equipment camp. The establishment of these facilities/buildings will require the clearing of vegetation and levelling of the development site and the excavation of foundations prior to construction. A laydown area for building materials and equipment associated with these buildings will also be required. Water storage tanks will also be placed on-site to collect water for cleaning of the PV panels.

Undertake Site Rehabilitation

Once construction is completed and once all construction equipment is removed from site, the site must be rehabilitated where practical and reasonable. On full commissioning of the facility, any access points to the site which are not required during the operational phase must be closed and rehabilitated.

2.4.2 Overview of the Operation Phase

The electricity that is generated from the PV panels will be stepped up through the onsite inverters and transformers at the substation. Thereafter an overhead power line approximately 250m in length to tie into the existing 88kv power line (Heuningspruit Rural-Syferfontien Traction 88kV Eskom power line) on site. It is anticipated that full-time security, maintenance and control room staff will be required on site. Each component within the solar energy facility will be operational except under circumstances of mechanical breakdown, unfavourable weather conditions or maintenance activities.

Maintenance and cleaning of the PV Panels Using Water

Two panel cleaning events per year are estimated which should accommodate dust storm events and regular cleaning. For operations, approximately 500,000 litres (or 500 m³) of water per annum is proposed to be trucked in from the nearest water source as per a water purchase agreement from a local authorised user or service provider.

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 is not regarded as wastewater. If the water quality of purchased water is poor and or needs deionising for panel cleaning then a small salt rich residue will remain and will be disposed of at the appropriate municipal waste disposal facility. It is envisaged that the volume of salt residue would not exceed 0.5m³ per cleaning event and would be transported off site and disposed of at the nearest authorised waste disposal facility. The anticipated volumes of salt residue would not trigger the need for a waste license.

2.4.3. Overview of the Decommissioning Phase

The solar energy facility is expected to have a lifespan of more than 20 years (with maintenance) and the power plant infrastructure would only be decommissioned once it has reached the end of its economic life. If economically feasible/desirable the decommissioning activities would comprise the disassembly and replacement of the individual components with more appropriate technology or infrastructure available at that time. However, if not deemed so, then the facility would be completely decommissioned which would include the following decommissioning activities.

Site Preparation

Site preparation activities will include confirming the integrity of the access to the site to accommodate the required equipment (e.g. lay down areas) and the mobilisation of decommissioning equipment.

Disassemble and Remove Components

All above ground facilities that are not intended for future use at the site would be disassembled, and reused and recycled (where possible), or disposed of in accordance with regulatory requirements. Much of the above ground wire, steel, and PV panels of which the system is comprised are recyclable materials and would be recycled to the extent feasible. The components of the plant would be deconstructed and recycled or disposed of in accordance with regulatory requirements. The site will be rehabilitated and can be returned to the current or other beneficial land-use.



Chapter 3



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3. Description of the affected/ receiving Environment

3.1 Environmental Attributes Associated with the project alternatives.

This section serves to provide a general description of the status quo of the receiving environment in the development area. It provides context within which the Scoping exercise was conducted. It also allows for an appreciation of sensitive environmental features and possible receptors of the effects of the proposed Project and provides a baseline against which impacts can be determined. The study area includes the entire footprint of the Project, including the proposed Solar PV Plant and the power line. A brief overview is also provided of the manner in which the environmental features may be affected (positively or negatively) by the proposed Project.

Significant environmental issues are discussed further in this chapter. These preliminary aspects and impacts are only discussed concisely on a qualitative level, as part of the Scoping Phase. The EIA Report a more detail and comprehensive evaluation of the potential impacts.

3.1.1 Surrounding Land Use

Current Status

The proposed Heuningspruit PV Solar Energy Facility is located near Koppies, Free State province, and is currently zoned as Agricultural. The land would need to be rezoned in-order to accommodate the proposed development. The Project's PV Site is currently vacant and was historically used for agricultural purposes. There are into four land capability classes in the Ngwathe Municipality area, each with specific limitations for field crops, risk of damage if they are used for crops, and response to management. The bulk of the land in the Ngwathe Municipality is arable, although only having medium (Class III) or low (Class IV) arable land capabilities. The land in these areas may be used for cultivated crops, but has severe limitations that reduce the choice of plants or require special conservation or management practices, or both. The capability of two areas of land in the north-western corner of the Ngwathe Municipality limits the use thereof largely to pasture, range, woodland or wildlife food and cover. An area with high grazing potential (Class V) is nearly level and has little or no erosion hazard, but has other limitations to cultivation that are impractical to remove and that restrict the kind of plants that can be grown and prevent normal tillage of cultivated crops. A small pocket of land (Class VIII) in the northern part of the Ngwathe Municipality has limitations that cannot be corrected, preclude its use for commercial plant production and restrict its use to recreation, wildlife, water supply or aesthetic purposes.

The project's proposed power line route will follow property boundaries. A section of approximately 1.7km of the route also runs alongside existing power lines before it connects to the Eskom Heuningspruit Rural 88/11kV Substation. As indicated, agriculture is the dominant land use in the project area. The following land uses are encountered around the Project's PV Site.

1. Businesses, such as Transnet and Senwes Grainlink Silo are located on the south-eastern part of the property
2. The Heuningspruit Police station located on the South-eastern part of the proposed development site.
3. The development is also located near Koppies,

Figure 3.1: Surrounding Land Uses Pictures



C: GRAZING LAND: Located on South-Eastern Part of the earmarked site	D: AGRICULTURAL LAND: Located on the Northern part of the earmarked site
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Potential Environmental Impacts

Solar power is generally regarded as one of the most land-intensive power generation technologies. However, layouts can be flexible as the systems are modular and the PV modules can be arranged to fit within most footprints. The earmarked land is suitable for the scale and requirements of the proposed project. The Project's proposed overhead power line will be aligned alongside property boundaries and the existing power lines as far as possible.

Most project of this calibre have 20-30 years life span. After the decommissioning and rehabilitation, alternative land uses, such as returning the land to back to its original grazing status, can be pursued.

Triggered Specialist Studies

Specialist studies to be included in the EIA Report that will consider land use and land cover include the following:

- Agricultural Impact Assessment.
- Water Resources Assessment
- Heritage and Cultural Impact Assessment.
- Terrestrial Ecological Impact Assessment.
- Visual Impact Assessment.

The project layout will incorporate the findings of the specialist studies conducted and will attempt to mitigate environmentally sensitive areas.

3.1.2 Climate

Current Status

The annual rainfall in the NLM area ranges between 600mm and 700mm per year. The NLM area is known for thunderstorms and rainfall distribution might at times be affected by the topography of the area. Mean annual temperatures ranges from 8°C to 22°C. However, temperatures might often rise to the mid-thirties on a hot summer's day and fall to below freezing point on a cloudless winter night (Ngwathe EMF; 2013)

Potential Impacts / Implications

- The Project proposes to generate energy from a renewable resource, by harnessing solar energy.
- The proposed site was found to be suitable for the development of the Solar PV Plant due to the local climate and good solar resource (irradiation) (amongst others).
- The development has considered the tracking system during operation phase.

- The efficiency of the facility could be adversely affected if the modules are soiled (covered) by particulates/dust. Soiling of modules will require an appropriate maintenance and cleaning plan.
- Climate change may impact on the Project through extreme floods, which may pose a risk to the facility's infrastructure.

Specialist Study Related to Climate

- The EMPr will make provision for the maintenance of the facility.
- Infrastructure will be developed outside of the 1:100-year flood line of any watercourse, to minimise.

3.1.3 Geology and Soil

Current Status

The NLM area is characterized by soil patterns made up of soils with a strong texture contrast, with plinthic horizons, well-structured soils with high clay content and some isolated rocky areas. Soils with a strong texture contrast are strongly structured soils with a marked clay accumulation and a reddish colour, while soils with plinthic horizons are iron-rich soils that are normally more than 15cm deep.

The study area consists of shallow duplex, vertic and melanic soils with a relatively high clay content. These attributes put the proposed development sites 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 (Dr L G Du Pisani).

According to the Land Type Survey Staff (1976 - 2006) the study area's geology can be categorized as Mainly Eccca shale and sandstone with dolerite sills, also Hekpoort lava, Ventersdorp lava and Adelaide Subgroup mudstone and sandstone. Mucina & Ruherford (2006) describe the geology as sedimentary mudstone and sandstone mainly of the Adelaide Subgroup (Beaufort Group, Karoo Supergroup) as well as those of the Eccca Group (Karoo Supergroup) (Dr L G Du Pisani).

Potential Impacts

The geotechnical characteristics determine the suitability of the PV Site in terms of foundations for structures and infrastructure.

Construction phase:

- Usage of heavy equipment during the construction phase could lead to soil compaction.

- Soil could be contaminated through inadequate storage and handling of hazardous materials, spillages from equipment and plant and poor management of waste, wastewater and cement mixing.
- Topsoil may be lost if not properly stripped and stockpiled for use during rehabilitation.
- Erosion may take place if stormwater is not adequately managed.
- Soil could be contaminated through inadequate storage and handling of hazardous materials, leaks from the BESS and poor management of waste and wastewater.

Operational phase:

- Soil erosion may take place if stormwater mitigation measures are not implemented adequately.
- There could be soil contaminated through inadequate storage and handling of hazardous materials, leaks from the Battery Storage Facility and due to poor management of waste and wastewater.

Triggered Specialist Studies

The findings from geotechnical investigations need to be taken into cognisance during the project design phase.

- Where required, the Geotechnical Impact Assessment will be undertaken, and the findings will be included in the EIA Report.
- The EMPr will contain measures to mitigate against impacts to soil, for example the management of topsoil, preventing soil contamination during construction, etc.

3.1.4 Hydrology

Current Status

Hydrology is a very important factor to consider when building PV Solar Facilities especially since the MLM is situated in one of South Africa's pivotal water management areas – the Upper Vaal management area, as published in terms of Government Notice 1160 of 1999 (NWRS, 2004).

The area is situated in the Highveld Eco-region that experiences early to late summer rainfall, with a mean annual precipitation (MAP) of 400mm –1000mm and mean annual runoff (MAR) of 5 to more than 250mm. Land use activities in the water management area are primarily extensive livestock farming and rain fed crop production, with some irrigation farming (NWRS, 2011).

Potential Impacts

- Construction phase: Groundwater could be contaminated through inadequate storage and handling of hazardous materials, spillages from equipment and plant and poor management of waste, wastewater and cement mixing.
- Operational phase: Erosion may take place if stormwater is not adequately managed.
- Utilisation of the on-site boreholes.

Triggered Specialist Studies:

The EIA Phase will investigate potential impacts to groundwater (e.g pollution during construction) and appropriate mitigation measures will be identified to manage potential implications. The proposed development will extract water from the current boreholes. Should, the water extracted exceeds the permitted threshold, a WULA will be applied for.

3.1.5 Topography

Current Status

The NLM is situated at an altitude ranging between roughly 1274 and 1611 meters above sea level. Due to the geological history of the area, the area is characterized by some ridges and valleys. The areas of higher altitude are characterised by ridges and upper slopes, while the areas of lower altitude are often characterised by flat and lower slopes. Valleys are located at differing altitudes and are relatively scarce in the NLM area. The ridges are especially significant due to their geological character and should be considered as sensitive features at all times.

Potential Impacts

Construction Phase

- The topography of the earmarked site is relatively flat which makes it suitable for the development of a large-scale Solar PV Plant.
- Potential visual intrusion of construction activities on the existing views of sensitive visual receptors in the rural landscape.
- Visual impacts might be caused by the transformation of the landscape.
- The areas cleared for construction purposes may be prone to erosion is not managed appropriately.
- Potential visual impact of night lighting during the construction phase on the nightscape of the region.
- According to research, from a glint and glare perspective, it has been noted that solar panels are designed to absorb, not reflect, irradiation.

Operational Phase:

- Potential landscape impact of introducing a large solar plant into a remote rural landscape.
- Potential visual intrusion of a large solar field on the existing views of sensitive visual receptors.
- Potential visual intrusion of tall, relatively large structures on the existing views of sensitive visual receptors.
- Potential impact of night lighting of the development on the relatively dark rural nightscape.

Triggered Specialist Studies

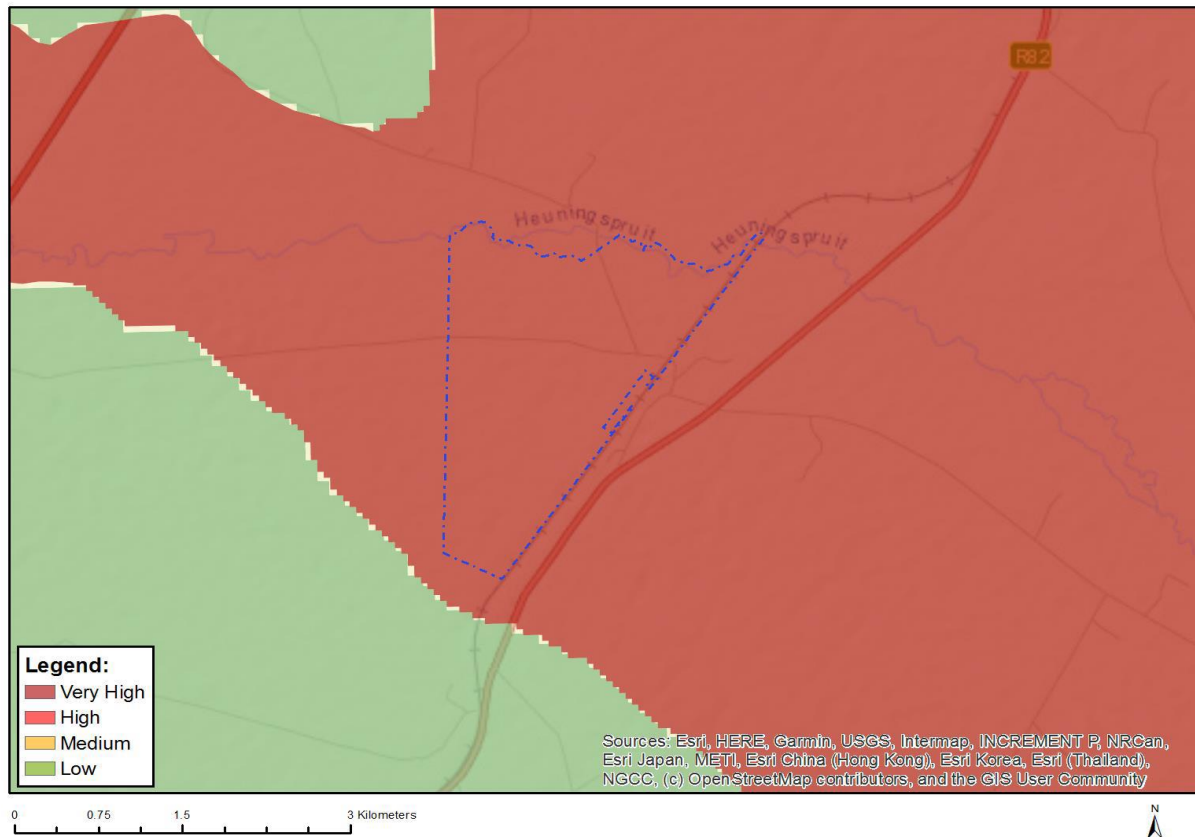
- The findings of the Visual Impact Assessment will be included in the EMPr and EIA Report. It must be noted that potential visual impacts were sourced from the area's Visual Impact Study conducted in 2013 by Sun Mechanics (Pty) Ltd.
- The EMPr will make provision for managing possible environmental impacts associated with this aspect during the construction, operational and decommission phases.

3.1.6 Surface Water

Current Status

Surface water resources in the study area comprise of perennial rivers and non-perennial rivers, wetlands and other water bodies. The most significant surface water features in the study area, which is of national significance, is the Vaal River, as well as the Renoster River and the Koppies dam. The tributaries in the area that supplies main rivers such as the Vaal should, however, also be acknowledged. Wetlands are furthermore distributed throughout the study area and should be regarded as sensitive to any activities that might contribute to their degradation (Ngwathe EMF; 2013). The DFFE Screening report identified the earmarked site as having a Very-High Sensitive aquatic biodiversity theme. See below the sensitivity map.

Figure 3.2 : Map of Relative Aquatic Biodiversity Theme Sensitivity



Potential Impacts

- **Construction Phase:** Surface Water could be contaminated through inadequate storage and handling of hazardous materials, spillages from equipment, and plant, cement mixing, poor management of waste, wastewater.
- **Operational Phase:** Possible soil erosion may take place if stormwater is not adequately managed.

Triggered Specialist Studies

- An aquatic study has been conducted, a draft report is attached to this Scoping Report as Appendix K.
- The EMPr will make provision for managing possible environmental impacts associated with this aspect during the construction, operational and decommission phases.

3.1.7 Terrestrial Biodiversity, Flora & Fauna, Avifaunal

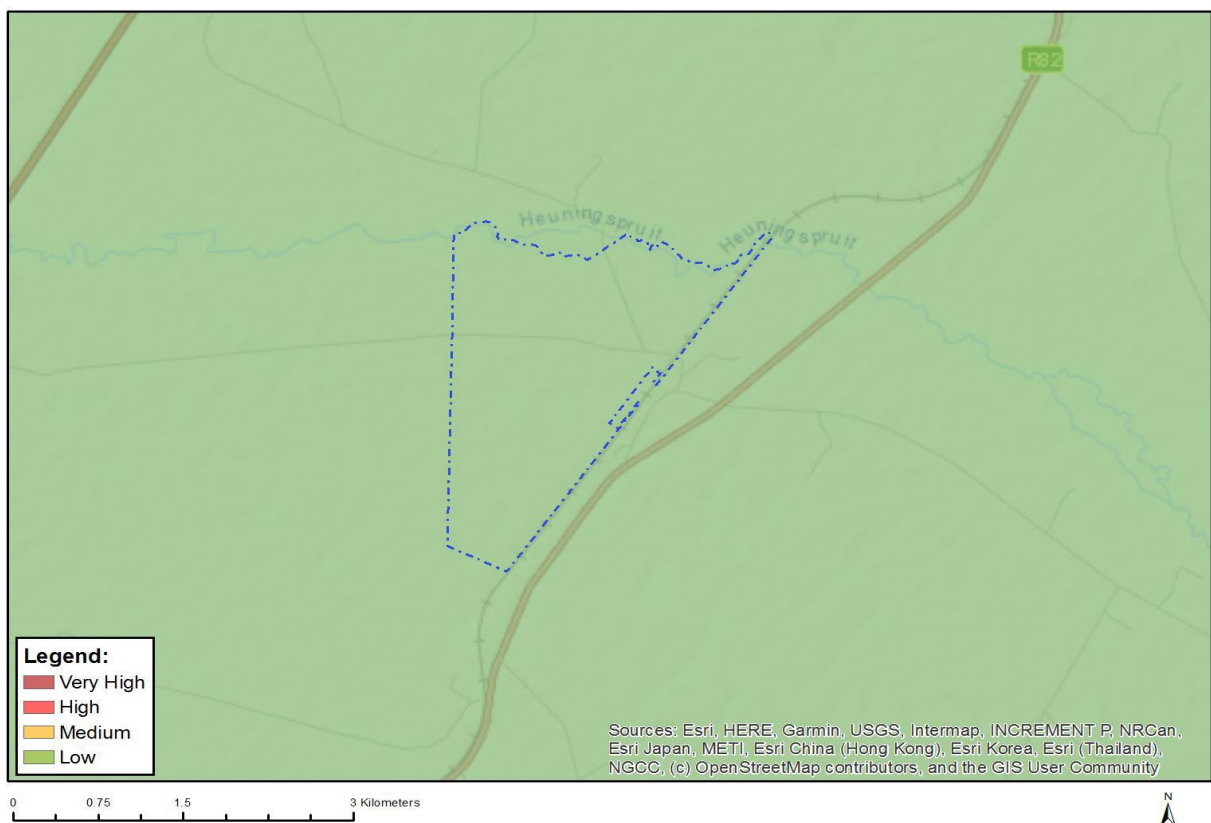
Current Status - Flora

Twelve broad vegetation types occur in the NLM. The most dominant vegetation type is the Central Free State Grassland, which covers approximately 56% (395,000ha) of the NLM area, followed by the Frankfort Highveld Grassland and Vaal-Vet Sandy Grassland, which respectively covers approximately 19% and 14% of the NLM area each.

Three other vegetation types cover more than 1% of the NLM, i.e. Vredefort Dome Granite Grassland (6%), Soweto Highveld Grassland (3%) and Eastern Free State Clay Grassland (1%). The remaining six vegetation types are the Andesite Mountain Bushveld, Bloemfontein Karroid Shrubland, Eastern Temperate Freshwater Wetlands, Gold Reef Mountain Bushveld, Highveld Salt Pans and Northern Free State Shrubland, each of which covers less than 1% of the study area (Ngwathe EMF; 2013).

The DFFE Screening report identified the earmarked site as having a low Sensitive Plant Species theme. See below the sensitivity map.

Figure 3.3: Map of Relative Plant Species Theme Sensitivity



Invasion Alien Plants

Category 1/1b under CARA and NEMBA invasive alien plant species were recorded on site (refer to figure 11 below).

Figure 3.4: *Opuntia microdasys* observed on site in high densities.



Current Status-Fauna

According to the study done by Mora Ecological Services, historical data of the Animal Demographic Units (ADU) Virtual Museum, shows the following fauna species occurring on site:

**Figure 3.5: List of mammal, reptile and amphibian species
(ADU Virtual Museum records using the 2727AD Quarter Degree Square)**

Reptiles

<i>Pseudaspis cana</i>
<i>Hemachatus haemachatus</i>
<i>Panaspis wahlbergii</i>
<i>Dasypeltis scabra</i>
<i>Duberria lutrix lutrix</i>
<i>Trachylepis punctatissima</i>

Amphibians

<i>Cacosternum boettgeri</i>



Image source: <https://nextgenherpetologist.co.za/2017/10/08/boettgers-caco-cacosternum-boettgeri/>

Mammals

Damaliscus pygargus phillipsi



Image source: <https://www.animal.photos/mamm4/antel-bles.htm>

Aepyceros melampus



Image source: <https://www.shadowsofafrica.com/impala-aepyceros-melampus>

Antidorcas marsupialis



Image source : <https://eleducation.org/resources/springbok>

According to the specialist report, none of the Mammalia, Reptile or Amphibian species are Red Data or of conservation concern.

Current Status-AviFauna

According to the SABAP2 species list in pentad 2725_2720, the estimated total of 102 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 2: List of avifaunal species recorded during February 2023 survey.

Scientific name	Common name
<i>Rhinopomastus cyanomelas</i>	Common Scimitarbill
<i>Anthus cinnamomeus</i>	African Pipit
<i>Microcarbo africanus</i>	Reed Cormorant
<i>Trachyphonus vaillantii</i>	Crested Barbet
<i>Polemaetus bellicosus</i>	Martial Eagle
<i>Buteo buteo</i>	Common Buzzard
<i>Columba guinea</i>	Speckled Pigeon

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<i>Passer melanurus</i>	Cape Sparrow
<i>Crithagra flaviventris</i>	Yellow Canary
<i>Spilopelia senegalensis</i>	Laughing Dove
<i>Streptopelia capicola</i>	Cape Turtle Dove
<i>Cisticola aridulus</i>	Desert Cisticola
<i>Macronyx capensis</i>	Cape Longclaw
<i>Melaenornis silens</i>	Fiscal Flycatcher
<i>Numida meleagris</i>	Helmeted Guineafowl
<i>Curruca subcoerulea</i>	Chestnut-vented Tit-Babbler
<i>Plocepasser mahali</i>	White-browed Sparrow-Weaver
<i>Tadorna cana</i>	South African Shelduck
<i>Ortygospiza atricollis</i>	African Quail-Finch
<i>Quelea quelea</i>	Red-billed Quelea
<i>Afrotis afraoides</i>	Northern Black Korhaan
<i>Vanellus coronatus</i>	Crowned Lapwing
<i>Prinia flavicans</i>	Black-chested Prinia
<i>Euplectes orix</i>	Southern Red Bishop
<i>Vidua macroura</i>	Pin-tailed Whydah
<i>Euplectes progne</i>	Long-tailed Widowbird
<i>Euplectes capensis</i>	Yellow Bishop
<i>Ardea cinerea</i>	Grey Heron
<i>Plegadis falcinellus</i>	Glossy Ibis
<i>Ardea melanocephala</i>	Black-headed Heron
<i>Bostrychia hagedash</i>	Hadeda
<i>Motacilla capensis</i>	Cape Wagtail
<i>Tricholaema leucomelas</i>	Acacia Pied Barbet

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<i>Mirafraga africana</i>	Rufous-naped Lark
<i>Pternistis swainsonii</i>	Swainson's Spurfowl
<i>Batis pririt</i>	Pirit Batis
<i>Plectropterus gambensis</i>	Spur-winged Goose
<i>Merops apiaster</i>	European Bee-eater
<i>Ploceus velatus</i>	Southern Masked Weaver
<i>Ploceus capensis</i>	Cape Weaver
<i>Crithagra atrogularis</i>	Black-throated Canary
<i>Hirundo rustica</i>	Barn Swallow
<i>Petrochelidon spilodera</i>	South African Cliff Swallow
<i>Apus affinis</i>	Little Swift
<i>Cecropis cucullata</i>	Greater Striped Swallow
<i>Polyboroides typus</i>	African Harrier-Hawk
<i>Lanius collaris</i>	Southern Fiscal
<i>Oena capensis</i>	Namaqua Dove
<i>Pycnonotus nigricans</i>	African Red-eyed Bulbul
<i>Riparia paludicola</i>	Brown-throated Martin
<i>Myrmecocichla formicivora</i>	Ant-eating Chat
<i>Melaniparus afer</i>	Grey Tit
<i>Elanus caeruleus</i>	Black-winged Kite
<i>Cisticola tinniens</i>	Levaillant's Cisticola
<i>Lamprotornis nitens</i>	Cape Glossy Starling
<i>Falco amurensis</i>	Amur Falcon
<i>Estrilda astrild</i>	Common Waxbill
<i>Micronisus gabar</i>	Gabar Goshawk

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<i>Threskiornis aethiopicus</i>	African Sacred Ibis
<i>Dendrocygna viduata</i>	White-faced Whistling Duck
<i>Anthoscopus minutus</i>	Cape Penduline Tit

Figure 3.6: Map of Animal Species Theme Sensitivity



Group-Species	Sensitivity
Mammalia- <i>Hydrictis maculicollis</i>	Medium

Figure 3.7: Map of Terrestrial biodiversity Theme Sensitivity



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

Potential Impacts:

Construction Phase:

- Loss of priority flora and fauna species from important habitats

Operational Phase

- Long-term or permanent degradation and modification of the receiving environment resulting to the loss of important habitats for species
- Loss of resident flora and fauna through increased disturbance

Decommissioning Phase

- Long-term or permanent degradation and modification of the receiving environment resulting to the loss of important habitats
- Displacement of resident fauna species through increased disturbance

Post Decommissioning Phase

- Long-term or permanent degradation and modification of the receiving environment resulting to the loss of important habitats for all animal and vegetation groups
- Cumulative displacement of resident fauna species
- Long-term or permanent degradation and modification of the receiving environment resulting to the loss of important habitats for flora and fauna species
- Spreading of invasive alien plants from margins. The altered environment will also favour species that are better adapted to disturbed/transformed areas.

Triggered Specialist Studies

- Terrestrial Biodiversity Impact Assessment has been conducted, report is included in Appendix K
- The EMPr will make provision for managing possible environmental impacts associated with this aspect during the construction, operational and decommission phases.

3.1.8 Air Quality

Current Status

There is a high level of concern about the direct and indirect adverse effects of atmospheric pollution on the environment and human health in South Africa (Andrew et al., 2012). Globally, South Africa is the world's 13th biggest emitter of greenhouse gases. It is clear that the highly polluted Vaal Triangle area, which is in close proximity to the NLM, will have an effect on some parts of the NLM due to dispersion. Although the effect may not be 100% accurate, due to micro climatic variables, there doesn't seem to be one pollutant that is more common for the NLM than the others (Ngwathe EMF; 2013).

Potential Impacts

Particulate pollution caused by crop production activities and gravel roads is potentially the biggest threat of air quality in the study area, and perhaps, from the Industry located in the Southern side of the proposed development. Renewable energy plants have very little impact, in terms of air pollution, Instead this type of development are employed to minimise air pollution as compared to coal-fired power stations.

Triggered Specialist Studies

- No specialist study is conducted in this regard, data was sourced from available information about the study area.
- The EMPr will make provision for managing possible environmental impacts associated with this aspect during the construction, operational and decommission phases.

3.1.9 Agriculture

Current Status

The proposed development is located in NLM. According to DFFE data, the grazing capacity of the natural grazing (veld) in the NLM is generally good and in some areas even very good.

The DFFE Screening report conducted, identified the earmarked site as having Medium and Very-High Sensitive Agricultural theme. See below the sensitivity map.

Figure 3.8: Map of Relative Agricultural Theme Sensitivity



Based on the study conducted by Dr Du Pisani, the best agricultural use for the study area is livestock farming with beef cattle, where the grazing takes place on the veld and lands established with perennial planted pastures. The current veld grazing capacity of the study area is estimated at 7 ha/LSU. The current grazing capacity of the veld is estimated to be 7 ha/LSU, mainly due to the shallow and clayey soils present. Based on these estimates the ~245ha site can therefore carry ~35 large stock units (LSU's), which is equivalent to 23 medium framed beef cows, which is negligible in terms of agricultural production and/or food security.

The 245ha proposed PV Energy site is therefore negligible in terms of agricultural production in the region and nationally. The study area does not consist of unique agricultural land and its conservation status is regarded as vulnerable.

Potential Impact

Construction Phase

- Possible impact on the normal day-to-day management of the livestock and the veld management system.
- Removal of vegetation and soil erosion
- Generation of dust and dust pollution

Operational Phase

- There could be oil, petrol, diesel and other hazardous contaminants used for vehicles and equipment's and for the cleaning of the PV arrays which could cause Soil and water contamination.
- Loss of agricultural / grazing potential

Triggered Specialist Studies

- Agricultural Impact Assessment has been conducted (Refer to Appendix K of the report for details).
- The EMPr will make provision for managing possible environmental impacts associated with this aspect during the construction, operational and decommission phases.

3.1.10 Socio-Economic Environment

Current Status

The discussion on the socio-economic context reflect the socio-economic profile of the area. This section aims at addressing the socio-economic profile of the area based on the following aspects:

- Household income
- Population

EIAR for the Proposed new Heuningspruit 50MW PV Solar Facility and Storage, Near Koppies, Free State Province

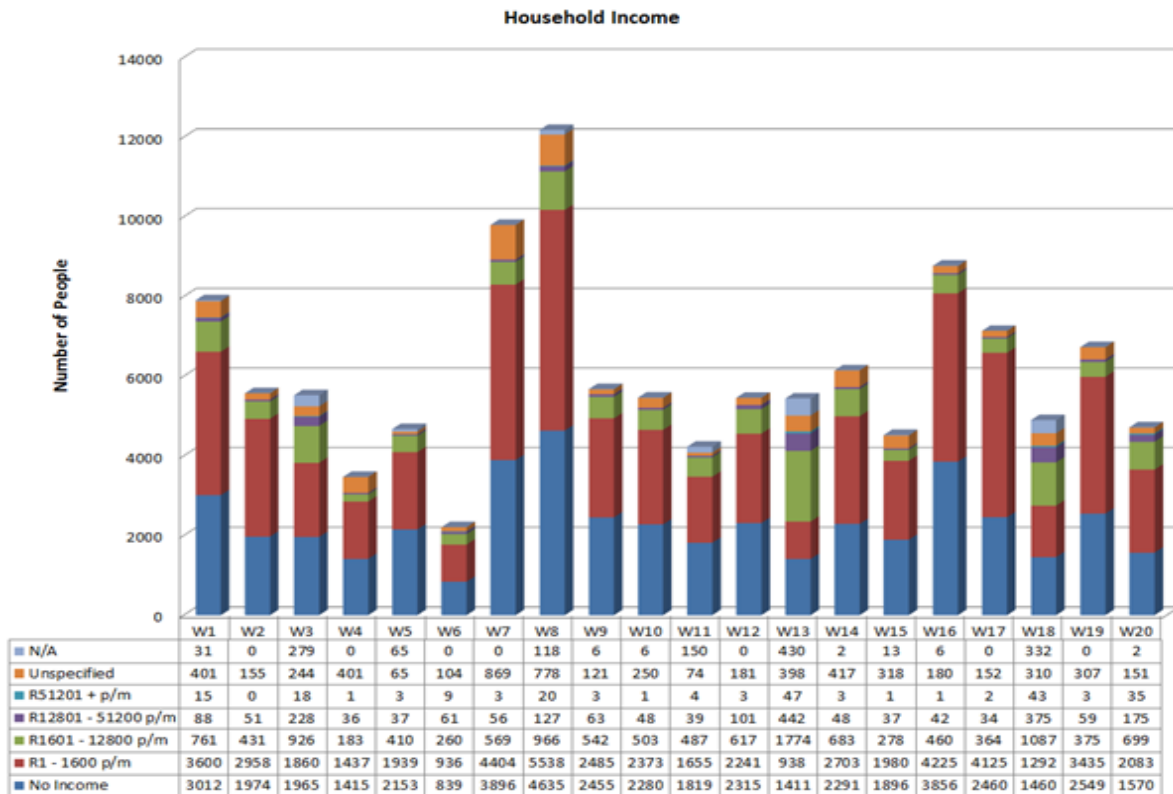
- Employment levels
- Levels of education

Household income

Current Status

Disposable income has a direct effect on economic development, especially with regard to economic activities dependent on the local population for success. Approximately 38% of all individuals in the NLM area do not have any income at their disposal whatsoever. When considering that 35% of the population are between the ages of 0 – 17, and assuming that none of these individuals is generating any income, it can be calculated that only 3% of individuals of 18 years and older do not generate any income. Of the remainder, 43% are generating less than R1 600 p/m, 10% between R1 601 and R12 800 p/m, 2% between R12 801 and R51 200 p/m and only less than 1% more than R51 201 p/m. It is clear that the average monthly (disposable) income per individual is relatively low in NLM. This might affect the manner in which individuals will have to rely on their physical environment through the harvesting of natural products for their day to day survival and should be considered in relation to environmental sensitivity.

Figure 3.9: The Graph reflecting the household Income of the study area



Source: Ngwathe EMF, 2013

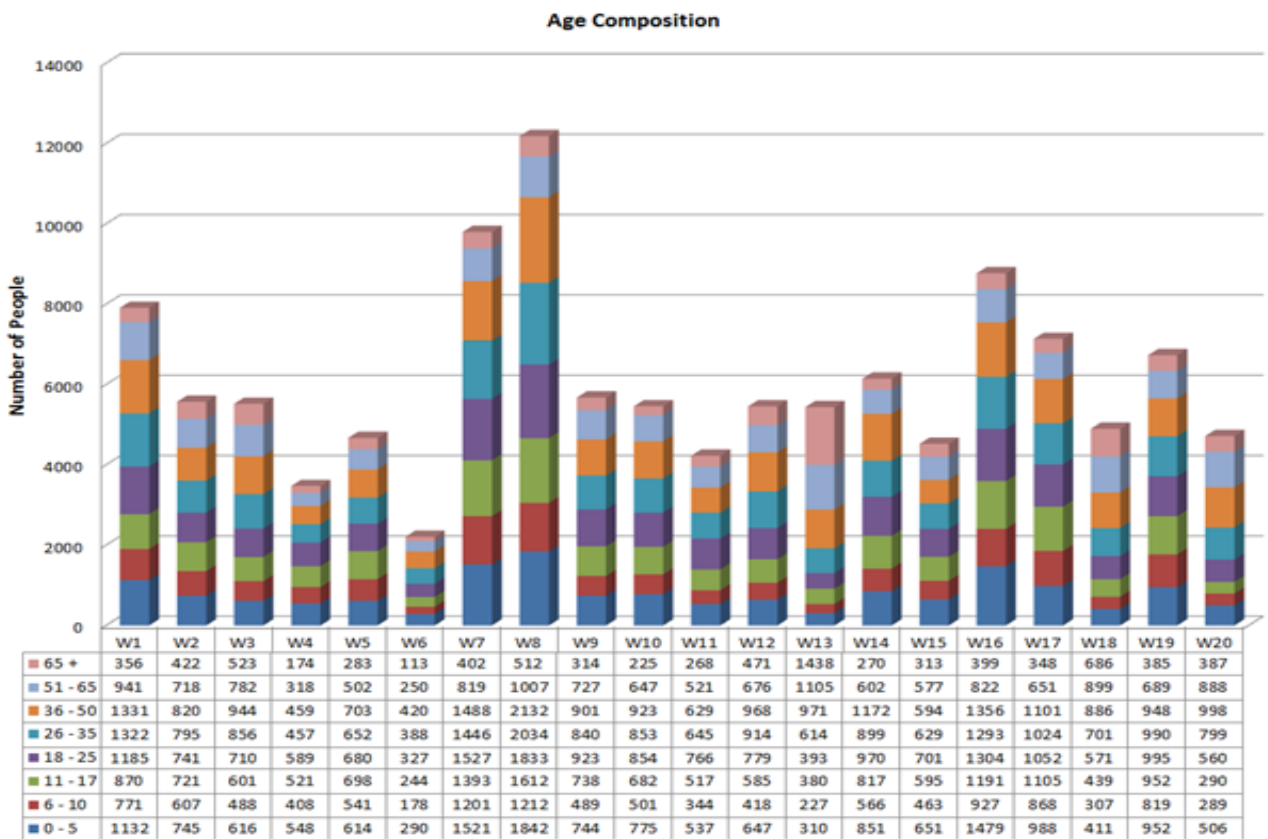
EIAR for the Proposed new Heuningspruit 50MW PV Solar Facility and Storage, Near Koppies, Free State Province

Population

According to the NLM EMF, 2013 rural areas are sparsely populated, with densities ranging between 0 to 10 people per km^2 . Higher population densities only occur in the urban areas around Parys, Vredefort, Koppies and Heilbron, with population densities of more than 2000 people per km^2 .

When analysing the total population size data at the ward level, it is clear that the population sizes in two wards in the north-western and south-western parts of the NLM, are less than 5 000 people and between 5 001 and 7 000, respectively. In only one ward in the eastern part of the NLM, the total population size is between 7 001 and 10 000 people. The age group 18 to 50 years, which is mainly responsible for economic activities in the area, represent almost 46% of the total population, with the age group 0 to 17 being the second largest with close to 35%.

Figure 3.10: The Graph reflecting the household Income of the study area

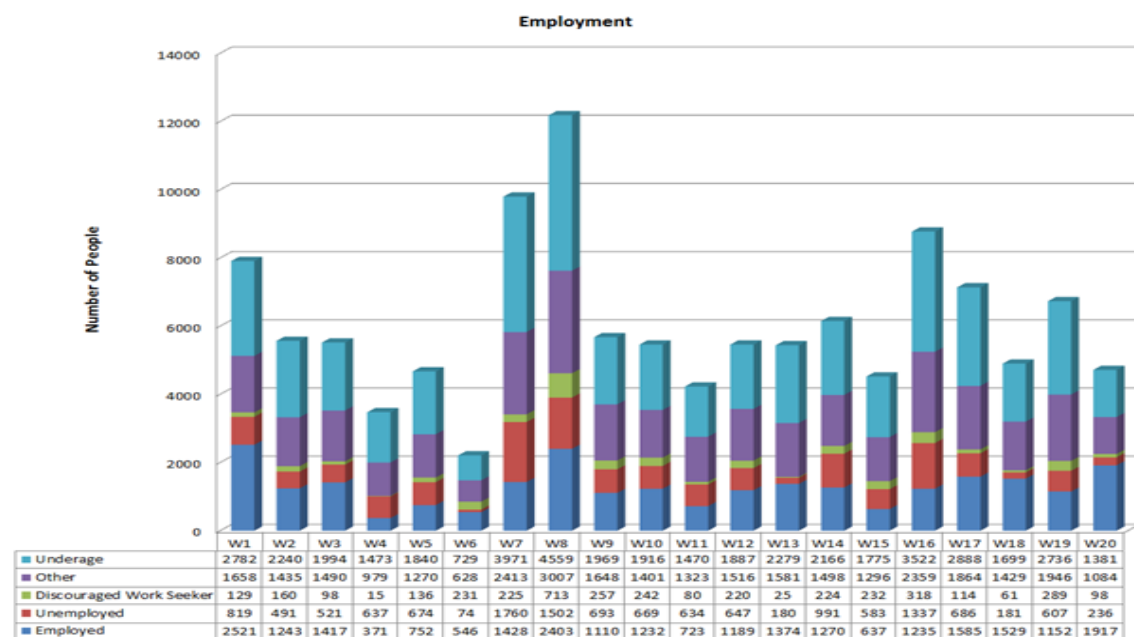


Source: Ngwathe EMF, 2013

Employment Levels

Almost a quarter (21%) of the available workforce in the NLM is employed to some extent, leaving the employment rate just below the national average of 25%. It is important to note that the 75% unemployed includes the underage segment of the population as well. On average 12% of all individuals older than 18 is unemployed, with 3% regarding themselves as discouraged work seekers. Of the 21% employed individuals, 68% work in the formal sector while 19% and 13% work in the informal sector and private households respectively. The segment of the workforce employed in the formal sector is rather high, which should have a positive effect on the overall economic development of the area.

Figure 3.11: The Graph reflecting the employment level of the study area

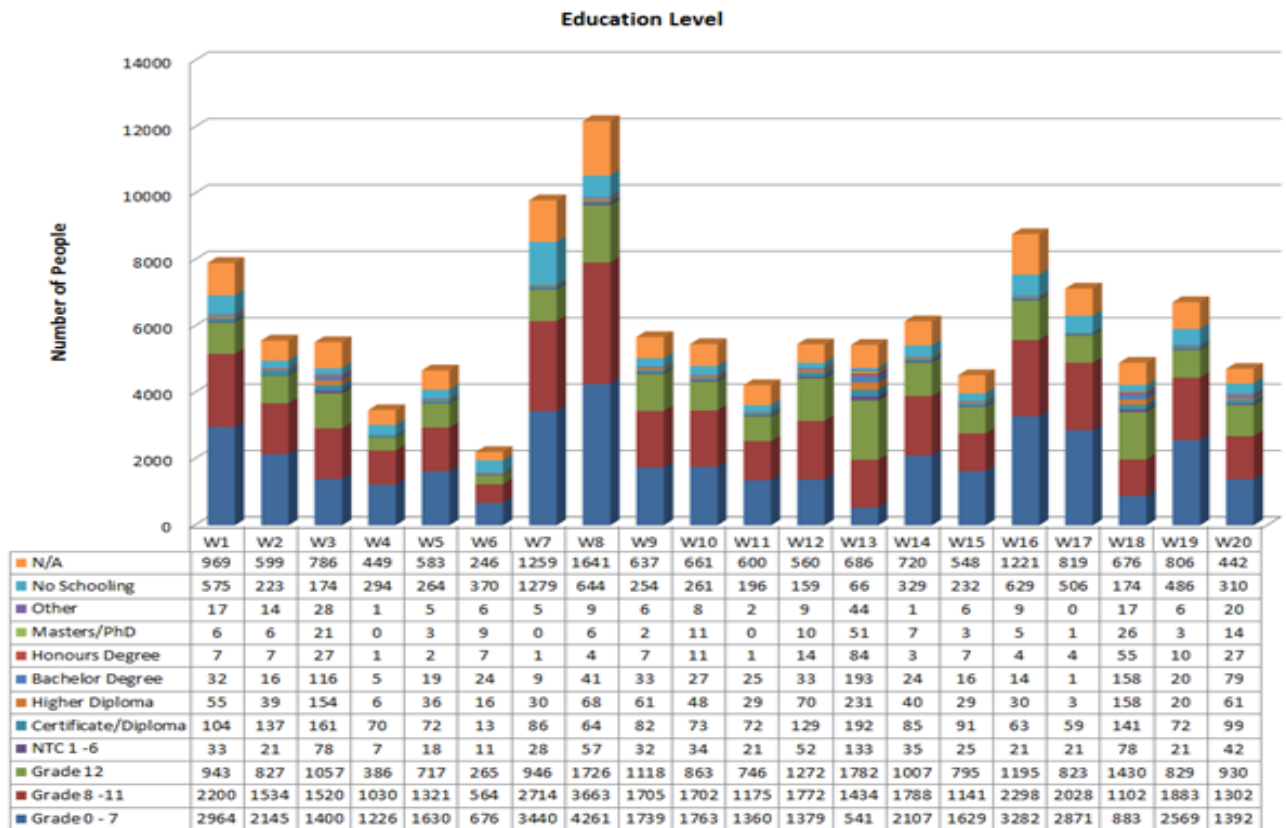


Source: Ngwathe EMF, 2013

Education Levels

There are a high number of people with Grade 0 – 11 in the NLM area. When comparing the number of people with Grade 0 – 11 with the number of people between the ages of 6 and 18 (currently at school), it is clear that approximately 54% of people within the Grade 0 – 11 bracket have the applicable grade as their highest qualification and are likely to improve this status. The remaining 45% have probably left school and will therefore in all likelihood not improve their highest qualification level. Overall the number of people with tertiary qualifications is lower (4%) than the national average of 12%. Although higher qualifications such as Honours, Master and Doctorate degrees are rare, with just over 1% of the population having graduated with these, it is only slightly lower than the national average of 1.2%. Finally, the number of people with no schooling at all (6%) is below the national average of 9% (Ngwathe EMF, 2013).

Figure 3.12: The Graph reflecting the educational level of the study area



Source: Ngwathe EMF, 2013

Potential Impacts

Construction and Operational Phases:

- Influx of jobseekers.
- Increased competition for urban-based employment.
- Increases in social deviance.
- Increases in incidence of HIV/AIDS or any other infections disease like COVID 19.
- Communicable diseases.
- Psychosocial disorder (e.g. social disruptions).
- Safety and security.
- Lack of appropriate health services.
- Expectations regarding jobs.
- Local spending.
- Local employment (Positive).
- Job losses at the end of the project life-cycle.
- Cultural conflicts, squatting, demographic changes.
- Safety and security.

- Visual impacts to surrounding communities.
- High level of traffic due to the use of local road networks.
- Nuisance from dust and noise.
- Consideration of local labourers and suppliers in area boosting the economy (Positive).
- Transfer of skills (positive impact).
- Post construction, the established Solar PV Plant would result in direct and indirect economic opportunities.

One of the most important aspects of social impact assessment, is the consideration of all landowners, including those from disadvantaged communities. In order to ensure equality, the status for possible land claims will be verified with appropriate government bodies to avoid future dispute. However, the project was also published on the local newspaper and notices placed at strategic points of the development area, including the Kroonstad Public Library.

Triggered Specialist Studies

- The findings of the Social Impact Assessment is included in as Annexure K5 of this report.
- The EMPr will make provision for managing possible environmental impacts associated with this aspect during the construction, operational and decommission phases.

3.1.11 Infrastructure found on site

The availability of infrastructure largely determines the development potential of a region. In the case of insufficient infrastructure, development will be more expensive and subsequently less likely, due to the cost of service provision that will have to be provided by individual developers. Good infrastructure will in this regard promote economic development, while poor infrastructure will hamper economic development.

Figure 3.13: The picture of Infrastructure in the study area

<p>Picture 1: Eskom Heuningspruit Substation, located on the Southern Part of the site</p>	<p>Picture 2: Powerlines Traversing the site on the South-Eastern Part of the site</p>
	
<p>Picture 3: Transnet Railway & Roads located on the Eastern part of the site</p>	
	

Access and internal roads

The identified site is accessible via the R82 from Kroonstad and the S155 bordering the site on the northern side. There are several internal farm access roads on the study area and the proposed site is easily accessible via these roads.

Powerlines and Substation

The earmarked site is located near the Heuningspruit Substation and 88KV Powerline. Several more powerlines traverse the site on the South-eastern part of the earmarked site as well as the South-western side. It should be easy to connect the proposed PV Solar Facility to the grid.

Potential Impact

The perceived impact may not reflect that of environment but could affect the economical aspect of the project if not attend to.

Triggered Studies

Where required, the EMPr has made provision for managing possible economic impacts associated with this aspect during the construction, operational and decommission phases.

3.1.11 Noise

Current Status

According to the local acoustical environment, the background noise levels are expected to be typical of a rural area. Noise in the greater area emanates primarily from farming operations (e.g., use of farming equipment), vehicles on the surrounding road network, human activities in surrounding settlements and trains passing on the railway.

Potential Impacts

Construction phase:

- Localised increases in noise may be caused by construction equipment, machinery and vehicles;
- Construction related vehicles, such as those collecting and delivering material and other equipment's
- General activities at the construction camp.

Operational phase:

- Solar PV facilities produce electricity during the daytime hours, when the sun's rays are collected by the panels.
- Equipment is significantly reduced. The main sources of noise from the Project will be the rack mounted inverters and the central step-up transformer, which are only expected to be audible to operational staff who will come near these components.

- Localised noise from operation and maintenance activities.

Triggered Specialist Study

- Noise that emanates from construction and operational activities has been addressed through EMPr.
- The EMPr has made provision for managing possible environmental impacts associated with this aspect during the construction, operational and decommission phases.

3.1.13 Heritage, Cultural and Paleontological

Current Status

The site for development is located in the Volksrust Formation (highly sensitive; orange) and the Quaternary alluvium along the river valley (moderately sensitive; green). The Volksrust Formation is the upper part of the Ecca Group (and lower Beaufort according to Johnson et al., 2020) and is predominantly argillaceous and the grey to black silty shale with thin, usually bioturbated siltstone or sandstone lenses and beds that occur mostly in the upper and lower boundaries. The very thick and fine-grained sediments represent an open shelf environment where muds were deposited from suspension with (Johnson et al., 2006) in a deep water environment. It is not known if this was an inland sea or open marine setting but the discovery of the marine bivalve, *Megadesmus*, (albeit one instance) about 25km west southwest of Newcastle in Volksrust Formation shales, points to a marine influence for at least part of the sequence (Cairncross et al., 2005).



Figure 3.14: SAHRIS palaeosensitivity map for the proposed Heuningspruit 50MW SEF shown within the red outline.

Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero

Potential Impacts

Archaeology and Cultural Landscape:

Construction and Operational Phases:

Heritage & Cultural

- Direct disturbance and/or destruction of archaeological material;
- Direct impacts to the landscape through introduction of industrial type facilities; and
- Direct disturbance and/or destruction of possible graves.

Palaeontology:

- Potential damage to or destruction of fossil heritage at or near the surface within the study area.
- According to Professor Marion Bamford, due to 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. The impact on the palaeontological heritage would therefore be low, as far as the palaeontological & heritage is concerned. However, should the 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.

Triggered Environmental Study

- Heritage, Cultural and Paleontological studies were conducted, triggered by the property sizes and DFFE screening report (Refer to Appendix K3 &4 for more details).
- The EMPr has made provision for managing possible environmental impacts associated with this aspect during the construction, operational and decommission phases.

3.2 Required Resources and services for Construction and Operational Phases

This section seeks to outline the resources that will be required to execute the proposed Project. It must be noted that the EMP will however, address the mitigation identified in detail, to ensure the appropriate environmental management during the Construction, Operational and Decommissioning Phases of the project.

3.2.1 Raw Materials

Construction Phase

Material required for construction phase, will include but not limited to the following; fencing and construction material (e.g. cement, sand, aggregate, etc.). This material will be purchased from suitable suppliers. The PV modules and other components of the PV Solar Facility will be sourced from accredited suppliers.

Operation Phase

During the Operational Phase, a few raw materials will be required. Material such as consumable spares will be used for the operation of the facility.

3.2.2 Water

Construction Phase

During construction, the Contractor will require water for potable use by construction workers and water will also be used in the construction of the foundations and other components of the Project. The necessary negotiations will be undertaken with the relevant landowners to obtain water from approved sources.

Operation Phase

Water use requirements for a Solar PV Plant during the operational phase depends on the technology and climate conditions at the site. In general, solar power technologies use relatively low volumes of water for cleaning solar collection and reflection surfaces like PV panels, as well as for domestic consumption by the staff.

Water will be supplied by the NLM, with a water connection to the site.

3.2.3 Sanitation

Construction Phase

Sanitation services will be required for construction workers in the form of chemical toilets, which will be serviced at regular intervals by the supplier.

Operation Phase

Sewage from the buildings and toilets across the site will be discharged into various septic tank systems. The soakaway systems will be designed with sufficient spare capacity to accommodate the possibility of excessive usage above the anticipated average. This option is the most cost-effective system for this Project. It is to be considered that a well-constructed and maintained septic tank should be odourless and problem free. Should the receiving environment be regarded as sensitive, then the use of honey sucker services from an independent contractor will be considered.

3.2.4 Waste

Construction Phase

Both general and Solid waste generated during the construction phase will be temporarily stored at suitable locations (e.g., at the construction camp) and will be removed at regular intervals and disposed of at licenced waste disposal sites.

Wastewater, which refers to any water adversely affected in quality through construction-related activities and human influence, will include the following:

- Sewage
- Water used for washing purposes (Grey water)
- Drainage over contaminated areas (e.g., workshop, equipment storage areas).

The constructor, assisted by the relevant environmental officer will take suitable measures to manage all wastewater generated during the construction period.

Operational Phase

Refuse generated during the operational phase will be removed on a weekly basis and will be disposed of at licenced waste disposal facilities for the area.

3.2.5 Roads

Construction Phase

Temporary access roads will be created during the construction phase. The areas affected by temporary roads will be reinstated, as they will not be used permanently in the operational phase.

Operational Phase

The Project site is accessible by the R82 from Kroonstad and the S155 bordering the site on the northern side of the earmarked site.

3.2.6 Stormwater

Construction Phase

Measures will be included in the EMPr to ensure best environmental practices will be implemented during construction to manage stormwater.

Operational Phase

The stormwater run-off along the main access road will be controlled by side swales and dispersed in a controlled manner at regular intervals. Stormwater run-off from the buildings will be disposed of through soakaways.

3.2.7 Electricity

Construction Phase

The appointed site contractor will be responsible for the supply of electricity during construction phase. The electricity supply will be obtained from diesel generators and / or temporary supply via cables from the site power grid.

Operational Phase

An energy mix strategy will be employed during operational phase of the development. The electricity will be supplied by the solar plant during daylight hours (off-peak times – 07:00 to 17:00). The BESS will supply electricity during night hours (peak times – 05:00 to 07:00 and 17:00 to 19:00). During unfavourable weather conditions like raining seasons and or winter electricity might be sourced from the power grid.

3.2.8 Laydown Areas

Construction

A laydown area will be required during the construction phase. The location of the laydown area is reliant on the preferred power line route that will be identified in the EIA Report.

3.2.9 Construction Workers

Construction

The appointed Contractor will mostly make use of skilled labour for the construction of the facility and its associated infrastructure. In those instances where casual labour is required, the applicant will ensure that such personnel are sourced from local communities, as far as possible.



Chapter 4



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FIGURES (No Figures)

N/a		
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TABLES (No tables)

N/a		
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4. Public Participation and EIA process

4.1 Details for Public Participation Process (PPP)

This section seeks to address the process of Public Participation that took place.

4.1.1 The purpose of public participation includes the following:

- To provide I&APs with an opportunity to obtain information about the development.
- To allow I&APs to express their views, issues, and concerns with regard to the proposed development.
- To grant I&APs an opportunity to recommend measures to avoid or reduce adverse impacts and enhance positive impacts associated with the proposed development.
- To enable the applicant to incorporate the needs, concerns, and recommendations of I&APs into the proposed development, where practical.

The public participation process is governed by the NEMA and the EIA Regulations. For this project, an announcement phase has been completed, and are currently busy with Scoping Reporting Phase, later on the EIAR Phase will be conducted as required by the competent authorities.

4.1.2 Land-Owners Consent

In terms of Regulation 39(1) of the EIA Regulations, if the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must, before applying for an Environmental Authorisation in respect of such activity, obtain the written consent of the landowner or person in control of the land to undertake such activity on that land.

This requirement does not apply *inter alia* for linear developments (e.g. pipelines, power lines, roads) or if it is a SIP as contemplated in the Infrastructure Development Act, 2014. Although not mandatory a consent form was acquired from landowner for the Heuningspruit 50 MW PV Solar Facility.

4.1.3 Database of I&APs

The database for I&APs, as required by section 40(2) of NEMA EIA Regulations, was prepared for the project and is contained in Appendix N. This database will be updated and maintained as part of the EIA process.

4.1.4 Project Announcement Phase

The Announcement Phase was undertaken from 7th December 2022 to 25th January 2023. The purpose for this phase was to obtain upfront comments from I&APs regarding the proposed development in-order to understand potential concerns and to guide the environmental assessment process.

The Project was announced as follows:

- Notices were placed in VrystaatKroon newspapers (refer to copies contained Appendix C1)
- Site notices were placed at strategic points within the Project Area (refer to details of the locations and photographs contained in Appendix C2)
- A Background Information Document (IID) were distributed to the I&APs contained in the database Appendix C3

Copies of comments received during the Announcement Phase are contained in Appendix C. Comments were incorporated into a Comments and Responses Register, provided in Appendix L, of the report.

4.1.5 Period to Review the Draft Scoping Report

Based on Regulation 43(1) of the NEMA EIA Regulations, I&APs were provided an opportunity to review and comment on the draft Scoping Report from 14th March 2023 until 16th of April 2023.

4.1.6 Notification of Review of Draft Scoping Report

Authorities and I&APs contained in the database were notified via email of the details about the review process.

4.1.7 Access to the Draft Scoping Report

A hardcopy of the draft Scoping Report was placed at the Kroonstad Public Library. The draft Scoping Report was also uploaded to the following website, for downloading purposes - www.ccrenewables.com/ [ccrenewables Facebook Page](#). Copies of the Draft Scoping Report was provided to all registered I&AP's, which included key regulatory and commenting authorities with jurisdiction powers.

The comment & response form was provided as Appendix L, which was used to provide comments and concerns on the draft Scoping Report.

4.1.8 Public Meeting to Present the Draft Scoping Report

A virtual public review meeting was conducted with all registered I&AP's, for the purpose of reviewing the Draft Scoping Report. A Zoom / or Teams link was shared with all stakeholders to grant them access accordingly.

4.1.9 COVID-19-related requirements and adherence process

It is the responsibility of all I&APs accessing the hardcopy of the draft Scoping Report to ensure compliance with the prevailing COVID-19-related protocols and requirements.

4.1.10 Comments received during Draft Scoping Reporting Process

The Scoping Phase serves to identify and prioritise issues for further assessment during the EIA Phase. Based on comments received from competent authorities and I&APs during public participation process, will be afforded due consideration and further investigation during the pending EIA stage. A Comments and Responses Report will be included in the final Scoping Report with the list of all issues raised by I&APs and the EAP response provided accordingly.

4.1.11 Public Participation during the EIA Phase

- The database of identified stakeholders, which includes authorities, different spheres of government (national, provincial, local), parastatals, stakeholders, landowners, interest groups, members of the public and I&APs, was maintained during the EIA phase (Refer to Appendix B).
- Period to Review the Draft EIA Report In accordance with Regulation 43(1) of the EIA Regulations, organs of state and I&APs are given an opportunity to review and comment on the draft EIA Report from Tuesday, 5th July 2023 until Thursday, 5th August 2023.
- Notification of Review of Draft EIA Report to all I&AP's /or stakeholders as contained in the database (refer to Appendix B) will be done through emails. Evidence of this notification will be included in the final EIA Report.
- I&APs' have access to a hardcopy of the Draft EIA Report will be placed at the Kroonstad Public Library. The Draft EIA Report will also be uploaded to the following website, for downloading purposes - <https://crenewables.com/EIA/Projects/> and [Facebook Page](#). Copies of the draft EIA Report will be provided to the following parties, which include key regulatory and commenting authorities with jurisdiction over the receiving environment:
 - DESTEA / DEFF
 - DWS: Free State Region;
 - DMRE;

- FSDPRT;
 - FSHRA / SAHRA
 - Ngwathe LM;
 - Fezile Dabi DM.
-
- Public Meeting to Present the Draft EIA Report to anyone who is interested in the project will be held virtually, during the last week of July 2023. Anyone interested to attend the meeting must inform CRRENEWABLES Pty Ltd in writing on or before the 24th of July 2023. Only pre-registered parties that confirmed interest will receive the zoom public meeting link to join the meeting in question.
 - Comments received on the Draft EIA Report will be updated with all comments received from organs of state and I&APs during the review period the Draft EIA Report. The updated comments report (Appendix L) will be appended to the final EIA Report that will be submitted to DESTEA.
 - Notification of DESTEA Decision: All registered I&APs will be notified of the final decision, as soon as DESTEA release it. The notification will include the appeal procedure to the decision and key reasons for the decision.



Chapter 5



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FIGURES (No Figures)

N/a		
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TABLES (No tables)

N/a		
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5. Details of All Alternatives Assessed

5.1 Site Alternatives

A site alternative refers to the identification of more than one potential sites 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 developer as being technically feasible. Therefore, no site alternatives have been considered, all options of the proposed development are identified within the two parallel farms, farm Voorspoed 1508 and Verdun 1511.

Motivation for the “No Site Alternative Decision”.

The following characteristics were considered in determining the feasibility and the Best Practicable Environmental Option (BPEO)

a. Site Extent - space is an important factor for the development of a PV facility. An area of approximately 150ha would be required for the 50MW facility. The proposed site, Voorspoed 1508, with a study area of 179 ha plus Verdun 1511 with a study area of 212 ha, will therefore be 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.

b. Land availability and Site access - The land is available for lease by the developer. The identified site is accessible via the R82 from Kroonstad and the S155 bordering the site on the northern side and is therefore appropriately located for easy transport of components and equipment as well as labour movement to and from the site.

c. Climatic Conditions - the economic viability of a PV facility is directly dependent on the annual direct solar irradiation values. The site has been demarcated as an area of high irradiation, 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 (i.e. a gradient of 3% or less). The slope of the proposed site is considered to be acceptable from a development perspective, which reduces the need for extensive earthworks and associated levelling activities, thereby minimising environmental impacts.

d. Grid Connection: Due to the proposed size and location of the facility, an 88KW connection to the Heuningspruit Rural Substation is the preferred option. A connection application has been made to Eskom.

e. Locality Alternative 1 (preferred alternative):

The proposed Heuningspruit PV 1 Facility is expected to be established on the farm Voorspoed 1508 and Verdun 1511, which is located 35km South West of Koppies in the Free State Province. The PV Arrays will have a developmental footprint of 150ha which is smaller than the broader site area (391ha). Therefore, the facility and associated infrastructure (i.e. PV panels, internal roads, etc.) can be appropriately located to avoid sensitive areas within the broader study area.

The extent of the site therefore allows for the identification of design, layout and siting alternatives within the site boundaries. Please refer to **Appendix D** for sites coordinates.

f. Powerline Alternative:

The co-ordinates for the proposed power line of 88KW to connect into the existing.

Eskom 88KV is provided below:

Starting point of the activity	Latitude (S)	27° 27' 0, 50"	Longitude (E)	27° 24' 39, 54"
Middle point	Latitude (S)	27° 27' 0, 67"	Longitude (E)	27° 24' 45, 85"
	Latitude (S)	27° 26' 48, 00"	Longitude (E)	27° 24' 53, 61"
Ending Point	Latitude (S)	27° 26' 49, 73"	Longitude (E)	27° 24' 57, 18"

5.2 Layout Alternatives

Description:

The proposed Heuningspruit PV 1 Facility is expected to have a developmental footprint (150 ha) which is smaller than the broader area (391 ha). Therefore, the facility and associated infrastructure (i.e. PV panels, internal roads, etc.) can be appropriately located to avoid sensitive areas within the broader study area. The extent of the site therefore allows for the identification of design layout and siting alternatives within the site boundaries. The process is still at its feasibility stage, the final site layout with all associated PV Solar Facility Infrastructures will be submitted to the department when engineering drawings and survey are completed.

5.3 Technology Alternatives

Where the “activity” is the generation of electricity, possible reasonable and feasible land-use alternatives for the proposed properties would include Biomass, Hydro Energy and Wind Energy, but, based on the preliminary investigations undertaken by the project applicant, no other renewable energy technologies were found to be appropriate for the earmarked site.

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 as would be required for concentrated solar power technology (CSP). In addition, PV technology is considered more feasible from a technical perspective at this scale of development (i.e. 50MW). PV is also preferred when compared to CSP technology because of the lower visual profile.

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, such 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.

There are a number of different solar PV technologies, i.e.:

- Fixed / static PV panels;
- Tracking PV panels (with solar panels that rotate to follow the sun's movement);
- Concentrated PV Plants (CPV technology).

Fixed or single-axis tracking PV is being considered for the proposed Heuningspruit PV Solar Facility. The final preferred option will be informed by financial, technical and environmental factors.

5.4 Operating Alternatives

This refers to the manner in which a proposed facility would function. For example, should a wind energy facility prove problematic for avifauna during migrating periods, an operating alternative of switching off certain turbines during those times could be proposed. No operating alternatives would be applicable to the proposed solar energy facility as there are no feasible means of alternative operation for a facility of this nature.

5.5 The No-Go Alternative

5.5.1 No-go Alternative

This is the option of not constructing Heuningspruit 50 MW PV Solar Energy Facilities and Storage. This option is assessed as the “no go alternative” in this Scoping Report. 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. Further, load-shedding challenge is a reality at Ngwathe Local Municipality, and entire nation. Global warming and climate change challenges are a reality, hence the renewable energy solution is of utter most importance.

5.5.2 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-development option is therefore not a suitable option for this project, given the negative impacts related to it.



Chapter 6



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6. ENVIRONMENTAL IMPACT ASSESSMENT

6.1 General Issues

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 Heuningspruit 50MW 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.

6.2 Impacts associated with Listed Activities

The development of a 50 MW PV Solar Facility, outside an urban edge, require an Environmental Impact Assessment Reporting (EIAR) Process as contemplated in GNR. 325, Section 1, of Environmental Impact Assessment Regulations Listing Notice 2 of 7 April 2017

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

Table 6.1: Listed Activities triggered by the project and their Impacts

Listed Activities Anticipated	Potential Environmental Impacts
<p>GN R325; Listing Activity 1:</p> <p>The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or</p>	<p>The generation capacity of the proposed development is 50MW.</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

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<p>infrastructure is for photovoltaic installations and occurs —</p> <p>(a) within an urban area; or</p> <p>(b) on existing infrastructure.</p>	<p>used for agricultural purposes, outside of an urban area.</p> <ul style="list-style-type: none"> • 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) • Potential loss of sensitive environmental features (e.g. sensitive fauna and flora species). According to the Terrestrial Biodiversity Study conducted by MORE Ecological Services, the larger part of the development is located on CSA1, while a smaller part on ESA1.
<p>GN R325; Listing Activity 4</p> <p>The development and related operation of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.</p>	<p>The proposed development might have a battery Storage (BEES) of more than 500 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>(ii) infrastructure or structures with a physical footprint of 100 square metres or more; where</p>	<p>The proposed development will surely have infrastructure / structure with a physical footprint of 100 square meters, and these may occur within a watercourse.</p>

<p>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>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>a) will occur behind a development setback;</p> <p>b) is for maintenance purposes undertaken in accordance with a maintenance management plan;</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>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 01April 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 residential, mixed, retail, commercial, industrial or institutional purposes.</p>	<p>The proposed 50MW PV Solar facility is regarded as a commercial facility. The total development footprint exceeds 1ha and is located outside the urban edge.</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.

	<ul style="list-style-type: none"> • 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, where possible. • Socio-economic impacts associated with construction activities (Such as noise, visual impact etc) • Potential loss of sensitive environmental features (e.g. sensitive fauna and flora species). According to the Terrestrial Biodiversity Study conducted by MORE Ecological Services, the larger part of the development is located on CSA1, while a smaller part on ESA1.
<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>(b) 2 kilometres or shorter in length;</p> <p>(c) within an existing transmission line servitude; and</p>	<p>The capacity of the proposed 250 m connecting (from DC switch station – to AC substation) power lines will be 88KV/11 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 where possible. • Socio-economic impacts associated with construction activities (Such as noise, visual impact etc)

(d) will be removed within 18 months of the commencement of development.	<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 150 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.

6.3 Issues raised by Environmental Authorities and IAPs

A few issues were raised during Scoping Reporting Phase by the authorities and other interested and affected parties pertaining to the environmental Impacts of the proposed development. Kindly see details of issues raised in Appendix L of the EIAR.

6.4 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.

Table 6.2: Potential Environmental Impacts of different Project Activities

Pre-construction

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

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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	Legal Contraventions

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		compliance monitoring process causing the project to start without required permits	
	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

Project Phase: Construction

Activities related to Construction Phase (PV Solar Facility, P powerline & Switching Station /or Sub- 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

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	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)

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	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

Project Phase: Operation

Activities related to Operational Phase (PV Solar Facility)	Activities	Aspects	Impacts
	Powerline / Switching Station/ or substation Maintenance	Driving to sites Vegetation clearance on the servitude	Air pollution (Dust & Emissions) Impact on Flora / Fauna Noise pollution

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	PV Solar Facility Maintenance	Driving to sites (Using diesel driven vehicles / trucks/ machinery) Vegetation clearance around and inside the substation / Solar Arrays yards	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)

6.5 Impact Assessment Methodology

6.5.1 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
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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

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.

6.5.2 Impact Mitigation

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).

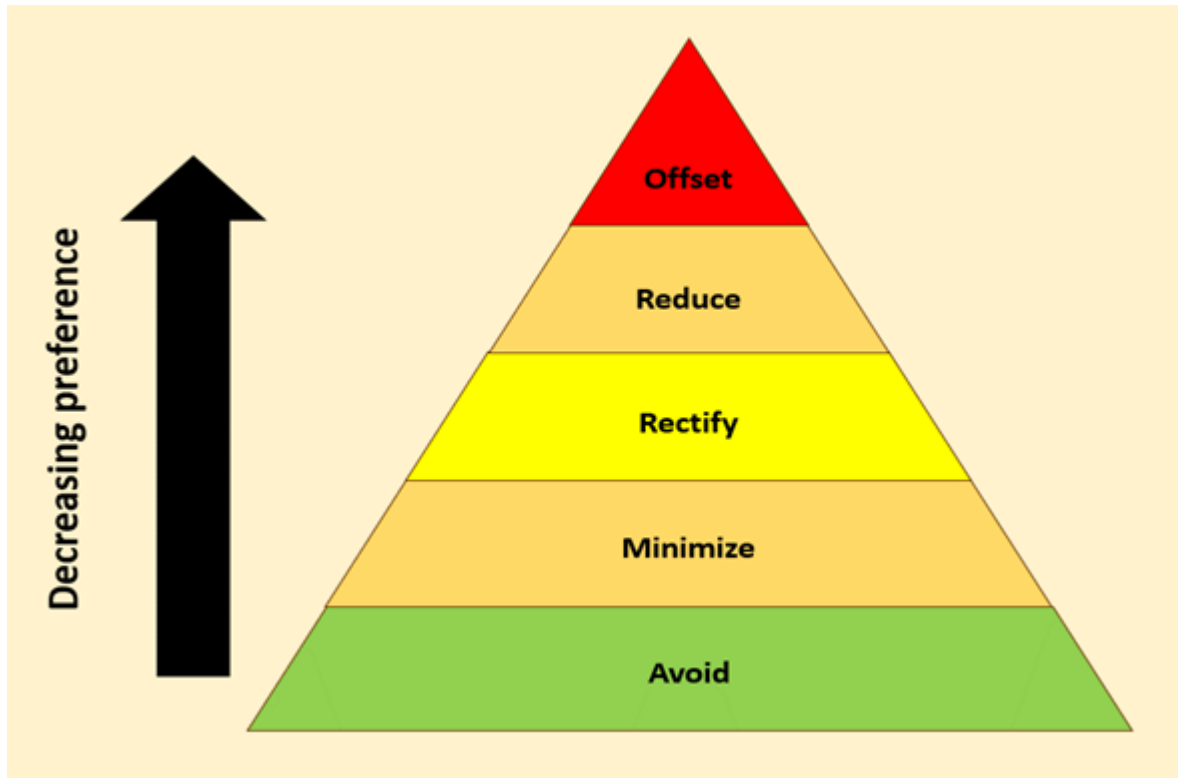


Figure 6.1 : Mitigation Measure Hierarchy

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

6.6 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. 326 of 7 April 2017 (As amended).

The EMPr of the proposed development is provided in Appendix G of the report.

6.6.1 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 6.3: Showing the Significant Environmental Impact Assessment- S&EIR Phases

SIGNIFICANT ENVIRONMENTAL IMPACT ASSESSMENT																								
Project Name	The proposed Heuningspruit 50 MW PV Solar Facility																							
Compiled by	Cate Rapudi																							
Date	Mar-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 the project is taking plac. The developer must avoid unnecessary clearance of vegetation						1	1	2	1	1	5	L	Refer to the Specialist Study done & recommendations (Annexure K2 & G-EMPr)

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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 if any. 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 Terrestrial Biodiversity Specialist Study done & recommendations	
			Impact on Fauna	2	2	2	2	3	11	H	Avoid habitat destructions , Contain all construction & Operational within the boundaties of the specified area	1	1	2	1	1	5	M	Refer to the Terrestrial Biodiversity Specialist Study done & recommendations.(Annexure K2 & G-EMPr)	
			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 & Agricultural studies recommendations done and the EMPr.	1	1	2	2	1	6	M	Refer to the Specialist Study done & recommendations.(Annexure K6 & G-EMPr)	
	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 land degradation , Contain all operational activities within the boundaties of the specified development area. Adhere to the Agricultural study recommendations done, included in the EMPr as well.	1	1	2	1	1	5	L	Refer to the Specialist Study done & recommendations.(Annexure K6 & G-EMPr)	
			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, and the EMPr mitigation measures	1	1	2	2	1	6	M	Refer to the Agricultural Specialist Study done & recommendations. (Annexure K6 & G-EMPr)

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Topography	Construction Phase	Powerline /Solar Arrays / Substation construction	Visual/Aesthetic Impacts	3	1	2	3	3	11	H	Professional services of a landscape architect should be employed, Green buffer zones should be reserved or created and maintained at critical areas surrounding the facilities (where necessary). Clearing of vegetation for servitudes should be restricted. The substation station site should be properly screened to avoid / minimise visual impacts.	2	1	2	2	2	8	M	Refer to the Specialist Study done & recommendations.(Annexure K7 & G-EMPr)
		Construction of PV Arrays on site	Visual/Aesthetic Impacts	3	1	2	3	3	11	H	Clearing of vegetation should be restricted to arrays footprint. Where possible the site should be properly screened to avoid / minimise visual impacts.	2	1	2	2	2	8	M	Refer to the Specialist Study done & recommendations.(Annexure K7 & G-EMPr)
		Construction BEES facility	Visual/Aesthetic Impacts	3	1	2	2	2	9	M	Professional services of a landscape architect should be employed, Green buffer zones should be reserved or created and maintained at critical areas surrounding the facilities (where necessary).	2	1	1	1	1	5	L	Refer to the Specialist Study done & recommendations . (Annexure K7 & G-EMPr)
Heritage/ Cultural & Paleontological Issues	Construction and Operational Phases	Disturbance of Heritage sites / Paleontological Features	Social Impact	2	2	2	3	3	12	H	A heritage & paleontological Impact studies were done. According to the specialist report Grave Yards / Cementries have been recorded on site 1 (section 8 of the report) and they 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	1	1	2	1	1	5	L	Refer to the Specialist Study done & recommendations. (Annexure K4 & G-EMPr)

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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	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	1	1	2	1	1	5	L	Refer to the Specialist Study done & recommendations.(Annexure K5 & G-EMPr)
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	1	1	5	L	Refer to the Specialist Study for more details.(Annexure K6 & G-EMPr)
	Construction Phase	Loss of priority flora and fauna species from important habitats during site clearance for construction of PV	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 for more details.(Annexure K6 & G-EMPr)
	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 for more details.(Annexure K6 & G-EMPr)
		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 electrocution and bird collision	1	1	2	3	2	8	M	Refer to the Specialist Study for more details (Annexure K6 & G-EMPr)

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Surface Water/ Acquatic	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 & 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 for more details (Annexure K1 & G-EMPr)
		Emissions	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	1	1	5	L	Specialist Study to provide more details during EIA process (Annexure G-EMPr)

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Surface Water/ Acquatic	Operational Phase	Operation of Sewage facilities	Soil Pollution	2	3	3	3	3	15	H	Control by: * Correctly sizing, designing and constructing of the facility; and * Groundwater monitoring	1	1	2	3	2	8	M	Refer to the Aquatic Study Conducted (Annexure G-EMPr)
			Social Impact	2	3	3	3	3	15	H		1	1	2	3	2	8	M	Refer to the Aquatic Study Conducted (Annexure G-EMPr)
			Ground water Pollution	2	3	3	3	3	15	H		1	1	2	3	2	8	M	Refer to the Aquatic Study Conducted (Annexure G-EMPr)
		Fuel Usage and Storage of hazardous Substances (possible Spillages)/ BESS strage facility	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 Aquatic Study Conducted.(Annexure K1 & G-EMPr)
			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	1	1	5	L	Refer to the Aquatic Study Conducted.(Annexure K1 & G-EMPr)
		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	1	1	5	L	Refer to the Aquatic Study Conducted.(Annexure K1 & G-EMPr)
			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	1	1	5	L	Refer to the Aquatic Study Conducted.(Annexure K1 & G-EMPr)
			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 Social Impact Study Conduced/ EMPr
			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 for more details/ EMPr

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Social Issues	Construction Phase	Influx of jobseekers	Social Impact	3	2	3	3	3	15	H	Some community members will find Jobs during construction phase (positive Impact) The findings of the Social Impact Assessment must be adhererd to.	1	1	2	1	2	6	M	Refer to the Specialist Social Impact Study for more details.(Annexure K5 & G-EMPr)
	Operational Phase	Job losses at the end of the project life-cycle	Social Impact	3	2	3	3	3	15	H	Those who had temorary 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 for more details.(Annexure K5 & G-EMPr)
		Communicable Diseases	Social Impact	3	2	3	3	3	15	H	All working on site must take pre-cautionary measures to minimise or avod the spread of communicable diseases. The findings of the Social Impact Assessment must be adhererd to.	1	1	2	3	2	8	M	Refer to the Specialist Study for more details.(Annexure K5 & G-EMPr)
		Tourism / More Visitors in the area due to the new plant	Social Impact	2	3	2	3	3	14	H	The findings of the Social Impact Assessment must be adhererd to.	1	1	2	3	2	8	M	Refer to the Specialist Study for more details.(Annexure K5 & G-EMPr)
Noise Issues	Construction Phase	Transportation	Social Impact (Traffic Impact)	2	3	2	3	3	14	H	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	3	2	8	M	Refer to the Specialist Study for more details.(Annexure K5 & G-EMPr)
	Operational Phase		Noise Pollution	2	3	2	3	3	14	H	All activities should be conducted within normal working hours	1	1	2	3	2	8	M	Refer to the Specialist Study for more details(Annexure G-EMPr)

6.7 Scoping/ EIAR Phase Specialists Studies conducted.

This section presents the studies conducted, Impact description, Impact Assessment and mitigations there-of.

6.7.1 Aquatic Biodiversity (Aquatic and Flood line Assessment)

6.7.1.1 General

According to Mora Ecological Services, the PV arrays which are proposed to be located on northern part of Portion 1511 will be located within the floodplain wetland. The impacts of the PV panel are expected to be severe, as vegetation be cleared, and wetlands will be traversed where the northern arrays are placed. Only arrays placed on the southern portion are acceptable.

This finding will be taken into consideration when presenting the final project lay-out, during the EIA phase, to ensure the position of solar arrays is completely out of sensitive zone.

6.7.1.2 Impact Description

Compaction, Soil Erosion and Sedimentation

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.

6.7.1.3 Impact Assessment

The Impact assessment was done using the below methodology:

Risk rating tables and methodology for the risk assessment

SEVERITY

How severe does the aspects impact on the resource quality (flow regime, water quality, geomorphology, biota, and habitat)?

Insignificant / non-harmful	1
Small / potentially harmful	2

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Significant / slightly harmful	3
Great / harmful	4
Disastrous / extremely harmful and/or wetland(s) involved	5
Where "or wetland(s) are involved" it means that the activity is located within the delineated boundary of any wetland. The score of 5 is only compulsory for the significance rating.	

SPATIAL SCALE

How big is the area that the aspect is impacting on?

Area specific (at impact site)	1
Whole site (entire surface right)	2
Regional / neighbouring areas (downstream within quaternary catchment)	3
National (impacting beyond secondary catchment or provinces)	4
Global (impacting beyond SA boundary)	5

DURATION

How long does the aspect impact on the resource quality?

One day to one month, PES, EIS and/or REC not impacted	1
One month to one year, PES, EIS and/or REC impacted but no change in status	2
One year to 10 years, PES, EIS and/or REC impacted to a lower status but can be improved over this period through mitigation	3
Life of the activity, PES, EIS and/or REC permanently lowered	4
More than life of the organisation/facility, PES and EIS scores, a E or F	5
PES and EIS (sensitivity) must be considered.	

FREQUENCY OF THE ACTIVITY

How often do you do the specific activity?

Annually or less	1
6 monthly	2
Monthly	3
Weekly	4
Daily	5

FREQUENCY OF THE INCIDENT/IMPACT

How often does the activity impact on the resource quality?

Almost never / almost impossible / >20%	1
Very seldom / highly unlikely / >40%	2
Infrequent / unlikely / seldom / >60%	3
Often / regularly / likely / possible / >80%	4
Daily / highly likely / definitely / >100%	5

LEGAL ISSUES

How is the activity governed by legislation?

No legislation	1
Fully covered by legislation (wetlands are legally governed)	5
Located within the regulated areas	

DETECTION

How quickly/easily can the impacts/risks of the activity be observed on the resource quality, people and property?

Immediately	1
Without much effort	2
Need some effort	3
Remote and difficult to observe	4
Covered	5

Mitigation measures

- 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.
- 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.
- Refer to Annexure K1, section 7.1.2 for a full list of mitigation measures recommended.

6.7.1.3 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.

6.7.1.4 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.

Please Refer to Annexure K1, section 7.3.2 for a full list of mitigation measures recommended.

6.7.1.5 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.

Please Refer to Annexure K1, section 7.4.2 for a full list of mitigation measures recommended.

Cumulative impact on wetlands

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

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.

6.7.2 Terrestrial Biodiversity (Fauna, Flora & Avifauna)

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.

6.7.2.1 Description of Impact

According to the specialist report, potential impacts were evaluated against the data captured during the fieldwork to identify relevance to the project area, specifically the proposed prospecting footprint. Impacts were assessed in terms of the construction, operational, decommissioning, rehabilitation and closure phases. The operational phase refers to that phase of the project where the prospecting is being conducted and once complete, the decommissioning phase will begin.

6.7.2.2 Impact Assessment Rating

Table 6.4: Impact rating scoring used.

Points	Impact significance rating	Description
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive low impact	The anticipated impact will have minor positive effects.

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29 to 50	Negative medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative high impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive high impact	The anticipated impact will have significant positive effects.
74 to 96	Negative very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive very high impact	The anticipated impact will have highly significant positive effects.

The aim of conducting a risk assessment is to identify the impacts that the current activity, as well as that of the operational phase of which the proposed project will have on the receiving terrestrial environment. If avoidance is not possible, recommendations and practical mitigation measures are mandatory. Only Low Risk Activities located within the regulated area of the receiving environment will qualify for the proposed project. Considering the proposed project, buffer zones were suggested that mitigation techniques will be advised to ensure that threats are kept to a minimum (MORA Ecological Services).

Table 6.5: Impact Assessment Ratings & Required Mitigations

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

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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		

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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

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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

It must be noted that not all impacts and mitigations are provided in this section. A full report and recommendations can be found in Annexure K2 of the report.

No-go Areas, Buffers, and Alternatives

No no-go areas or buffers are applicable for this study.

Conclusion

According to the specialist, from the survey conducted, there are no evident fatal flaws that would prevent this development from being authorised, nor being conducted in a sustainable manner. It is therefore the opinion of the specialist that the proposed development be considered, provided that all mitigations and recommendations are strictly followed. Overall, the impacts associated with this proposed solar facility are considered Low-Medium.

6.7.3 Paleontological

General

The project lies in the central part of the main Karoo Basin where some of the basal sediments are preserved.

Impact Description

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the right age but wrong type to contain fossils.

Impact Assessment

Below is the Criteria used for assessing the Impact.

Table 6.6: Criteria for assessing Paleontological Impacts

PART A: DEFINITION AND CRITERIA		
Criteria for ranking of the SEVERITY/NATURE of environmental impacts	H	Substantial deterioration (death, illness or injury). Recommended level will often be violated. Vigorous community action.
	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
M		Reversible over time. Life of the project. Medium term
H		Permanent. Beyond closure. Long term.
	L	Localised - Within the site boundary.
	M	Fairly widespread – Beyond the site boundary. Local

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Criteria for ranking the SPATIAL SCALE of impacts	H	Widespread – Far beyond site boundary. Regional/national
PROBABILITY (of exposure to impacts)	H	Definite/ Continuous
	M	Possible/ frequent
	L	Unlikely/ seldom

Table 3b: Impact Assessment

PART B: Assessment		
SEVERITY/NATURE	H	-
	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	-

PART B: Assessment		
	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.

Mitigation Measures

According to the specialist, 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 is 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.

Conclusion

Based on the specialist study conducted, the impact on the palaeontological heritage would be low, so as far as the palaeontological heritage is concerned, the project should be authorised.

6.7.4 Phase 1 Cultural and Heritage Impact Assessment

6.7.4 1 General

Cultural and Heritage

The study area is indicated as of high paleontological significance on the SAHRA Paleontological map (Refer to the map below), and an independent study (Bamford 2023) was commissioned for this aspect.

Figure 6.2: Paleontological sensitivity of the approximate study area

The yellow polygon, as indicated on the SAHRA Palaeontological sensitivity map.

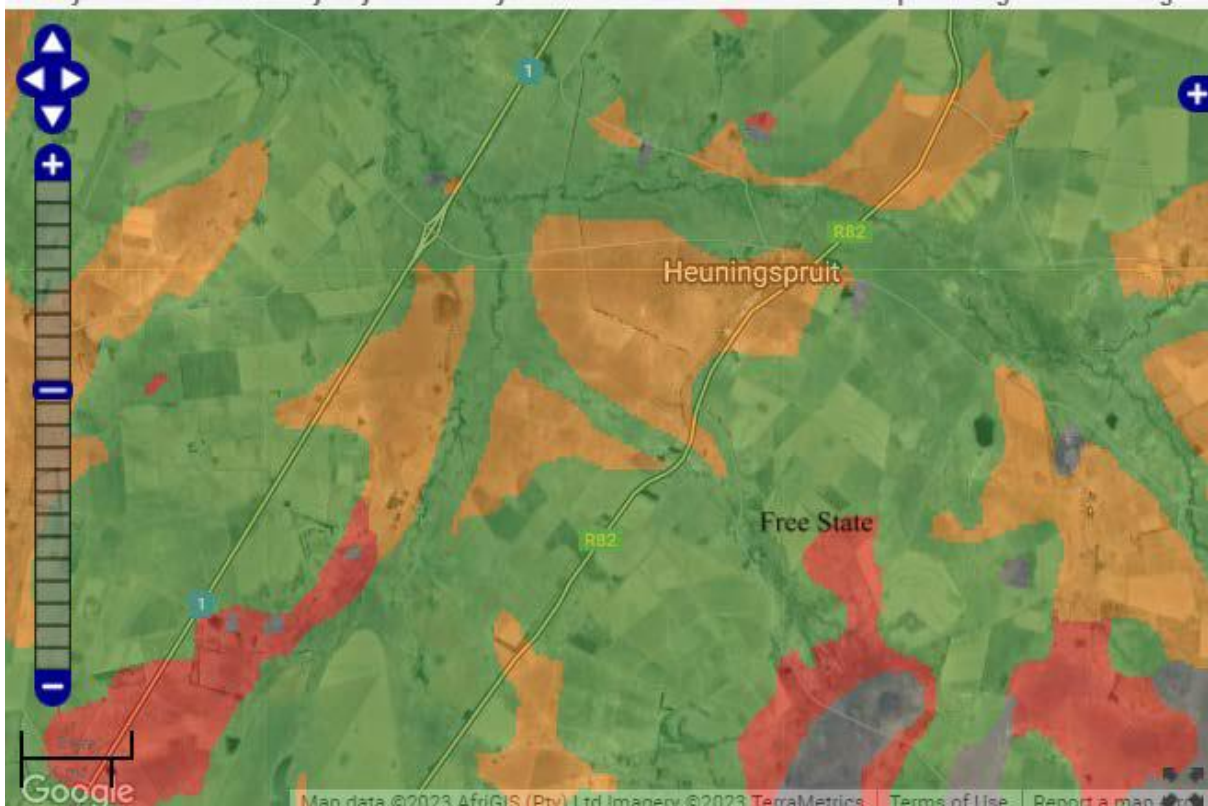


Table 6.7: Heritage Sensitivity Assessment Table

COLOUR	SENSITIVITY	REQUIRED ACTION
RED	VERY HIGH	Field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	Desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	Desktop study is required
BLUE	LOW	No palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	No palaeontological studies are required
WHITE/CLEAR	UNKNOWN	These areas will require a minimum of a desktop study. As more information comes

		to light, SAHRA will continue to populate the map
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6.7.4.2 Impact Description

The main cause of impacts to heritage resources is physical disturbance of the material itself and its context during removal of topsoil and vegetation as well as the excavations associated with the establishment of infrastructure. In terms of this project the main source of impacts will happen during the following activities.

- Establishment of new roads and upgrade of existing roads;
- Earthworks for temporary infrastructure including laydown areas;
- Visual impact of the PV Facility on the landscape and sense of place;
- Excavation and levelling of the PV facility footprint;
- Trenches for cables and erection of powerlines;
- Influx of people into the area that could impact on the burial site;
- Excavations during construction of the sub stations.

6.7.4.2 Impact Assessment

Impact Assessment Methodology

The criteria below are used to establish the impact rating on sites:

- The nature, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The extent, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- The duration, wherein it will be indicated whether:
 - The lifetime of the impact will be of a very short duration (0-1 years), assigned a score of 1;
 - The lifetime of the impact will be of a short duration (2-5 years), assigned a score of 2;
 - Medium-term (5-15 years), assigned a score of 3;
 - Long term (> 15 years), assigned a score of 4; or
 - Permanent, assigned a score of 5;

The magnitude, quantified on a scale from 0-10 where; 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is

low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.

The probability of occurrence, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1-5 where; 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures). The significance, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and the status, which will be described as either positive, negative or neutral.

- the degree to which the impact can be reversed.
- the degree to which the impact may cause irreplaceable loss of resources.
- the *degree* to which the impact can be mitigated.

The significance is calculated by combining the criteria in the following formula:

$$\mathbf{S=(E+D+M) P}$$

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The significance weightings for each potential impact are as follows:

- < 30 points: Low (i.e., where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e., where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- 60 points: High (i.e., where the impact must have an influence on the decision process to develop in the area).

6.8 Impact Assessment Table

Potential impact of the project. Nature: 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)	Low (2)
Probability	Not Probable (2)	Not Probable (1)
Significance	30 (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
Mitigation:		
<p>1. Regular monitoring of the development footprint by the ECO to implement the Chance Find Procedure for heritage and palaeontology resources (outlined in Section 10.2) in case heritage resources are uncovered during the course of construction;</p> <p>2. The recorded burial site should be indicated on development plans and avoided with a 30 m buffer;</p> <p>3. The final development layout should be subjected to a heritage walk down prior to construction with enough lead time to facilitate heritage mitigation if needed.</p>		

6.7.4.3 Residual Impacts:

Although surface sites can be avoided or mitigated, there is a chance that completely buried sites would still be impacted on, but this cannot be quantified.

6.7.4.4 Cumulative impacts:

The proposed project will have a low cumulative impact as no significant heritage resources will be adversely affected.

6.7.4.5 Mitigation Measures

The only recorded heritage resource consists of a burial site (Site 1- Map 8.1 of the Heritage Impact Study Report), that would be excluded from the PV footprint (refer to Section 8 of the specialists report). The assessment study states that the impact can be mitigated, using the following recommendations:

Recommended Mitigations:

- Regular monitoring of the development footprint by the ECO to implement the Chance Find Procedure for heritage and palaeontology resources (outlined in

Section 10.2 of the specialist report) in case heritage resources are uncovered during the course of construction.

- The recorded burial site should be indicated on development plans and avoided with a 30m buffer;
- The final development layout should be subjected to a heritage walk down prior to construction with enough lead time to facilitate heritage mitigation if needed.

6.7.5 Social Impact Assessment

General

The findings of the SIA undertaken for the proposed Heuningspruit 50 MW PV Solar Energy Facility indicate that the potential social benefits associated with the projects outweigh the potential negative social impacts. The proposed development also represents an investment in clean, renewable energy infrastructure, which, given the challenges created by climate change, represents a positive social benefit for society as a whole.

6.7.5.2 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.

Potential positive impacts

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

Potential negative impacts

- Impacts associated with the presence of construction workers on site;
- Increased risk of stock theft, poaching and damage to farm infrastructure associated with presence of construction workers on the site;
- Increased risk of veld fires associated with construction-related activities;
- Threat to safety and security of farmers associated with the presence of construction workers on site;
- Impact of heavy vehicles, including damage to roads, safety, noise and dust;
- Potential loss of grazing land associated with construction-related activities.

6.7.5.3 Impact Assessment

Direct, indirect and cumulative impacts of the above issues, as well as all other issues identified have been assessed in terms of the following criteria:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, where it will be indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score between 1 and 5 will be assigned as appropriate (with a score of 1 being low and a score of 5 being high).
- The **duration**, where it will be indicated whether:
 - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
 - the lifetime of the impact will be of a short duration (2–5 years) - assigned a score of 2;
 - medium-term (5–15 years) – assigned a score of 3;
 - long term (> 15 years) - assigned a score of 4; or
 - permanent - assigned a score of 5.

The **magnitude**, quantified on a scale from 0-10, where a score is assigned:

- 0 is small and will have no effect on the environment;
- 2 is minor and will not result in an impact on processes;
- 4 is low and will cause a slight impact on processes;
- 6 is moderate and will result in processes continuing but in a modified way;
- 8 is high (processes are altered to the extent that they temporarily cease); and
- 10 is very high and results in complete destruction of patterns and permanent cessation of processes.

The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale, and a score assigned:

- Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
- Assigned a score of 2 is improbable (some possibility, but low likelihood);
- Assigned a score of 3 is probable (distinct possibility);
- Assigned a score of 4 is highly probable (most likely); and
- Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).

The **significance**, which shall be determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.

- The **status**, which will be described as positive, negative or neutral.
- The degree to which the impact can be reversed.
- The degree to which the impact may cause irreplaceable loss of resources.
- The degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula:

$S=(E+D+M)P$; where

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance weightings** for each potential impact are as follows:

< 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),

30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),

> 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

A full assessment project related Social Impacts, is provided on page 34-59 of the Social Impact Assessment Study. Mitigation measures recommended will be part of the EIA Scoping and EMPr final reports.

6.7.5.4 Cumulative Impacts

One of the cumulative impacts raised in the report is on family and community relations that may, in some cases, persist for a long period of time. Also in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community. Mitigations in this regard will be part of the final EMPr of the project.

6.7.5.5 Mitigation Measures

Some of the recommended Mitigations have been provided below. More detail are found in page 60-79 of the Social impact Study . These mitigations cover both construction and operational phases and decommission.

- 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
- Minimum of 80% of the lowskilled workers are sourced from the local area;
- Where required, implement appropriate training and skills development programmes prior to the initiation of the construction phase to ensure that 80% target is met.
- Skills audit to be undertaken to determine training and skills development requirements;
- Develop a database of local BEE service providers and ensure that they are informed of tenders and job opportunities;
- Identify potential opportunities for local businesses

- Ensure that open fires on the site for cooking or heating are not allowed except in designated areas.
- Provide adequate fire fighting 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

6.7.5.6 Conclusion

According to the specialist , the findings of the SIA indicate that the development of the proposed Heuningspruit 50 MW PV Solar Energy Facility would create employment and business opportunities for locals during both the construction and operational phase of the project. The establishment of a Community Trust funded by revenue generated from the sale of energy will also create an opportunity to support local economic development in the area. This represents a social benefit for an area where there are limited opportunities.

The proposed development also represents an investment in clean, renewable energy infrastructure, which, given the challenges created by climate change, represents a positive social benefit for society as a whole. The establishment of the proposed Heuningspruit 50 MW PV Solar Energy Facility is therefore supported by the findings of the SIA.

6.7.6 Agricultural Impact Assessment

6.7.6.1 General

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.

6.7.6.2 Impact Description

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).

6.7.6.3 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 21-36). According to DR du Pisani's study results, all impacts can be mitigated with effective monitoring in place.

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

6.7.6.4 Mitigation Measures

Measures for inclusion in the draft environmental management programme for the Heuningspruit PV site are listed below.

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 erosion

Proper road construction and maintenance by applying 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 skills. 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.

6.7.6.5 Conclusion

Based on specialist, the development of Heuningspruit site is supported provided the proposed Environmental Management Program is followed. In his assessment DR du Pisani further said there are no agricultural sensitive areas present on the study area and are no agricultural infrastructure or lands present within the development footprint.

6.7.7 Overall Conclusion, based on the Draft EIAR

In summary, potential impacts associated with the Heuningspruit 50 MW PV Solar facility and storage, project are anticipated to mainly be of very low to moderate negative significance after mitigation, whilst some high positive socio economic impacts may be expected.

6.7.8 Cumulative Impacts

According to the DEFF screening report, there is no identified solar energy project proposals and other applicable projects, such as construction and upgrade of electricity generation, transmission or distribution facilities in the local area (i.e. within 30 km of the proposed development that are currently approved.

Generic cumulative effects associated with these similar types of projects would include inter alia:

- Impact on the avifauna
- The fragmentation and destruction of habitat.

**EIAR for the Proposed new Heuningspruit 50MW PV Solar Facility and Storage, Near Koppies,
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- Renewable energy contribution to the National
- The loss of good or potential agricultural land
- Jobs being created.
- Vegetation Removal
- An increase in stormwater runoff
- Issues with soil erosion
- A potential rise in water usage
- Social progress;
- Infrastructure Improvements



Chapter 7



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7. CONCLUSION

7.1 General:

Several factors define the environmental Assessment Process. Examples would include the characteristics of the receiving environment, the development choices considered, the methodology used in the evaluation process.

The following were the main findings of the Scoping and EIA Reporting phases for the proposed solar PV facility and storage, as well as related power line:

- Potential Significant environmental aspects and impact pertaining to the pre-construction phase, construction phase and operational phase of the Project were identified.
- Project alternatives for achieving the objectives of the proposed activity were considered.
- Interested and Affected Parties (I&AP'S) were identified and notified of the review of the draft EIAR
- Sensitive features of the environment that may be affected by the Project were identified and assessed.
- A Plan of Study was developed to explain the approach to be adopted during the EIAR Phase; and
- The scoping exercise set the priorities for the EIAR Phase.

7.2 OUTCOMES OF THE EIAR PHASE

The following key actions were taken throughout the proposed Project's EIA process:

- Potentially major effects on the Project's preconstruction, construction, and operating phases were identified, evaluated, and mitigation given;
- Alternatives for achieving the objectives of the proposed activity were considered, and the BPEO was identified. The "no-go" option is not supported when considering the implications of not implementing the Project. The outcomes of these tasks are captured accordingly.
- Specialized studies were carried out, and the results were incorporated into EIAR to comprehend the current state of the and sensitive features, to assess potential impacts establish corresponding mitigation measures, as well as to identify the preferred alternatives.

7.3 RECOMMENDATIONS BY AN EAP

There are no challenging environmental barriers preventing the construction of the proposed Heuningspruit 50MW PV Solar Energy Facility with Storage:

- The construction of the proposed solar energy facility should be implemented according to the proposed Draft EMPr to adequately mitigate and manage potential impacts associated with construction activities.
- The construction activities and relevant rehabilitation of disturbed areas should be monitored against the approved EMPr, the Environmental Authorisation and all other applicable environmental legislation.
- Relevant EMPr and EA conditions to be adhered to throughout the project phases, this include the Design, Pre-construction, Construction, Operational and Decommissioning Phases.
- Prior to construction, a walk-through survey should be done by a palaeontologist/or heritage specialist to conduct ground truthing.
- All relevant practical and reasonable mitigation measures detailed within this report and the specialist reports contained within Appendix K must be implemented as recommended.
- The implementation of this EMPr for all life cycle phases (Pre-construction, Construction, Operational and Decommission) of the proposed project is key in achieving the appropriate environmental management standards as detailed for this project.
- The final development area should be surveyed for species of conservation concern and suitable for search and rescue, which should be translocated prior to the commencement of construction.
- The approved EMPr, which is presented in Appendix G of the report, should be included in the contract with the contractors appointed to construct and manage the proposed solar energy project. The use of this EMPr will provide assurance and compliance to environmental legislation, laws, standards and best practices.
- Limited hazardous materials should be stored on site (In line with NEMWA).
- Any accidental chemical, fuel and oil spills that occur at the site during p construction phase should be cleaned up in the appropriate manner as related to the nature of the spill.
- There are several fences on the proposed site that may be interfered with. Contingency plans should be put in place to ensure that the farm owner can

still carry on with the day-to-day grazing management during and after the construction phase.

- Maintain natural vegetation in all places that are not part of the development footprint or servitude. This action will contribute to softening the power line's look in relation to its surroundings.
- Make sure that trash, debris, and abandoned building materials are stored properly (if not taken out every day) and periodically disposed of at authorised waste facilities.
- No un-controlled open excavations, holes, or pits should be left on the property for long periods of time since wildlife may fall in and get stuck.
- Any soil disturbance required for preconstruction exploration activities should be rectified after the appropriate measurements have been made.
- Following significant rainfall, large vehicles shouldn't enter the area since the saturated soils may harm the trucks, and there is a great likelihood that they may become stuck and disturb the soil.
- Using the best practises for the species in question, routine alien clearance should be carried out. Herbicide use should be avoided as much as feasible. The EMPr for the development should include a plan for managing aliens.
- The site's vegetation management should be as compatible with biodiversity as possible. Using herbicides to remove vegetation is not advised. When it comes to removing vegetation, livestock or manual labour (by hand) should be used.
- The following issues must be addressed in order to reduce the risk of soil erosion: (i) maintaining a healthy soil cover between the solar arrays, particularly a good grass cover; and (ii) using conservation techniques similar to conservation cultivation when planning the placement of the PV arrays, i.e. in strips of land on the contour of the land, with buffer zones of grass between the development strips and the channelling of runoff water from the development strip.
- The following mitigation measures should also be implemented. Maintenance of erosion control measures.
- Development and implementation of a storm water management plan.
- On-going maintenance of the facility to minimise the potential for visual impacts.
- On-going monitoring of the site to detect and restrict the spread of alien plant species. Training, skills development, and the use of local labour.

- Restore any impacted sites, construction zones, roads, slopes, etc. as soon as the project is complete. If necessary, an ecologist should be called to assist with or offer insight on the needs for rehabilitation.
- Roads must be kept in good condition to prevent erosion and to control dust, and places that have undergone restoration must be checked for failure. Corrective measures must be put into place as needed.
- All connected infrastructure that is not needed for the site's or servitude's post-rehabilitation use should be removed after the power line has reached the end of its useful life, and all damaged areas should be properly restored. To provide advice on the requirements for rehabilitation, an ecologist should be consulted.
- As needed (i.e. whenever dust is visible), use approved dust suppression techniques to reduce and regulate construction dust.
- Before beginning construction activities, an application for all further necessary permits (such as those pertaining to protected plant or tree species) must be made to the appropriate authority.
- The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) requires that all proclaimed alien plants be recognised and managed in accordance with its provisions. It is advised that a monitoring programme be put in place in this regard. Operation Phase: To minimise any environmental consequences, the mitigation and management actions previously described in this Basic Assessment Report should be put into place.

7.4 ENVIRONMENTAL IMPACT STATEMENT

This section provides an overview of the environmental studies and suggestions provided for the proposed solar energy installation. This is done by using the information received as part of the EIAR process and the knowledge the environmental consultants gained during the process to provide an informed assessment of the environmental consequences related to the proposed project.

The following conclusions can be drawn from the studies undertaken within the Scoping and the EIAR Phases (**Alternative 1-Preferred Option**).

Ecology/ Terrestrial Biodiversity

The overall impact on ecology, as a result of the construction and operation of the proposed facility is likely to be of low to medium significance (in terms of impacts associated with Listed Activities GN R325 Activity 1, GN R325 Activity 1,14,15, GN R327 Activity 11, 12 (x) and (xii), 19 (i), 24 (ii), 28(ii)). The site for the proposed Heuningspruit 50 MW PV Solar Facility is not considered highly sensitive from an ecological perspective (Refer to sensitivity map). The proposed development areas have been transformed in the past and although there are some relatively more sensitive habitats in the vicinity, these are of limited extent and are outside of the development footprint of the current development layout for Heuningspruit Project. Given the location and extent of the proposed development, there are not likely to be significant impacts on broad-scale ecological processes such as disruption of landscape connectivity. According to the study conducted there are no listed plant species identified on site and the abundance of listed fauna in the area are not red data species, and the impact is very low.

Aquatic Biodiversity

The overall impact on aquatic biodiversity is likely to be of a medium to low significance (in terms of impacts associated with Listed Activities GN R325 Activity 1, GN R325 Activity 1,14,15, GN R327 Activity 11, 12 (x) and (xii), 19 (i), 24 (ii), 28(ii)), during both the construction, operational and decommissioning phases with the implementation of the proposed mitigation measures. The solar arrays which were planned to be located on the Southern Part of the earmarked site had to be re-located to avoid a highly sensitive flood line area (refer to Appendix K2 for details).

Agricultural/ Soils Resources

The proposed activity will have a low to medium impact on soils in the immediate and surrounding areas (in terms of impacts associated with Listed Activities GN R325 Activity 1, GN R325 Activity 1,14,15, GN R327 Activity 11, 12 (x) and (xii), 19 (i), 24 (ii), 28(ii)). Implementation and management of proposed mitigation measures will minimise loss of topsoil, prevent contamination of topsoil and stockpiled soil and minimise overall soil erosion. In terms of agricultural potential, the study area is categorised as being "marginal potential arable land" and considered not suitable for cultivation. Impacts on agricultural potential will therefore be low.

Heritage and Cultural Resources

The impacts to heritage resources as a result of the construction and operation of the proposed development are considered to be low significance (in terms of impacts associated with Listed Activities GN R325 Activity 1, GN R325 Activity 1,14,15, GN R327 Activity 11, 12 (x) and (xii), 19 (i), 24 (ii), 28(ii)). The only heritage remains within the area consist of an informal cemetery (Site 1) which was documented outside of the proposed development area and no direct impact is foreseen on the site. However,

some recommendations are made to protect the site from accidental damage during the construction phase of the project and are discussed below. Management measures would need to be considered to avoid damage to the informal cemetery. Damage can be caused by construction vehicles unknowingly damaging the graves. To prevent this, the area should be demarcated with a fence and all construction activities should be located 30 meters from the boundary of the graveyard.

Palaeontological

The effects of the construction of the power generation facility will be restricted to the Volkrust Formation and Quaternary alluvium cover. It is interpreted herein that the effects of the construction of the project will in general be restricted to the immediate land surface and the upper few metres of the geological substrate. Any fossil materials that remain undiscovered beneath infrastructure elements after the construction of the project will only be negatively affected in so far as they will be unavailable for scientific study for the life expectancy of the infrastructural elements that comprise the project (e.g., a minimum of 20-25 years). The Volkrust Formation contains both plant macrofossils of the Glossopteris Flora, insect faunas, the bivalve *Megadesmus* and trace fossil assemblages that are potentially highly significant to the cultural and scientific heritage of South Africa. However, the number of fossil sites reported from the formation is not numerous, as such, the risk of a negative impact is low (in terms of impacts associated with Listed Activities GN R325 Activity 1, GN R325 Activity 1,14,15, GN R327 Activity 11, 12 (x) and (xii), 19 (i), 24 (ii), 28(ii), but the significance of any negative impact on the fossil assemblages could potentially be high.

Visual Impact Assessment

The results of the Visual Impact Assessment for the proposed Heuningspruit Facility therefore found that the proposed activity will have a medium to high (in terms of impacts associated with Listed Activities GN R325 Activity 1, GN R325 Activity 1,14,15, GN R327 Activity 11, 12 (x) and (xii), 19 (i), 24 (ii), 28(ii), impact from Key Observation Points identified in the foreground (1km). The project site has quite a large zone of visual influence, judging from the viewsheds generated. However, the viewsheds generated are compiled considering the contours of the area. The project site and the surrounding area are relatively flat. As a result, the initial viewshed created from the highest point on the project site does give the impression that the site is highly visible from its immediate surroundings.

The on-site verification from the selected Key Observation Points and the viewsheds generated from the latter points, however, indicated that the project site is not very distinguishable from most observation points. This is perhaps with the exception of the observation points in the foreground to the project site. This is mainly due to the flatness of the surrounding area. Trees, buildings or any other obstacle in the landscape has maximum effect in obscuring views from any point. The proposed mitigation measures will likewise reduce any significant impact to be a localised impact. Additionally, the

large silos that tower approx. 30m behind the south of the site. The aesthetics of the area are not being significantly altered.

Social Impact & Socio-Economic

The overall social and socio-economic impact in terms of positive and negative impacts is likely to be of a medium to low significance (in terms of impacts associated with Listed Activities GN R325 Activity 1, GN R325 Activity 1,14,15, GN R327 Activity 11, 12 (x) and (xii), 19 (i), 24 (ii), 28(ii), during both the construction and operational phases with the implementation of enhancement/mitigation measures. The potential negative impacts associated with the construction phase are typical of construction-related activities and are expected to respond to the mitigation measures proposed. Issues identified include the influx of outside workers, whether locals would be employable during the construction phase of the project as on-site skills development and training would be imperative to ensure that the benefits of employment could be maximised, the intrusion impacts associated with construction, and impacts on the daily living and movement patterns of neighbouring landowners and road users.

The possible job creation and skills development, although limited in extent, are regarded as a significant positive injection into the area. The project would result in significant positive economic spin-offs for the local area and region primarily because of the labour-intensive operational practices that would be associated with it.

Based on the findings of the studies undertaken, in terms of environmental constraints and opportunities identified through the Scoping and EIAR processes, no environmental fatal flaws were identified to be associated with the establishment of the proposed Heuningspruit PV1 / PV2 Solar Energy Facility and associated infrastructures. The significance levels of the majority of identified negative impacts can generally be reduced to acceptable levels by implementing the recommended mitigation measures. Therefore, it is recommended that the project should be authorised. Although, several issues requiring mitigation have been identified and highlighted in chapter 6, the impact assessment section of the report. In response to these potential environmental impacts, environmental specifications for the management of these issues / impacts are clearly detailed within the draft Environmental Management Programme (EMPr) included in this report as Appendix G.

No Go Alternative (Compulsory)

Also referred to as the 'Do nothing' option, this refers to Contrarians Capital (Pty) Ltd not constructing the proposed solar energy facility on the identified site. In this scenario the potential positive and negative environmental and social impacts as described in this EIAR phase will not occur and the status quo will be maintained. Should the project not proceed, the contribution of approximately 50 MW from this project towards the Government target for renewable energy will not be realised.

As a result, the potential local and regional socio-economic and environmental benefits expected to be associated with the proposed project would not be realised.

These include:

Enhanced energy security: The South African electricity crisis currently underway serves as a stark reminder of the important role renewable energy may play in power augmentation. Additionally, given that renewable energy sources may frequently be implemented and decentralized close to consumers, they have the chance to enhance grid stability and supply quality while lowering costly transmission and distribution losses.

Exploitation of South Africa's significant renewable energy resource: At present, valuable national resources including biomass by-products, solar radiation and wind power remain largely unexploited. The use of these energy flows will strengthen energy security through the development of a diverse energy portfolio.

Support for international agreements: By effectively implementing the renewable energy, RSA can show its commitment to its obligations under Kyoto-Protocol and to maintain its position as a major actor in the world at large.

* Pollution reduction: The releases of by-products through the burning of fossil fuels for electricity generation have a particularly hazardous impact on human health and contribute to ecosystem degradation.

* Employment creation: The sale, development, installation, maintenance, and management of renewable energy facilities have significant potential for job creation in South Africa.

* Acceptability to society: Renewable energy offers a number of tangible benefits to society including reduced pollution concerns, improved human, and ecosystem health.

* Support to a new industry sector: The development of renewable energy offers the opportunity to establish a new industry within the South African economy.

* Support to local community: Since the local community will acquire some ownership in the facility, some of the revenue generated by the facility will be utilised for upliftment of the local community. Within a policy framework, the development of renewable energy in South Africa is supported by the White Paper on Renewable Energy (November 2003), which has set a target of 17MW renewable energy contributions to final energy generation mix by 2030. The target is to be achieved primarily through the development of solar, biomass, solar and small-scale hydropower.

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 Solar Energy Facility and the benefits associated with the proposed community Trust. This could represent a negative social cost. The No-development option is therefore not a suitable option for this project, given the negative impacts related to it.



Chapter 8



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